

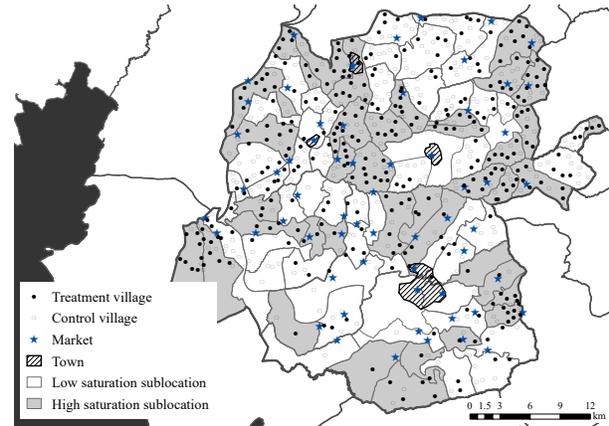
A Appendix exhibits

Figure A.1: Map of study area

Panel A: Location of the study area in Kenya

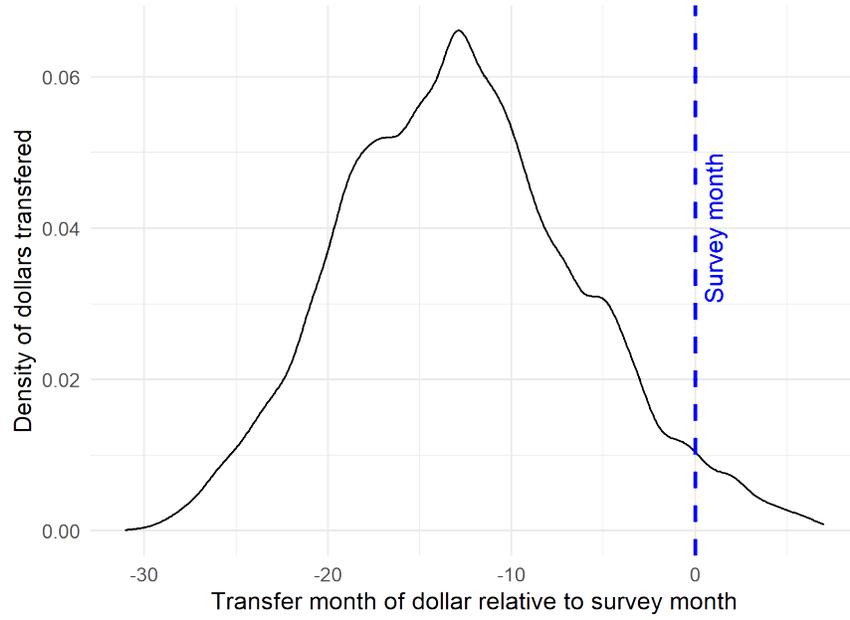


Panel B: Mapping study villages



Notes: In Panel A, Siaya County, the county in which the study takes place, is represented by the shaded area. Panel B plots the location of study villages and sublocation treatment saturation status (from Egger et al. (2022)).

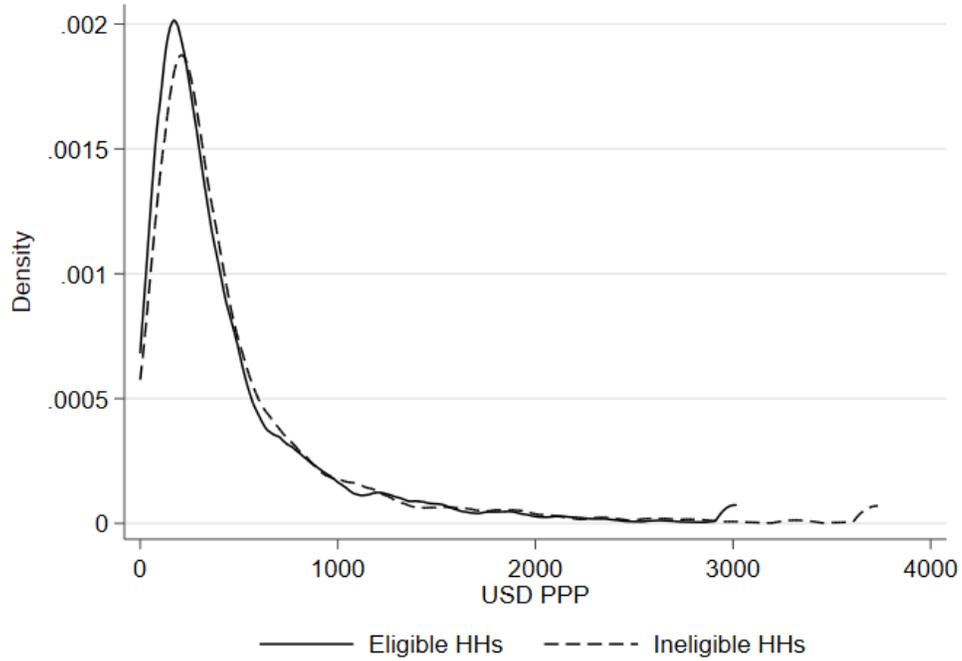
Figure A.2: Transfer date relative to endline survey time



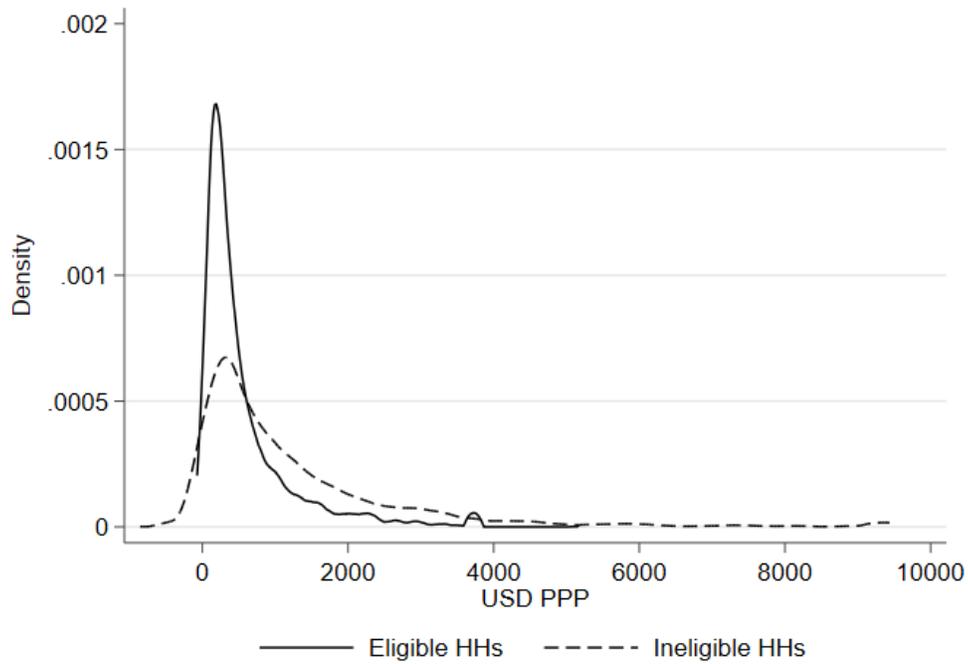
Notes: This figure plots the density of dollars transferred relative to the month when a household completed the endline survey (conducted by the research team) for treated households matched to treatment timing data from the NGO *GiveDirectly*.

