Supplementary Online Appendix
Exploring Recipient Preferences and Allocation Mechanisms in the Distribution of Development Aid
Jeremy Shapiro
S1. Program Descriptions

- **Health: Bed net distribution.** Malaria is a serious threat to life, especially in tropical climates as in Kenya. Many people lack access to treated bed nets, and this results in many deaths, especially of young children under the age of five. To combat malaria, many governments and non-governmental organizations (NGOs) provide households with treated bed nets as a simple means of preventing malaria. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving an insecticide-treated bed net?”

- **Finance: Technical assistance.** Lack of access to adequate financial information prevents many people from making the right decisions on planning and spending their finances as well as from accessing financial resources. For this reason, some NGOs and government bodies at times provide financial technical assistance to aid individuals in implementing effective financial practices. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as having the opportunity to attend a training session on financial management and services (such as for borrowing and saving)? Note that the training would be for you and 20 other individuals in one class.”

- **Water: Water supply—water tank or borehole.** Difficulties in accessing a water supply pose social and economic barriers to many low-income households. Providing households with access to sources of water such as water tanks or boreholes alleviates the efforts that many people go through to access sufficient water. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving an easily accessible water source such as a water tank or a borehole in your community? Note that the water source would be shared by you and other members in your community.”

- **Agricultural Inputs.** Agricultural inputs such as fertilizers, pesticides, agents, and additives account for big differences between successful and unsuccessful crop yields. Unfortunately, many smallholder farmers do not have the money or the information required to access such inputs. Some NGOs aim to solve this problem by providing small-scale farmers with the necessary inputs that these farmers require to meet their crops’ needs. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving a 50 kilogram bag of fertilizer?”

- **Energy: M-Kopa household solar power supply.** Around the world, limited access to electricity has kept many people stuck in lower standards of living. For example, lack of light can prevent children from studying. Solar energy is an alternative to traditional sources of electricity and is sustainable because it is wholly powered by the sun’s rays. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving a solar power system that allows you to have a rechargeable lamp and provide power to a cell phone?”

- **Education: Weekly tutoring for schoolchildren.** Many schoolchildren in Kenya experience slow academic progress due to high classroom numbers, low or inadequate staffing, and lack of basic materials to support them in their educational growth. Some NGOs provide remedial tutoring lessons to children in schools that lack the resources to sufficiently support their educational growth. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving weekly tutoring sessions for one of your children for one school term?”

- **Agricultural Extensions.** Smallholder farmers account for 70 percent of Kenya’s agricultural yield. One of the challenges that small-scale farmers face in optimizing their yield is that they lack the information necessary to grow crops with changing agricultural research, technologies, and weather patterns. Some NGOs and government programs run agricultural extension programs to help smallholder farmers by increasing their access to information on useful agricultural practices. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving agricultural extension education over the course of a planting season?”
• **Education: Teacher training.** A challenge facing the public education system in Kenya is the quality of training that teachers receive. This is worsened by funding constraints and the difficulties experienced by teachers in having to deal with inadequate resources. A digital tool has been developed that helps teachers to effectively incorporate information and computer technology (ICT) learning mechanisms into their existing curriculum through a short-term training course. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as having this training course provided to the teacher of one class your children attend? Note that the training would be for the teacher, benefiting your child and the rest of the class.”

• **Health: Condom distribution.** One of the most common preventive practices against the spread of HIV/AIDS is the use of condoms for safe sex. In very low-income areas, the cost of purchasing condoms is considered quite high relative to household spending budgets. Many NGOs in Kenya freely distribute condoms in order to curb the spread of HIV infection in low-income communities. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving a box of 50 condoms?”

• **Water: Hygiene/WASH supplies.** Delivering soap, waterguard, and hygiene supplies to households. Besides inadequate water supply, difficulty in accessing supplies such as soap and waterguard for basic hygiene practices is a major hinderance to many low-income households in Kenya. Insufficient hygiene practices can lead to certain avoidable hygiene-related diseases and heightened social stigma. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving two months’ supply of basic hygiene supplies (soap and waterguard)?”

• **Education: Inputs for ICT—Providing computers to schools.** A major facilitating factor for growth and development is technology. One of the initiatives that the Kenyan government has proposed in order to ensure that the population is up to date in knowledge of ICT is to provide computers to primary and secondary schools around the country. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as having computers provided to the government-run school in your community? Note that the computer would be for the class, benefiting your child and the rest of the class.”

• **Health: Family planning and reproductive health services.** Voucher for a clinic offering these services, and transportation if needed. One of the challenges that some families face, apart from the cost of basic family planning methods, is limited access to family planning and reproductive health services. Lack of information and knowledge is a major barrier to families taking up such services. Various NGOs work to provide reproductive health services to communities that cannot easily access them. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving one free visit to a family planning clinic to access family planning services, with transportation if required?”

• **Water: Hygiene/WASH education and workshops.** Around the world, 663 million people lack access to safe water, which results in many deaths from diseases such as diarrhea, cholera, typhoid, and worm infestations. To combat this problem, NGOs engage in providing increased access to safe water and teaching people safe water practices. Receiving hygiene education can change people’s everyday practices to more reliable ways of maintaining safe water. Potential recipients were asked, “How much cash, that you could spend however you thought best, would make you just as well off as receiving a half-day training on safe water practices? Note that the training would be for you and 20 other individuals in one class.”
S2. Elicitation Methods

To find an accurate, efficient, and low-cost method for measuring recipients’ valuations of aid programs, a variety of elicitation techniques were tested. Respondents were asked about their valuation of each of the aforementioned interventions but in different ways. These elicitation techniques, which were randomized across respondents, can be categorized as follows.

- **Hypothetical (H):** Respondents are administered 18 questions asking how much cash would make them as well off as each of the aforementioned aid programs, with no mention of receiving either. \((N = 136)\)

- **Becker-DeGroot-Marschak method with example and probabilistic payment (BDMe):** Respondents are administered 18 questions asking how much cash would make them as well off as each of the aforementioned aid programs. Respondents are told that the particular program to which their choice will actually be applicable is determined by lottery. The Becker-DeGroot-Marschak method (BDM)\(^1\) is explained and an example is provided. \((N = 142)\)

- **Becker-DeGroot-Marschak method on faith and probabilistic payment (BDMf):** Respondents are administered 18 questions asking how much cash would make them as well off as each of the aforementioned aid programs. Respondents are told that the particular program to which their choice will actually be applicable is determined by lottery. Respondents are also told that they will receive either cash or the program by a lottery designed by scientists in such a way that it is always in their best interest to report their true valuation. \((N = 133)\)

- **Multiple Price List (MPL):** Respondents are administered 18 questions asking them to choose between a program and a given amount of cash. If they choose the program, they are asked whether they would make the same choice for a larger amount of cash. This continues until the respondent selects the cash or until an upper bound of cash is reached. Respondents are told that the particular program to which their choice will actually be applicable is determined by lottery. \((N = 117)\)

- **Certainty (C):** Respondents are administered 18 questions asking them to choose between a program and a given amount of cash. When making the choice about the final program, respondents are told that this question (randomly selected *ex ante* to be WASH supplies) is the one that will determine their award. Thus, respondents have certainty that they will receive this program or cash when asked how much cash would make them as well off as the program. \((N = 265, \text{cross-randomized among the other elicitation methods})\)

The form of the questions asked of respondents in each elicitation method is as follows.

1. **Hypothetical:** I’d like to ask you about various programs that are often provided by NGOs, government, or other aid organizations. For each program, I will describe the program which might provide goods or services to you, and then I’d like you to tell me how much money, if you could have it as cash to spend however you thought best, would make you just as well off as receiving the program I describe. Note this is what you would prefer. For example, I might say, “Some NGOs provide school books, how much cash would make you just as well off as receiving school books from an NGO?” If you thought school books are worth 1,000 shillings to you, you would say “one thousand.”
   - Do you understand? → IF RESPONDENT SAYS NO, PLEASE EXPLAIN TO THE RESPONDENT AGAIN.
   - DESCRIBE ≪PROGRAM≫ → How much cash, that you could spend however you thought best, would make you just as well off as receiving ≪PROGRAM≫?