Figure A.3: Kernel densities of baseline distributions

Panel A: Income

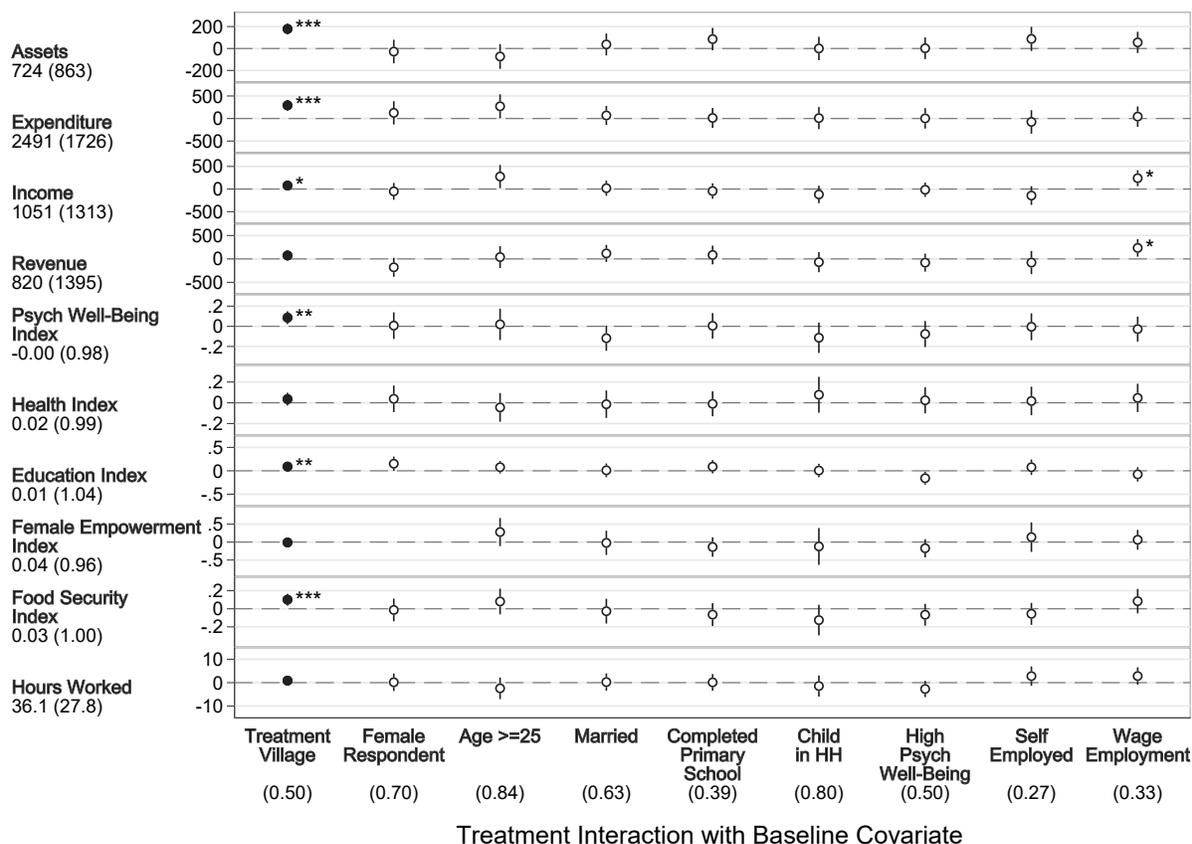


Panel B: Net assets



Notes: These figures plot the kernel densities (using an Epanechnikov kernel) of baseline income (Panel A) and net asset ownership (excluding land and housing) for transfer-eligible and ineligible households. There is noticeable overlap in the distributions for eligible and ineligible households for both of these outcomes.

Figure A.4: Previous heterogeneity results (EHMNW)

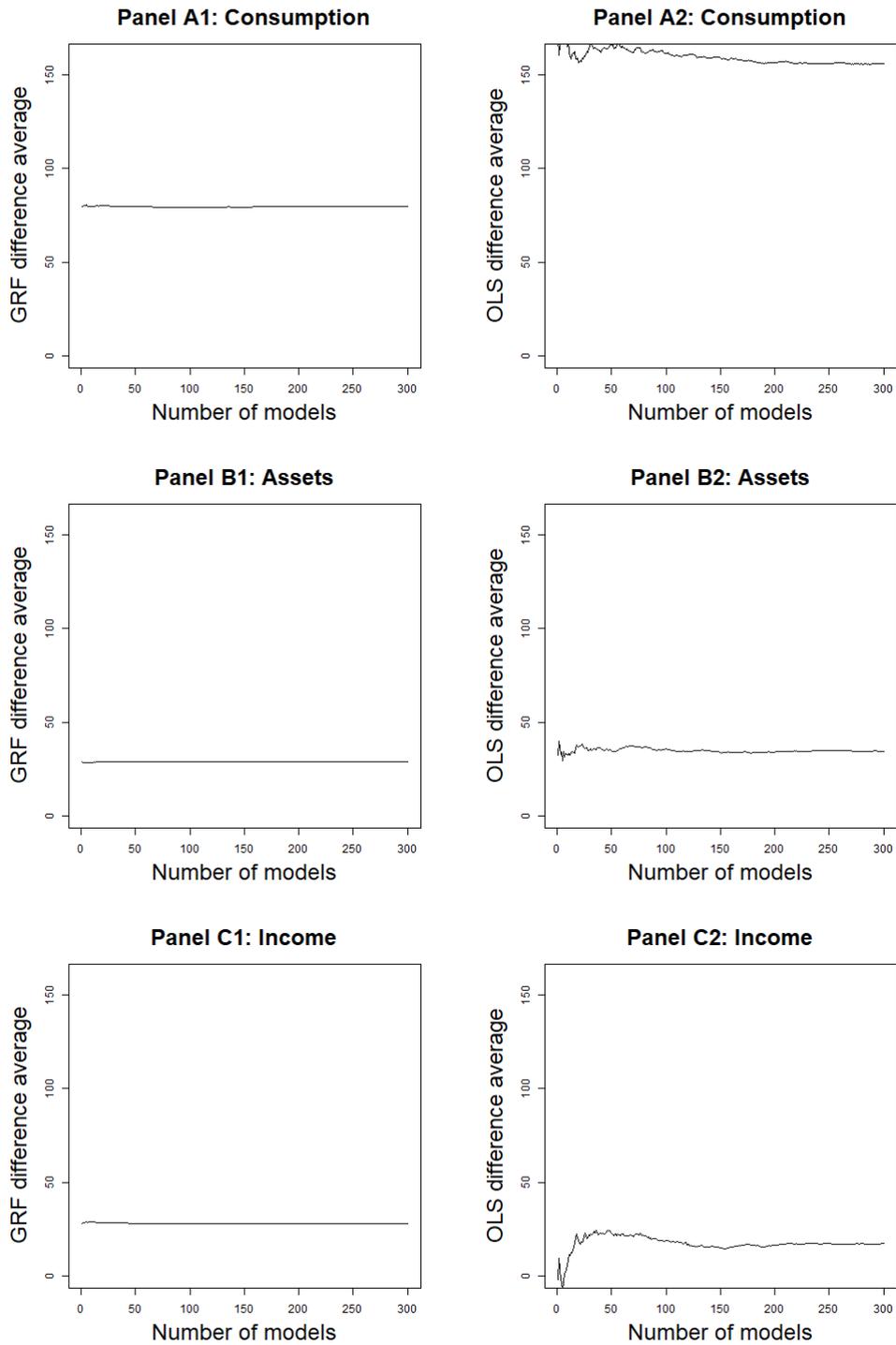


Notes: This figure, reproduced from [Egger et al. \(2022\)](#), presents estimates for treatment effect heterogeneity for eligible households in pre-specified primary outcomes along 8 pre-specified dimensions of heterogeneity. Each plotted coefficient is from a separate regression. Each row represents a separate primary outcome; the mean (SD) for eligible households in control, low saturation villages is reported below the outcome label. The first column (Treatment Village) plots estimated effects for the coefficient on an indicator for being in a treatment village, where the sample is restricted to eligible households and controls include an indicator for sublocation saturation status and the baseline value of the outcome variable (if available). Columns 2 through 8 plot the coefficient on the interaction term of the listed baseline covariate with the treatment village indicator; this interaction term and baseline covariate are added to the regression equation. Values in parentheses on the x-axis denote the mean of the baseline covariate. Standard errors are clustered at the village level. Reported significance levels correspond to FDR q-values, calculated following [Benjamini et al. \(2006\)](#). * denotes significance at 10 pct., ** denotes significance at 5 pct., and *** denotes significance at 1 pct. level.

Figure A.5: Model convergence

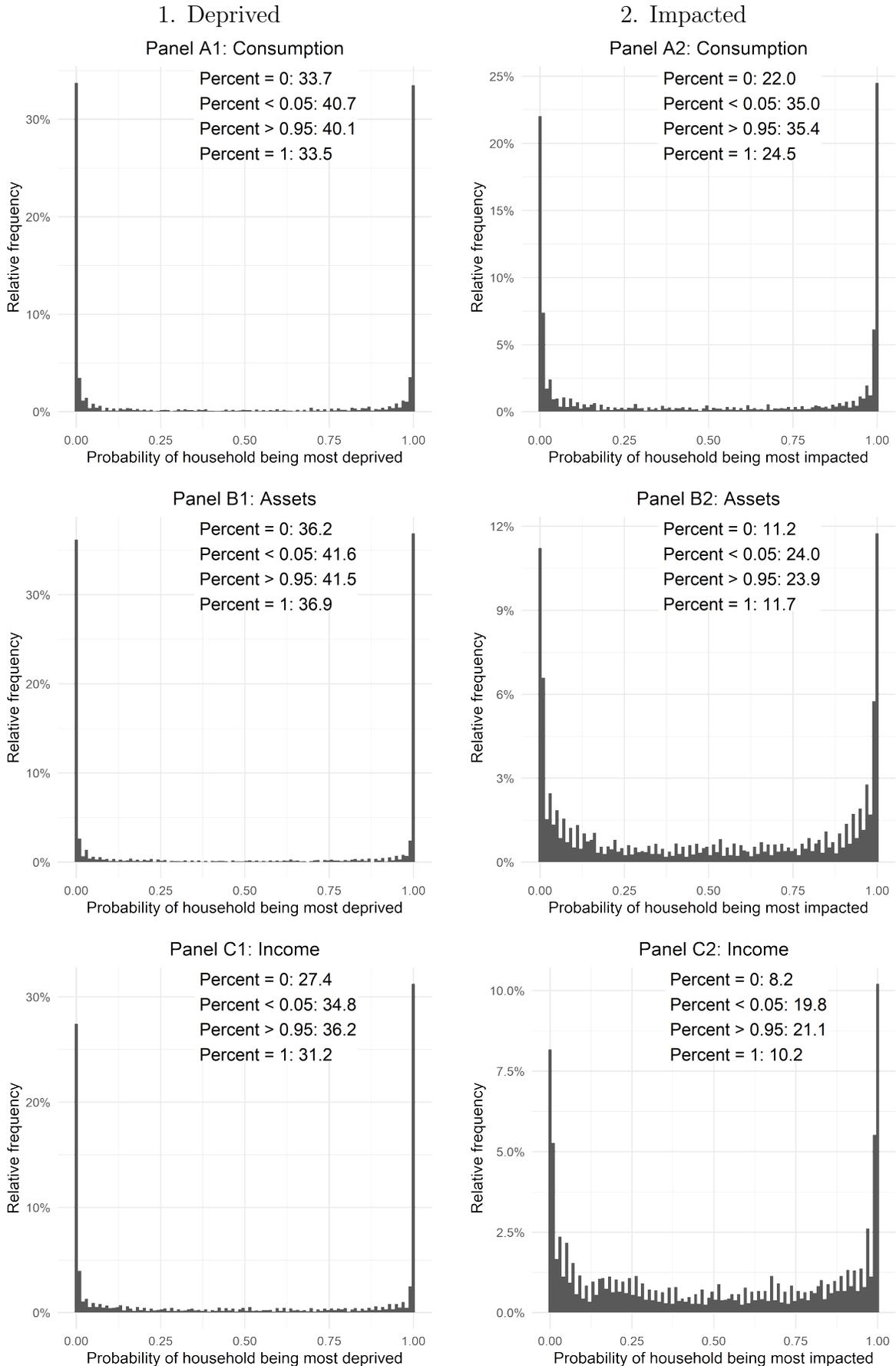
1. Predicted difference (GRF)

2. Actual difference (OLS)



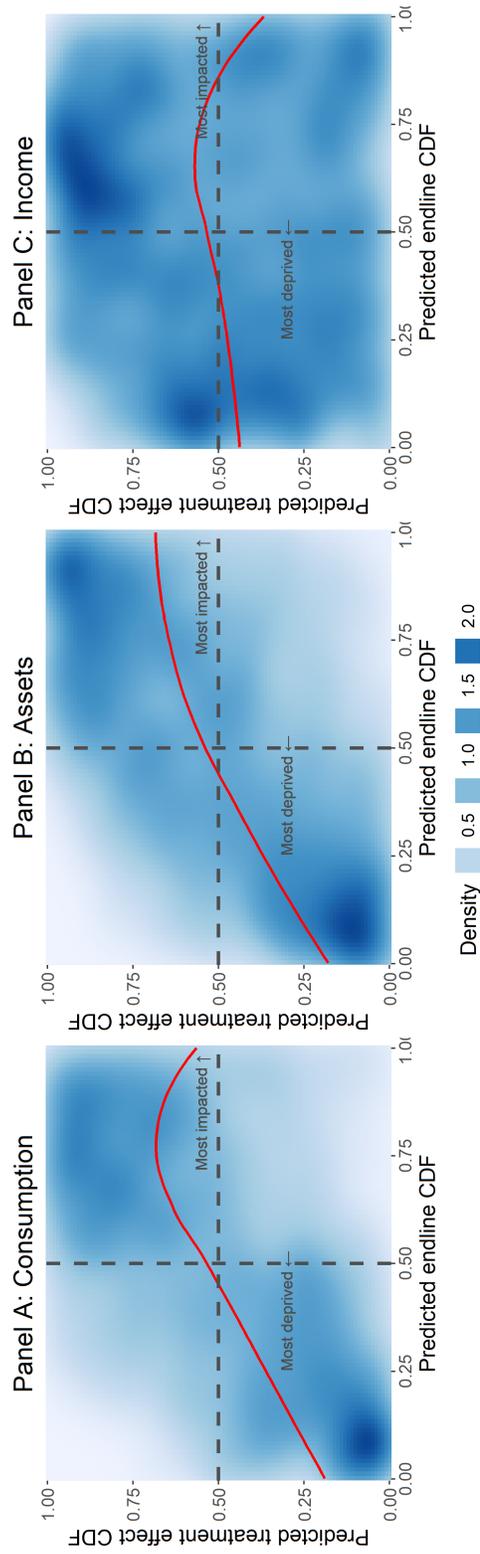
Notes: This figure presents the convergence of the difference of the predicted and actual average treatment effect between groups I, D as a function of the number of models being trained. Note that this statistic remains roughly constant between 150 and 300 models.