2. **BDM with example & probabilistic payment:** I’d like to ask you about various programs that are often provided by NGOs, government, or other aid organizations. For each program, I will describe the program which might provide goods or services to you, and then I’d like you to tell me how much

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money, if you could have it as cash to spend however you thought best, would make you just as well off as receiving the program I describe. Note this is what you would prefer. For example, I might say, “Some NGOs provide school books, how much cash would make you just as well off as receiving school books from an NGO?” If you thought school books are worth 1,000 shillings to you, you would say “one thousand.” For one of the questions you will actually receive either the program or an amount of cash, so these choices matter and you should make sure to think carefully and give the most accurate answer. First, we will pick one of the programs by lottery; then you will either get that program or an amount of cash. To determine if you get the program or the cash, we will choose a quantity of shillings randomly; if that number of shillings is higher than the amount of cash you said would make you just as well off as the program, you will get the number of shillings which we chose randomly. If the number we choose is less than the amount you said, you will get the program. Let’s do an example: imagine I asked about school books and you said they were worth 1,000 shillings to you. The random number drawn is ≪XYZ≫.

- If XYZ > 1,000 → Since the number is more than the number you said, you will get ≪XYZ≫, which is worth more to you than the books. Imagine I had drawn 500; then you would have received the books, which are worth more to you than 500. So if you give the exact value that makes you just as well off as the books, you always get the thing that is most valuable.

- If XYZ < 1,000 → Since the number is less than the number you said, you will get the books, which are worth more to you than ≪XYZ≫. Imagine I had drawn 1,500; then you would have received 1,500 shillings in cash, which is worth more to you than the books. So if you give the exact value that makes you just as well off as the books, you always get the thing that is most valuable.

- Think about it this way: imagine I asked about school books and you said they were worth 1,000 shillings to you. Imagine you gave me 1,000 shillings and I went to the market. If the price of the books was more than 1,000 I would give you the books even though you only gave me 1,000. If the price of the books is less than 1,000, you wouldn’t get the books but I would return your 1,000 and give you some additional money as well. So you always get the thing that is most valuable to you as long as you say the exact amount of cash that makes you just as well off as the school books.

- Do you understand? → If respondent says no, please explain to the respondent again.

- Describe ≪program≫ → How much cash, that you could spend however you thought best, would make you just as well off as receiving ≪program≫?

(3) BDM with example & certain payment: same as above but respondent is informed that their choice will be valid for one program, randomly selected to be wash supplies.

- Our lottery has selected “Water: Hygiene/WASH supplies—delivering soap, waterguard, and hygiene supplies to households” to be the one where you receive either the program or an amount of cash. So please think carefully and tell me the exact amount of money, if you could have it as cash to spend however you thought best, that would make you just as well off as receiving this program. Apart from water, accessibility to supplies for basic hygiene practices such as soap, waterguard, and other necessary hygiene supplies is a major hindrance to many low-income households around the country. This can lead to insufficient hygiene practices that can lead to certain avoidable hygiene related diseases and heightened social stigma. How much cash, that you could spend however you thought best, would make you just as well off as receiving two months’ supply of basic hygienic supplies (soap and waterguard)?