Figure A.6: Stability of most deprived and impacted classification



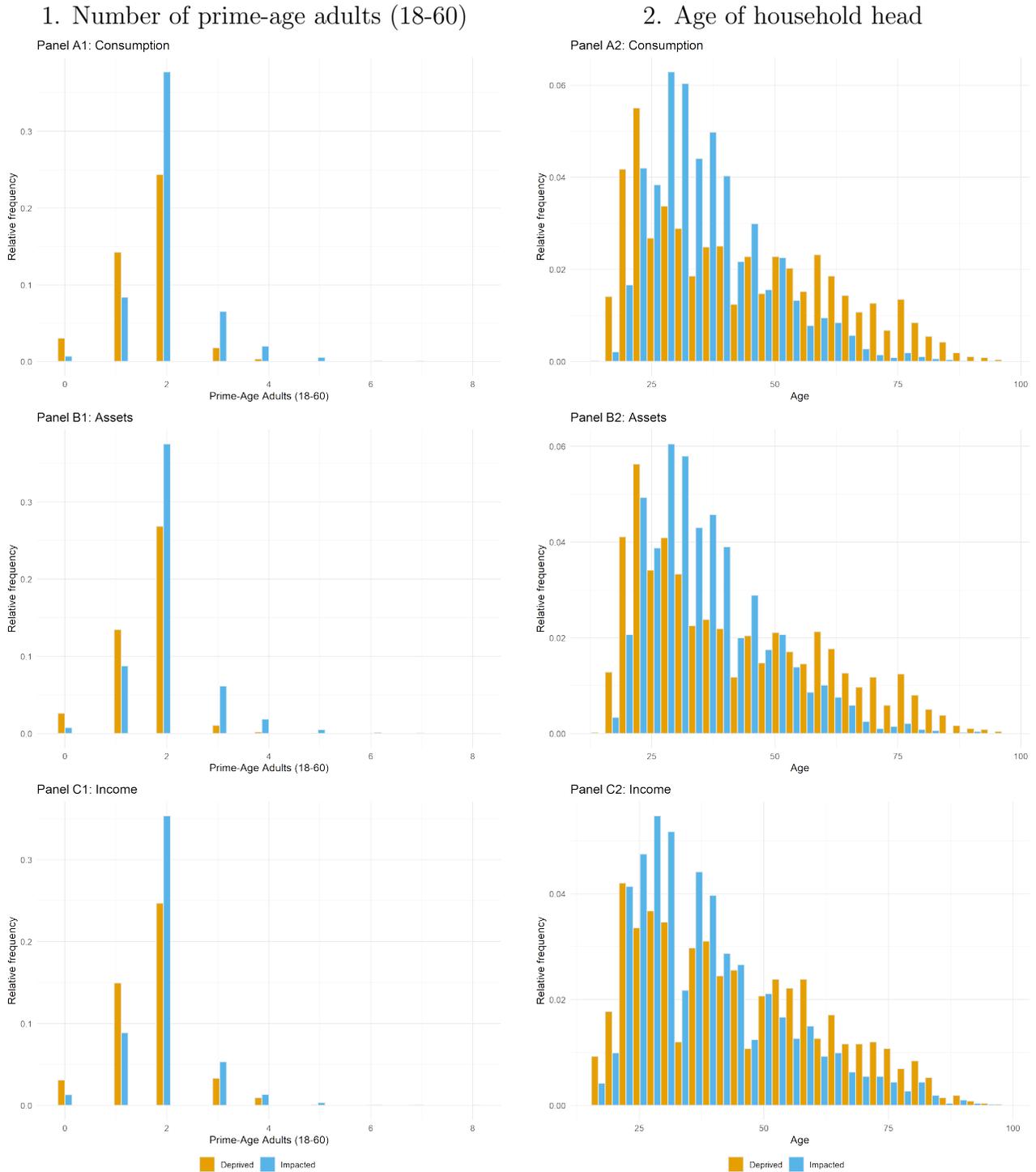
Notes: This figure presents the relative frequency of the probability that a household is classified as either most deprived (column 1) or most impacted (column 2) across 150 models. The large mass at/around 0 and 1 indicate that most households are being consistently classified to a group across models.

Figure A.7: CDF of predicted treatment effects against the CDF of predicted endline values for each outcome



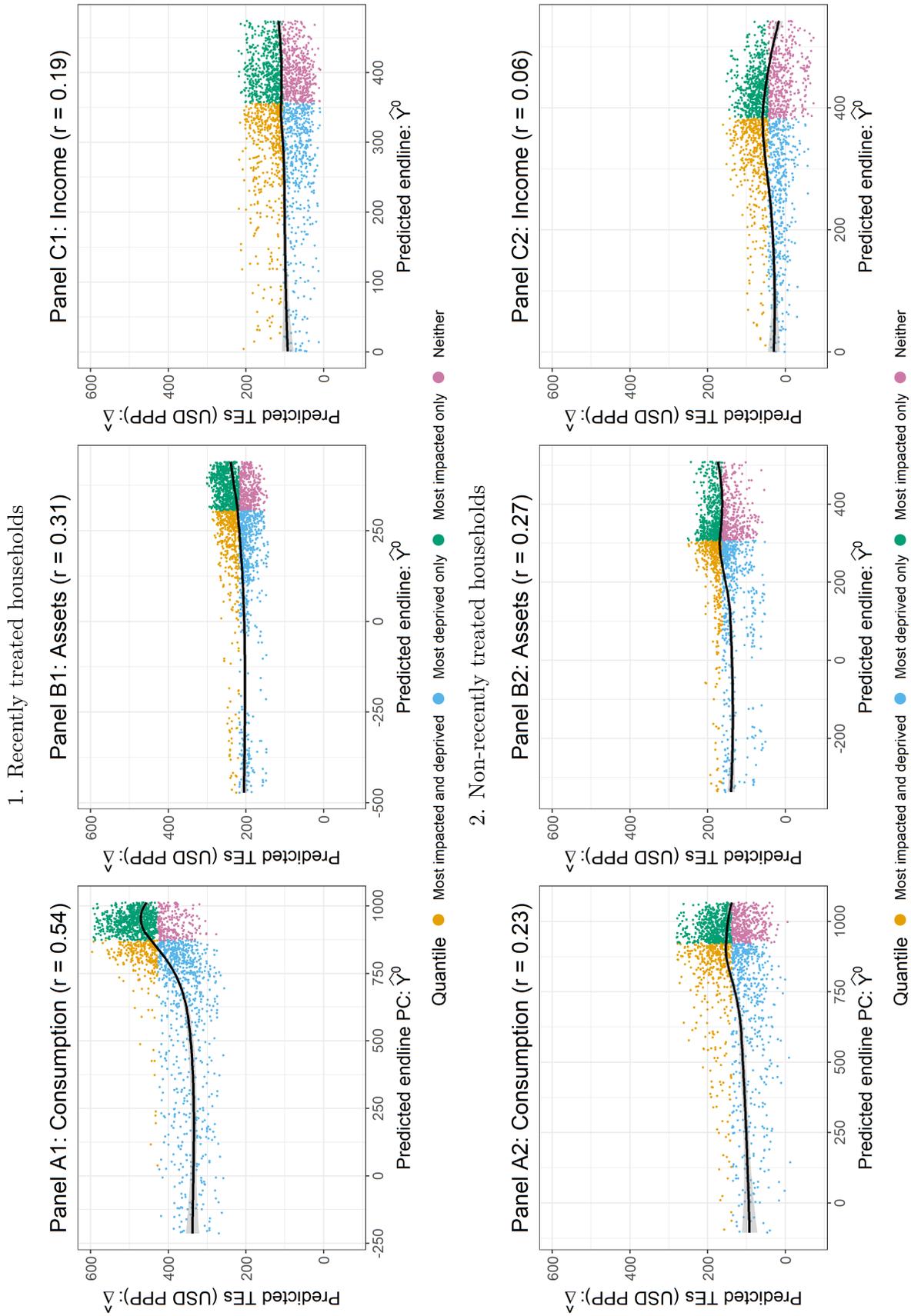
Notes: This figure complements Figure 1, but showing CDFs rather than levels. Each sub-figure shows the relationship between the CDF of predicted treatment effects against the CDF of the predicted endline values for each outcome with a local regression line and the two-dimensional density of observations. See note for Figure 1 for more details.

Figure A.8: Demographic characteristics in the most impacted and deprived households