(4) BDM on faith & probabilistic payment: I’d like to ask you about various programs that are often provided by NGOs, government, or other aid organizations. For each program, I will describe the program which might provide goods or services to you, and then I’d like you to tell me how much money, if you could have it as cash to spend however you thought best, would make you just as well off as receiving the program I describe. Note this is what you would prefer. For example, I might say, “Some NGOs provide school books, how much cash would make you just as well off as receiving
school books from an NGO?” If you thought school books are worth 1,000 shillings to you, you would say “one thousand.” For one of the questions you will actually receive either the program or an amount of cash, so these choices matter and you should make sure to think carefully and give the most accurate answer. First, we will pick one of the programs by lottery; then you will either get that program or an amount of cash. To determine if you get the program or the cash, we also use a lottery that makes sure you always get the thing that is most valuable to you as long as you say the exact amount of cash that makes you just as well off as the program. This lottery is carefully designed by scientists in such a way that it is always in your best interest to tell us your true valuation. So please think carefully and tell me the exact amount of money, if you could have it as cash to spend however you thought best, that would make you just as well off as receiving the program.

• Do you understand? → IF RESPONDENT SAYS NO, PLEASE EXPLAIN TO THE RESPONDENT AGAIN.
• DESCRIBE ≪PROGRAM≫ → How much cash, that you could spend however you thought best, would make you just as well off as receiving ≪PROGRAM≫?

(5) BDM on faith & certain payment: SAME AS ABOVE BUT RESPONDENT IS INFORMED THAT THEIR CHOICE WILL BE VALID FOR ONE PROGRAM, RANDOMLY SELECTED TO BE WASH SUPPLIES.

• Our lottery has selected “Water: Hygiene/WASH supplies—delivering soap, waterguard, and hygiene supplies to households” to be the one where you receive either the program or an amount of cash. So please think carefully and tell me the exact amount of money, if you could have it as cash to spend however you thought best, that would make you just as well off as receiving this program. Apart from water, accessibility to supplies for basic hygiene practices such as soap, waterguard, and other necessary hygiene supplies is a major hindrance to many low-income households around the country. This can lead to insufficient hygiene practices that can lead to certain avoidable hygiene related diseases and heightened social stigma. How much cash, that you could spend however you thought best, would make you just as well off as receiving two months’ supply of basic hygienic supplies (soap and waterguard)?

(6) Multiple price list (MPL): I’d like to ask you about various programs that are often provided by NGOs, government, or other aid organizations For each program, I will describe the program which might provide goods or services to you, and then I’d like you to tell me how much money, if you could have it as cash to spend however you thought best, would make you just as well off as receiving the program I describe. How we’ll do this is: I will ask you about various amounts of shillings, and whether you would prefer the program or that amount of shillings. For one of the questions you will actually receive either the program or an amount of cash, so these choices matter and you should make sure to think carefully and give the most accurate answer. First, we will pick one of the programs by lottery; then you will either get that program or an amount of cash. To determine if you get the program or the cash, we also use a lottery to pick one of the shilling amounts you mentioned. If you said you preferred the program to that amount, you will get the program. If you said you preferred that amount of shillings, you would get cash. For example, I might say, “Some NGOs provide school books. Would you rather have 500 shillings or books?” Suppose you said you would prefer books. Then I asked, “Would you rather have 1,000 shillings or books?” and you said you would like 1,000 shillings. If we randomly picked 500, you would get books since you said they were worth more than 500 shillings. If we randomly picked 1,000, you would get 1,000 shillings, since you said that was more valuable than books.

• Do you understand? → IF RESPONDENT SAYS NO, PLEASE EXPLAIN TO THE RESPONDENT AGAIN.
• DESCRIBE ≪PROGRAM≫ → How much cash, that you could spend however you thought best, would make you just as well off as receiving ≪PROGRAM≫?
• DESCRIBE ≪PROGRAM≫ → Would you prefer to receive this program or would you rather receive ≪LOWEST AMOUNT OF MPL≫ shillings to spend in a way you thought best?
• IF RESPONDENT CHOOSES PROGRAM → Would you prefer to receive this program or would you rather receive ≪NEXT LOWEST AMOUNT OF MPL≫ shillings to spend in a way you thought best?
• CONTINUE ASKING FOR HIGHER AMOUNTS TILL CASH IS CHOSEN OR HIGHEST AMOUNT IN MPL IS REACHED.
## Table S3.1. Intervention Cost Estimates

<table>
<thead>
<tr>
<th>No.</th>
<th>Intervention</th>
<th>Description</th>
<th>Sample</th>
<th>Cost (KES)</th>
<th>Cost rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vocation: Computer skills training</td>
<td>Vocational training course in computer skills</td>
<td>Urban; Rural</td>
<td>10,000</td>
<td>A benchmark from external providers is used, based on a survey of vocational skills training centers in Kibera; e.g., PCEA Kibera Emmanuel Technical Training Centre charges 10,000 KES for a 3-month computer skills course.</td>
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<td>3</td>
<td>Water: WASH education and workshops</td>
<td>Group-based training session on safe water practices</td>
<td>Urban; Rural</td>
<td>1,500</td>
<td>For consistency, the same cost as financial education and agricultural extension training is used.</td>
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<td>4</td>
<td>Water: WASH supplies</td>
<td>Waterguard and two months’ supply of soap</td>
<td>Urban; Rural</td>
<td>1,032</td>
<td>The cost of this intervention was estimated as the cost of Waterguard (60 KES) plus four 200 g bars of soap costing 200 KES each, for a total cost of 860 KES of WASH supplies, to which a 20 percent overhead was then added.</td>
</tr>
<tr>
<td>5</td>
<td>Health: Family planning services</td>
<td>One visit to a family planning clinic to receive services, plus cost of transportation to clinic</td>
<td>Urban; Rural</td>
<td>5,200</td>
<td>A benchmark from external providers is used; e.g., Vipawa health clinic in Kibera charges 5000 KES for one visit that includes injectable contraceptives; transportation costs a maximum of 200 KES.</td>
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<td>6</td>
<td>Health: Condom distribution</td>
<td>A box of 100 condoms</td>
<td>Urban</td>
<td>1,000</td>
<td>A benchmark from external providers is used: Mann Global Health estimates the cost-recovery price per condom at 10 KSH (<a href="https://aidsfree.usaid.gov/sites/default/files/mgh_condom_cs_kenya.pdf">https://aidsfree.usaid.gov/sites/default/files/mgh_condom_cs_kenya.pdf</a>).</td>
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<td>7</td>
<td>Health: Condom distribution</td>
<td>A box of 50 condoms</td>
<td>Urban; Rural</td>
<td>500</td>
<td>A benchmark from external providers is used: Mann Global Health estimates the cost-recovery price per condom at 10 KSH (<a href="https://aidsfree.usaid.gov/sites/default/files/mgh_condom_cs_kenya.pdf">https://aidsfree.usaid.gov/sites/default/files/mgh_condom_cs_kenya.pdf</a>).</td>
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<td>8</td>
<td>Health: Bed net distribution</td>
<td>An insecticide treated bed net</td>
<td>Urban; Rural</td>
<td>240</td>
<td>A benchmark from external providers is used: Against Malaria Foundation indicates that a net costs $2, plus non-net expenses of approximately 20 percent (<a href="https://www.againstmalaria.com/FinancialInformation.aspx">https://www.againstmalaria.com/FinancialInformation.aspx</a>).</td>
</tr>
<tr>
<td>No.</td>
<td>Intervention</td>
<td>Description</td>
<td>Sample</td>
<td>Cost (KES)</td>
<td>Cost rationale</td>
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<tr>
<td>9</td>
<td>Education: Teacher training</td>
<td>Training course for school teachers</td>
<td>Urban; Rural</td>
<td>2,250</td>
<td>A benchmark from external providers is used: Kenya Technical Training College’s training course for instructors costs 30,000 KES; the course runs for three months, so 50 percent of a teacher’s salary (about 25,000 KES a month) for that time period is added. (<a href="https://www.tessabold.com/uploads/7/0/1/0/70101685/2018-08-09_ke_rct.pdf">https://www.tessabold.com/uploads/7/0/1/0/70101685/2018-08-09_ke_rct.pdf</a>, <a href="https://pubs.aeaweb.org/doi/pdf/10.1257/jep.31.4.185">https://pubs.aeaweb.org/doi/pdf/10.1257/jep.31.4.185</a>). A class size of 30 is assumed.</td>
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<td>10</td>
<td>Education: Inputs for ICT</td>