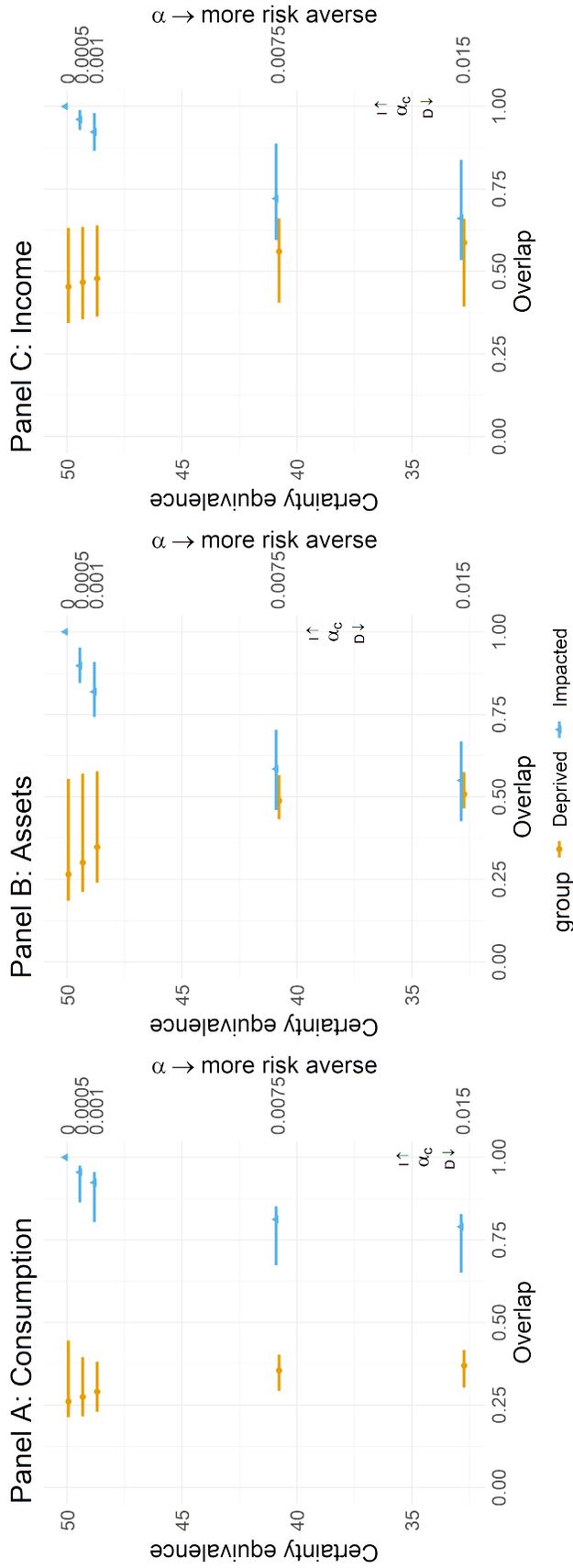
Notes: This figure plots the baseline distribution of two key demographic characteristics – the number of prime-age adults in a household (Column 1), and the age of the household head (Column 2), by classification into the most deprived and most impacted groups from the median model in terms of the difference in average treatment effects between the most deprived and most impacted groups for each outcome (as used in Figure 1).

Figure A.9: Predicted treatment effects ($\hat{\Delta}_h$) plotted against the predicted untreated per capita values (y_h^0) by treatment timing



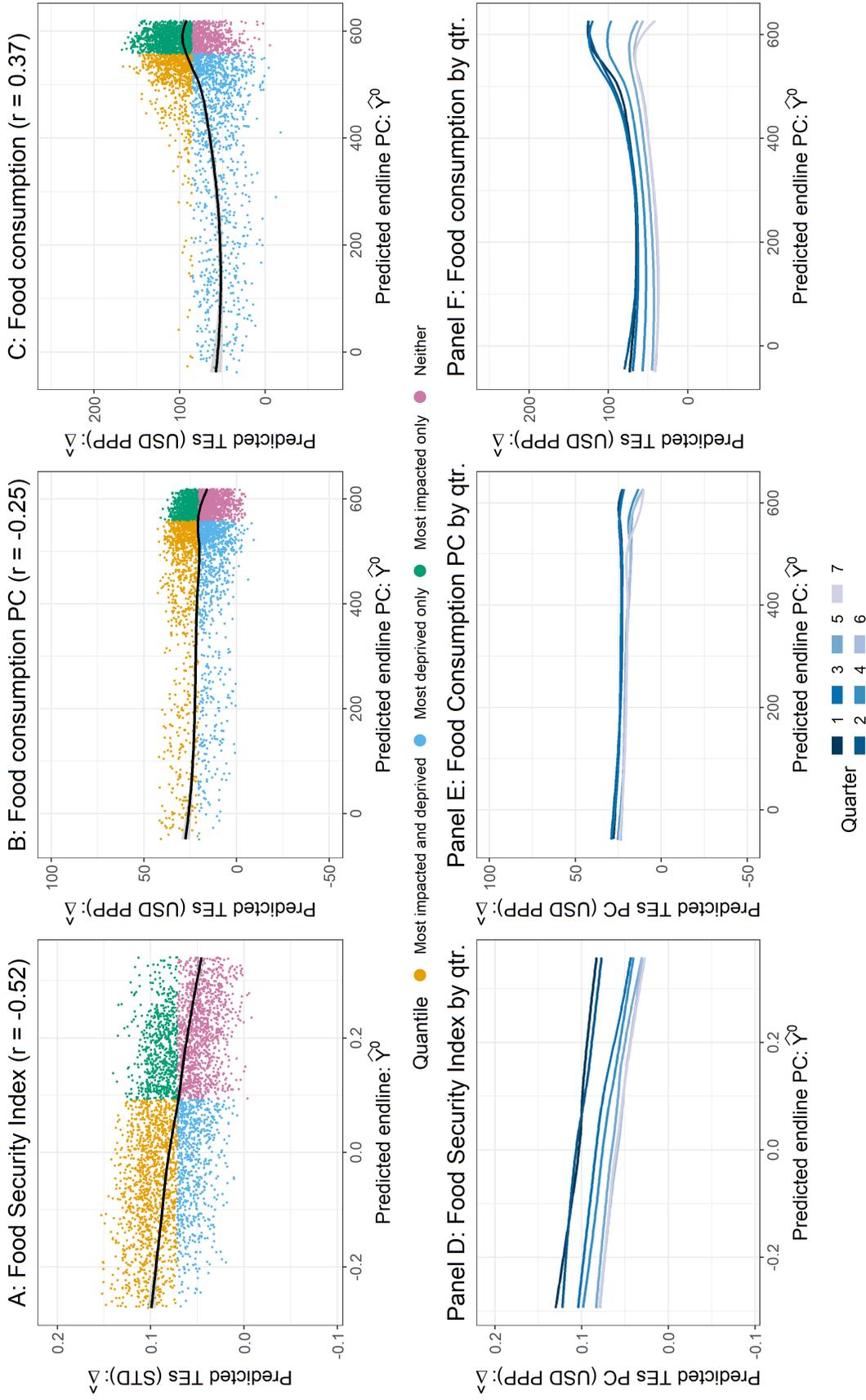
Notes: This figure reproduces Figure 1 using models estimated separately for recently treated households (Row 1) and non-recently treated households (Row 2). For each household we computed the number of months between the survey and the experimental start date of their village. Households under the median of this timing variable are defined as recently treated, otherwise they are defined as non-recently treated.

Figure A.10: Overlap of socially optimal households to target with most deprived and most impacted



Notes: The left y-axis denotes the certainty equivalent (CE) of a 50-50 lottery over \$0 or \$100 under the specified CARA α parameter value given on the right y-axis. The figure plots point estimates and bootstrapped 95% confidence intervals of the share of I (D) that are also “socially optimal” for a planner to treat. Socially optimal households are those in the top 50% of households ranked by potential gains from treatment using a CARA utility function. α_c displays the minimum value of α required to rationalize a policy targeting the most deprived instead of targeting the most impacted. Formally, $\alpha_c = \min(\{\alpha : SW(D; \alpha) \geq SW(I; \alpha)\})$.

Figure A.11: Predicted treatment effects ($\hat{\Delta}_h$) and untreated per capita values (y_h^0) for food security



Notes: This figure demonstrates that the pre-specified food security index appears to behave more similarly to a per-capita measure than a household measure. It follows the format of Figure 1: panels a, b and c plot scatterplots of predicted treatment effects for an outcome (y-axis) against the predicted endline values (x-axis) for that same outcome with a local regression line. Panels d, e and f plot the regression lines for each quarter after treatment. Both predicted endline and predicted treatment effects are estimated from generalized random forest models with the same set of covariates. Predicted endline values are from models trained on time-demeaned data; a constant was added to the reported statistics so that the overall predicted mean matches the observed sample mean.

Table A.1: Household balance

	Eligibles			Ineligibles		
	(1) Control, Low Sat Mean (SD)	(2) Treatment Effect	(3) N	(4) Control, Low Sat Mean (SD)	(5) Treatment Effect	(6) N
Female	0.67 (0.47)	0.01 (0.02)	4,768	0.79 (0.41)	-0.02 (0.02)	2,458
Respondent aged 25 or older	0.83 (0.38)	0.01 (0.01)	4,755	0.97 (0.18)	-0.01 (0.01)	2,448
Is married	0.64 (0.48)	0.02 (0.01)	4,768	0.42 (0.49)	0.03 (0.02)	2,458
Completed primary school	0.41 (0.49)	0.01 (0.02)	4,768	0.29 (0.45)	0.02 (0.02)	2,458
Has child	0.80 (0.40)	0.01 (0.01)	4,768	0.68 (0.47)	0.04* (0.02)	2,458
Self-employed	0.27 (0.45)	-0.00 (0.01)	4,768	0.28 (0.45)	0.01 (0.02)	2,458
Employed in wage work	0.36 (0.48)	-0.03 (0.02)	4,768	0.21 (0.41)	-0.03* (0.02)	2,458
Total non-land, non-home assets, net loans (z-scored) (USD)	-0.18 (0.65)	0.01 (0.02)	4,768	0.41 (1.36)	0.08 (0.06)	2,458
Total household income in the last 12 months (z-scored) (USD)	0.01 (0.89)	0.01 (0.03)	4,768	0.07 (1.02)	0.02 (0.05)	2,458
Total business revenue in the last 12 months (z-scored) (USD)	-0.08 (0.75)	0.03 (0.03)	4,768	0.13 (1.20)	0.05 (0.06)	2,458
Psychological wellbeing index	-0.00 (0.99)	0.06* (0.04)	4,765	-0.00 (0.99)	0.08* (0.05)	2,458
Food security index	-0.01 (1.00)	0.00 (0.03)	4,768	-0.01 (1.01)	0.09** (0.04)	2,458

Notes: Differences in baseline outcomes between households in treatment and control villages. Column (2) shows the baseline difference between eligible households in treated and untreated villages, and Column (5) shows the same difference for ineligible households. Columns (1) and (4) show the respective control means and standard deviations. * denotes significance at 10 pct., ** at 5 pct., and *** at 1 pct. level.

Table A.2: Tracking and attrition for eligible HHs

	(1) Surveyed at endline	(2) Surveyed at baseline	(3) Surveyed at baseline & endline	(4) Initially sampled household	(5) Replacement household
<i>Panel A: All households targeted at endline</i>					
Treatment Village	0.006 (0.009)	0.010 (0.011)	0.006 (0.013)	0.005 (0.010)	-0.008 (0.013)
High Saturation Sublocation	-0.003 (0.009)	-0.020 (0.014)	-0.019 (0.015)	0.006 (0.011)	-0.003 (0.013)
Control, Low Sat Mean (SD)	0.903 (0.297)	0.879 (0.326)	0.814 (0.389)	0.853 (0.355)	0.168 (0.374)
Observations	6,039	6,039	6,039	6,039	5,196
<i>Panel B: Among households surveyed at endline</i>					
Treatment Village		0.001 (0.011)	0.001 (0.011)	0.013 (0.010)	-0.015 (0.013)
High Saturation Sublocation		-0.018 (0.013)	-0.018 (0.013)	0.005 (0.011)	-0.002 (0.013)
Control, Low Sat Mean (SD)		0.902 (0.298)	0.902 (0.298)	0.845 (0.362)	0.172 (0.377)
Observations		5,425	5,425	5,425	4,768
<i>Panel C: Among households surveyed at baseline</i>					
Treatment Village	-0.004 (0.009)		-0.004 (0.009)	0.008 (0.013)	-0.008 (0.013)
High Saturation Sublocation	-0.000 (0.009)		-0.000 (0.009)	0.003 (0.013)	-0.003 (0.013)
Control, Low Sat Mean (SD)	0.926 (0.262)		0.926 (0.262)	0.832 (0.374)	0.168 (0.374)
Observations	5,197		5,197	5,197	5,196

Notes: This table reports differences in tracking and attrition by treatment status for baseline and endline household surveys. The main analysis sample used in this paper comprises households surveyed at both baseline and endline (Column 3). Initially sampled households are the initial eight eligible households targeted for surveys in a village. If these households were not available on the date of baseline household surveys, a replacement household was sought. Endline surveys targeted all initially-sampled households (regardless of baseline survey status) and replacement households.

Table A.3: Robustness check: only observable assets

Statistic	(1) All	(2) Most deprived (D)	(3) Most impacted (I)	(4) Difference (D)-(I)
Predicted endlines (y_h^0)				
<i>Panel A1: Observable Assets</i>				
Predicted	165	45	232	-187
Actual	150	25	224	-198
				(-224,-172)
<i>Panel A2: All Assets</i>				
Predicted	232	85	343	-258
Actual	213	53	336	-283
				(-314,-253)
Predicted treatment effects (Δ_h)				
<i>Panel B1: Observable Assets</i>				
Predicted	128	120	142	-22
Actual	121	111	123	-12
				(-54,31)
<i>Panel B2: All Assets</i>				
Predicted	189	178	207	-29
Actual	182	154	188	-34
				(-82,14)

Note: This table reproduces Table 1 and Table 2 for observable assets by the enumerator and all assets (referred as *assets* elsewhere in the paper). Panels A1 and A2 display results analogous to Table 1 and Panels B1 and B2 for 2. For additional details refer to Table 1 and Table 2.

Table A.4: Differences in characteristics and treatment effects by deprivation and impact group classification using consumption

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	D	D^C	$D - D^C$	I	I^C	$I - I^C$	$D - I$
<i>Panel A: Baseline demographics, Mean (SD)</i>								
Household size	4.40 (2.21)	2.99 (1.57)	5.82 (1.80)	-2.83 (0.05)	6.04 (1.63)	2.74 (1.27)	3.30 (0.05)	-3.05 (0.04)
Number of prime-age adults in household	1.88 (0.77)	1.59 (0.71)	2.11 (0.72)	-0.52 (0.03)	2.07 (0.78)	1.64 (0.67)	0.44 (0.03)	-0.50 (0.02)
Number of children in household	2.46 (1.88)	1.34 (1.37)	3.59 (1.64)	-2.26 (0.05)	3.84 (1.48)	1.07 (1.04)	2.76 (0.04)	-2.50 (0.03)
Education level of household head	6.48 (3.72)	5.52 (3.93)	7.45 (3.23)	-1.92 (0.12)	6.98 (3.27)	5.97 (4.07)	1.01 (0.12)	-1.47 (0.10)
Age of household head	42.37 (15.47)	45.32 (18.10)	39.39 (11.52)	5.93 (0.50)	40.42 (12.05)	44.34 (18.10)	-3.92 (0.52)	4.94 (0.45)
Female household head	0.26 (0.44)	0.43 (0.50)	0.09 (0.28)	0.34 (0.01)	0.20 (0.40)	0.32 (0.46)	-0.11 (0.01)	0.23 (0.01)
Widow	0.18 (0.39)	0.36 (0.48)	0.01 (0.08)	0.35 (0.01)	0.12 (0.33)	0.25 (0.43)	-0.13 (0.01)	0.24 (0.01)
Household owns any livestock	0.27 (0.44)	0.18 (0.38)	0.35 (0.48)	-0.18 (0.01)	0.37 (0.48)	0.16 (0.36)	0.22 (0.01)	-0.20 (0.01)
Household owns land	0.84 (0.36)	0.84 (0.37)	0.85 (0.36)	-0.01 (0.01)	0.88 (0.32)	0.80 (0.40)	0.08 (0.01)	-0.04 (0.01)
Respondent self-employed	0.27 (0.44)	0.20 (0.40)	0.34 (0.47)	-0.14 (0.01)	0.29 (0.45)	0.25 (0.43)	0.04 (0.01)	-0.09 (0.01)
Respondent employed	0.33 (0.47)	0.32 (0.46)	0.35 (0.48)	-0.03 (0.02)	0.37 (0.48)	0.29 (0.45)	0.08 (0.02)	-0.06 (0.01)
Number of meals eaten yesterday	2.29 (0.68)	2.22 (0.69)	2.37 (0.66)	-0.16 (0.02)	2.23 (0.66)	2.36 (0.69)	-0.13 (0.02)	-0.01 (0.02)
Received any loan	0.54 (0.50)	0.46 (0.50)	0.61 (0.49)	-0.15 (0.02)	0.62 (0.48)	0.45 (0.50)	0.17 (0.02)	-0.16 (0.01)
Any loan denied	0.24 (0.43)	0.22 (0.41)	0.26 (0.44)	-0.05 (0.01)	0.27 (0.44)	0.22 (0.41)	0.05 (0.01)	-0.05 (0.01)
<i>Panel B: Endline Treatment Effects (SEs)</i>								
Respondent hours worked last week	1.05 (0.98)	1.90 (1.32)	-0.30 (1.34)	2.20 (1.83)	-0.24 (1.28)	2.23 (1.38)	-2.47 (1.78)	2.14 (1.58)
Indicator for household self-employed	0.04 (0.02)	0.04 (0.02)	0.03 (0.02)	0.01 (0.03)	0.06 (0.02)	0.01 (0.02)	0.05 (0.03)	-0.02 (0.03)
Indicator for household employed	-0.03 (0.02)	-0.04 (0.02)	-0.02 (0.02)	-0.01 (0.03)	-0.05 (0.02)	-0.01 (0.02)	-0.05 (0.03)	0.01 (0.03)
Interhousehold transfers received	9.85 (7.13)	-4.82 (9.51)	24.22 (9.81)	-29.04 (13.13)	28.77 (10.44)	-9.45 (8.94)	38.22 (13.29)	-33.59 (11.18)
Interhousehold transfers sent	7.96 (2.75)	5.39 (3.53)	9.51 (4.16)	-4.12 (5.48)	9.38 (4.11)	6.39 (3.89)	2.99 (5.81)	-3.99 (4.82)
Total value of loans taken in last 12 months	3.48 (4.03)	-5.70 (4.81)	10.84 (6.74)	-16.54 (8.45)	8.03 (6.12)	-1.56 (5.54)	9.59 (8.39)	-13.73 (6.84)
Total value of loans given in last 12 months	3.43 (0.79)	4.04 (0.99)	2.51 (1.29)	1.53 (1.65)	2.70 (1.13)	4.14 (1.18)	-1.44 (1.68)	1.34 (1.40)
Number of household members	0.18 (0.07)	0.13 (0.09)	0.11 (0.09)	0.02 (0.12)	0.13 (0.09)	0.18 (0.08)	-0.05 (0.11)	0.00 (0.11)