<td>Computers for government-run school in community</td>
<td>Urban; Rural</td>
<td></td>
<td>The cost of a basic desktop computer is estimated at 50,000 KES, and the cost of internet connection at 5,000 KSH a month. A 20 percent overhead for maintenance, etc., is added on. One computer per 15 students is assumed.</td>
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<td>11</td>
<td>Education: Tutoring</td>
<td>Weekly tutoring sessions for one child for one school term</td>
<td>Urban; Rural</td>
<td>8,400</td>
<td>A benchmark from external providers is used: KTTC reports that one tutoring session costs 700 KES; for 12 weekly sessions (one school term) the total cost is 8,400 KES. This is consistent with posted rates on classified advertisements (<a href="https://www.pigiame.co.ke/education-tuition-training?p=2">https://www.pigiame.co.ke/education-tuition-training?p=2</a>).</td>
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<td>12</td>
<td>Finance: Technical assistance</td>
<td>A training session on financial management</td>
<td>Urban; Rural</td>
<td>1,500</td>
<td>A benchmark from external providers is used: the cost estimate from a study of financial literacy training in the Dominican Republic (<a href="https://dspace.mit.edu/openaccess-disseminate/1721.1/88086">https://dspace.mit.edu/openaccess-disseminate/1721.1/88086</a>) was converted to KSH using PPP conversion factors; this is also in line with the comparable agricultural extension training cost.</td>
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<td>13</td>
<td>Energy: Household solar light supply</td>
<td>Solar power system to recharge lamp and cell phone</td>
<td>Urban; Rural</td>
<td>21,750</td>
<td>A benchmark from external providers is used: according to <a href="http://www.m-kopa.com/products/">http://www.m-kopa.com/products/</a>, a basic M-KOPA Solar Home System costs a 3,500 KES deposit plus daily payments of 50 KES for a year.</td>
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<td>14</td>
<td>Agriculture: Inputs</td>
<td>One 50 kg bag of fertilizer</td>
<td>Rural</td>
<td>3,732</td>
<td>One bag of 50 kg Mavuno planting (Makueni) fertilizer for green leafy vegetables costs 3,110 KES, to which a 20 percent overhead is added.</td>
</tr>
<tr>
<td>15</td>
<td>Agriculture: Inputs</td>
<td>One 50 kg bag of fertilizer</td>
<td>Rural</td>
<td>3,036</td>
<td>One bag of 25 kg Mavuno DAP planting (Nakuru) fertilizer for maize costs 1,477 KES, and one bag of 25 kg Mavuno CAN top-dressing fertilizer for maize costs 1,053 KES, to which a 20 percent overhead is added.</td>
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<td>16</td>
<td>Agriculture: Extension</td>
<td>Agricultural extension courses over one cropping season</td>
<td>Rural</td>
<td>1,500</td>
<td>Based on Busara’s experience delivering such a program, the estimated cost for six extension sessions delivered over one cropping season is 30,000 KES. With 20 people per group, the cost per recipient is 1,500 KES.</td>
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**S4. Supplemental Figures**

**Figure S4.1. Recipient Valuation**

*Source: Author’s analysis based on own data.*

*Note: Box plots display the distribution of recipient value (in Kenyan shillings) spanning the interquartile range for each intervention. The white line inside each box represents the median valuation and the left and right ends of each box represent the lower and upper quartiles; the dot indicates the estimated cost of the intervention.*
Figure S4.2. Ratio of Recipient Valuation to Total Intervention Cost by Program Type

Source: Author’s analysis based on own data.
Note: Box plots display the distribution of the recipient average value-to-cost ratio (using the total, not per-person, cost of the intervention) for interventions of three specific types: private goods, private services, and local public goods. The white line inside each box represents the median valuation and the left and right ends of each box represent the lower and upper quartiles.