Notes: This table presents differences in baseline characteristics (Panel A) and treatment effects estimated via OLS (Panel B) based on households' classification into most deprived (D) or most impacted (I) groups across our 150 models. Specifically, households are assigned to the most deprived (impacted) group if they are classified as deprived (impacted) in more than 50% of the 150 models. In Panel A, columns 1,2,3,5 and 6 report group means and standard deviations. Columns 3, 6 and 7 test for differences between groups using OLS, group indicators and their interaction. In Panel B, column 1 reports the coefficient (and standard error) from a regression on treatment status and a constant, with standard errors are clustered at the village level. Columns 2, 3 and 4 present group ATEs from a regression on treatment status, deprivation status, and the interaction between the two; columns 5 through 7 do the same by most impacted status. Column 8 presents the difference in treatment effects for the most deprived and most impacted; standard errors for the difference are calculated by bootstrapping the regressions in columns 2-4 and 5-7 999 times.

Table A.5: Differences in characteristics and treatment effects by deprivation and impact group classification using assets

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	<i>D</i>	<i>D^C</i>	<i>D – D^C</i>	<i>I</i>	<i>I^C</i>	<i>I – I^C</i>	<i>D – I</i>
<i>Panel A: Baseline demographics, Mean (SD)</i>								
Household size	4.40 (2.21)	2.88 (1.40)	5.91 (1.77)	-3.04 (0.05)	5.72 (1.93)	3.06 (1.58)	2.65 (0.06)	-2.82 (0.04)
Number of prime-age adults in household	1.88 (0.77)	1.60 (0.66)	2.10 (0.77)	-0.50 (0.02)	2.05 (0.77)	1.68 (0.70)	0.37 (0.03)	-0.44 (0.02)
Number of children in household	2.46 (1.88)	1.25 (1.22)	3.66 (1.64)	-2.41 (0.05)	3.55 (1.72)	1.35 (1.30)	2.20 (0.05)	-2.29 (0.04)
Education level of household head	6.48 (3.72)	5.77 (4.00)	7.18 (3.28)	-1.41 (0.12)	6.89 (3.32)	6.06 (4.04)	0.83 (0.11)	-1.11 (0.10)
Age of household head	42.37 (15.47)	44.03 (17.98)	40.73 (12.30)	3.30 (0.50)	40.32 (12.19)	44.43 (17.96)	-4.11 (0.51)	3.68 (0.45)
Female household head	0.26 (0.44)	0.37 (0.48)	0.14 (0.35)	0.23 (0.01)	0.20 (0.40)	0.32 (0.47)	-0.12 (0.01)	0.17 (0.01)
Widow	0.18 (0.39)	0.31 (0.46)	0.06 (0.24)	0.25 (0.01)	0.12 (0.32)	0.26 (0.44)	-0.14 (0.01)	0.19 (0.01)
Household owns any livestock	0.27 (0.44)	0.07 (0.26)	0.46 (0.50)	-0.39 (0.01)	0.41 (0.49)	0.12 (0.32)	0.29 (0.01)	-0.34 (0.01)
Household owns land	0.84 (0.36)	0.82 (0.38)	0.86 (0.35)	-0.04 (0.01)	0.86 (0.35)	0.83 (0.38)	0.03 (0.01)	-0.03 (0.01)
Respondent self-employed	0.27 (0.44)	0.22 (0.41)	0.32 (0.47)	-0.10 (0.01)	0.37 (0.48)	0.16 (0.37)	0.21 (0.01)	-0.15 (0.01)
Respondent employed	0.33 (0.47)	0.31 (0.46)	0.35 (0.48)	-0.03 (0.02)	0.42 (0.49)	0.24 (0.43)	0.18 (0.02)	-0.10 (0.01)
Number of meals eaten yesterday	2.29 (0.68)	2.23 (0.69)	2.35 (0.66)	-0.12 (0.02)	2.14 (0.63)	2.45 (0.69)	-0.30 (0.02)	0.09 (0.02)
Received any loan	0.54 (0.50)	0.46 (0.50)	0.61 (0.49)	-0.15 (0.02)	0.62 (0.49)	0.45 (0.50)	0.17 (0.02)	-0.16 (0.01)
Any loan denied	0.24 (0.43)	0.22 (0.42)	0.26 (0.44)	-0.04 (0.01)	0.26 (0.44)	0.22 (0.41)	0.05 (0.01)	-0.04 (0.01)
<i>Panel B: Endline Treatment Effects (SEs)</i>								
Respondent hours worked last week	1.05 (0.98)	1.32 (1.34)	0.71 (1.34)	0.62 (1.84)	1.17 (1.24)	0.88 (1.38)	0.29 (1.73)	0.16 (1.65)
Indicator for household self-employed	0.04 (0.02)	0.03 (0.02)	0.04 (0.02)	-0.00 (0.03)	0.05 (0.02)	0.02 (0.02)	0.03 (0.03)	-0.02 (0.03)
Indicator for household employed	-0.03 (0.02)	-0.02 (0.02)	-0.03 (0.02)	0.01 (0.03)	-0.03 (0.02)	-0.02 (0.02)	-0.01 (0.03)	0.01 (0.03)
Interhousehold transfers received	9.85 (7.13)	-12.80 (8.69)	32.31 (10.33)	-45.12 (12.73)	25.35 (9.53)	-5.84 (10.05)	31.19 (13.44)	-38.16 (11.85)
Interhousehold transfers sent	7.96 (2.75)	7.98 (3.79)	7.84 (4.01)	0.14 (5.57)	7.41 (3.99)	8.46 (3.74)	-1.05 (5.42)	0.57 (4.56)
Total value of loans taken in last 12 months	3.48 (4.03)	1.02 (4.74)	5.70 (6.68)	-4.68 (8.28)	7.53 (6.05)	-0.81 (5.49)	8.33 (8.23)	-6.51 (7.05)
Total value of loans given in last 12 months	3.43 (0.79)	3.74 (1.05)	3.09 (1.26)	0.65 (1.69)	3.02 (1.24)	3.81 (1.12)	-0.79 (1.74)	0.72 (1.50)
Number of household members	0.18 (0.07)	0.16 (0.08)	0.18 (0.09)	-0.02 (0.11)	0.19 (0.09)	0.15 (0.09)	0.04 (0.13)	-0.03 (0.12)

Notes: This table presents differences in baseline characteristics (Panel A) and treatment effects estimated via OLS (Panel B) based on households' classification into most deprived (D) or most impacted (I) groups across our 150 models. Specifically, households are assigned to the most deprived (impacted) group if they are classified as deprived (impacted) in more than 50% of the 150 models. In Panel A, columns 1,2,3,5 and 6 report group means and standard deviations. Columns 3, 6 and 7 test for differences between groups using OLS, group indicators and their interaction. In Panel B, column 1 reports the coefficient (and standard error) from a regression on treatment status and a constant, with standard errors are clustered at the village level. Columns 2, 3 and 4 present group ATEs from a regression on treatment status, deprivation status, and the interaction between the two; columns 5 through 7 do the same by most impacted status. Column 8 presents the difference in treatment effects for the most deprived and most impacted; standard errors for the difference are calculated by bootstrapping the regressions in columns 2-4 and 5-7 999 times.

Table A.6: Differences in characteristics and treatment effects by deprivation and impact group classification using income

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	<i>D</i>	<i>D^C</i>	<i>D - D^C</i>	<i>I</i>	<i>I^C</i>	<i>I - I^C</i>	<i>D - I</i>
<i>Panel A: Baseline demographics, Mean (SD)</i>								
Household size	4.40 (2.21)	3.56 (2.08)	5.23 (2.01)	-1.67 (0.07)	5.01 (2.43)	3.80 (1.76)	1.21 (0.07)	-1.44 (0.05)
Number of prime-age adults in household	1.88 (0.77)	1.66 (0.81)	2.06 (0.68)	-0.40 (0.03)	1.98 (0.78)	1.78 (0.73)	0.20 (0.02)	-0.30 (0.02)
Number of children in household	2.46 (1.88)	1.82 (1.74)	3.10 (1.79)	-1.29 (0.06)	3.01 (2.07)	1.93 (1.50)	1.07 (0.06)	-1.18 (0.04)
Education level of household head	6.48 (3.72)	5.32 (3.83)	7.63 (3.22)	-2.31 (0.12)	6.58 (3.60)	6.37 (3.84)	0.21 (0.13)	-1.26 (0.09)
Age of household head	42.37 (15.47)	47.20 (17.61)	37.58 (11.11)	9.62 (0.46)	41.61 (13.95)	43.12 (16.82)	-1.51 (0.51)	5.57 (0.36)
Female household head	0.26 (0.44)	0.45 (0.50)	0.07 (0.25)	0.38 (0.01)	0.22 (0.41)	0.30 (0.46)	-0.08 (0.01)	0.23 (0.01)
Widow	0.18 (0.39)	0.37 (0.48)	0.00 (0.00)	0.37 (0.01)	0.15 (0.36)	0.22 (0.41)	-0.07 (0.01)	0.22 (0.01)
Household owns any livestock	0.27 (0.44)	0.20 (0.40)	0.33 (0.47)	-0.12 (0.01)	0.35 (0.48)	0.18 (0.39)	0.17 (0.01)	-0.15 (0.01)
Household owns land	0.84 (0.36)	0.85 (0.35)	0.83 (0.38)	0.03 (0.01)	0.93 (0.25)	0.75 (0.43)	0.18 (0.01)	-0.08 (0.01)
Respondent self-employed	0.27 (0.44)	0.12 (0.33)	0.42 (0.49)	-0.29 (0.01)	0.19 (0.40)	0.34 (0.47)	-0.15 (0.01)	-0.07 (0.01)
Respondent employed	0.33 (0.47)	0.31 (0.46)	0.35 (0.48)	-0.04 (0.01)	0.60 (0.49)	0.07 (0.25)	0.54 (0.01)	-0.29 (0.01)
Number of meals eaten yesterday	2.29 (0.68)	2.14 (0.70)	2.44 (0.62)	-0.30 (0.02)	2.30 (0.66)	2.29 (0.69)	0.02 (0.02)	-0.16 (0.02)
Received any loan	0.54 (0.50)	0.46 (0.50)	0.61 (0.49)	-0.16 (0.02)	0.58 (0.49)	0.49 (0.50)	0.09 (0.02)	-0.12 (0.01)
Any loan denied	0.24 (0.43)	0.21 (0.41)	0.27 (0.45)	-0.06 (0.01)	0.28 (0.45)	0.21 (0.40)	0.07 (0.01)	-0.07 (0.01)
<i>Panel B: Endline Treatment Effects (SEs)</i>								
Respondent hours worked last week	1.05 (0.98)	1.47 (1.27)	0.22 (1.37)	1.25 (1.81)	-0.03 (1.25)	1.98 (1.41)	-2.01 (1.79)	1.50 (1.34)
Indicator for household self-employed	0.04 (0.02)	0.03 (0.02)	0.04 (0.02)	-0.02 (0.03)	0.06 (0.02)	0.01 (0.02)	0.05 (0.03)	-0.04 (0.02)
Indicator for household employed	-0.03 (0.02)	-0.04 (0.02)	-0.02 (0.02)	-0.02 (0.03)	-0.04 (0.02)	-0.02 (0.02)	-0.02 (0.03)	0.00 (0.02)
Interhousehold transfers received	9.85 (7.13)	9.45 (9.92)	10.19 (9.93)	-0.73 (13.81)	13.09 (8.78)	7.02 (10.42)	6.07 (13.04)	-3.64 (9.97)
Interhousehold transfers sent	7.96 (2.75)	6.26 (3.65)	8.82 (4.38)	-2.55 (5.91)	5.16 (3.74)	10.66 (4.27)	-5.50 (5.85)	1.11 (3.60)
Total value of loans taken in last 12 months	3.48 (4.03)	1.92 (4.08)	3.48 (7.07)	-1.56 (8.24)	8.32 (5.25)	-1.04 (6.09)	9.36 (8.10)	-6.40 (5.41)
Total value of loans given in last 12 months	3.43 (0.79)	3.14 (0.85)	3.43 (1.37)	-0.29 (1.64)	2.83 (1.17)	3.99 (1.09)	-1.16 (1.60)	0.30 (1.29)
Number of household members	0.18 (0.07)	0.21 (0.10)	0.10 (0.10)	0.10 (0.14)	0.16 (0.11)	0.17 (0.09)	-0.01 (0.14)	0.04 (0.11)

Notes: This table presents differences in baseline characteristics (Panel A) and treatment effects estimated via OLS (Panel B) based on households' classification into most deprived (D) or most impacted (I) groups across our 150 models. Specifically, households are assigned to the most deprived (impacted) group if they are classified as deprived (impacted) in more than 50% of the 150 models. In Panel A, columns 1,2,3,5 and 6 report group means and standard deviations. Columns 3, 6 and 7 test for differences between groups using OLS, group indicators and their interaction. In Panel B, column 1 reports the coefficient (and standard error) from a regression on treatment status and a constant, with standard errors are clustered at the village level. Columns 2, 3 and 4 present group ATEs from a regression on treatment status, deprivation status, and the interaction between the two; columns 5 through 7 do the same by most impacted status. Column 8 presents the difference in treatment effects for the most deprived and most impacted; standard errors for the difference are calculated by bootstrapping the regressions in columns 2-4 and 5-7 999 times.

Table A.7: Predicted per capita untreated food outcomes (y_h^0) by group

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Food Security Index</i>				
Predicted	0.06	-0.09	-0.03	-0.06
Actual	0.04	-0.17	-0.09	-0.08
				(-0.13,-0.04)
<i>Panel B: Total household food consumption</i>				
Predicted	470	358	555	-198
Actual	467	346	552	-206
				(-241,-171)
<i>Panel C: Food consumption per capita</i>				
Predicted	221	107	181	-74
Actual	220	123	185	-62
				(-83,-41)

Notes: This table reproduces Table 1 for food security-related outcomes. The food security index is an index of questions about the food consumption of adults and children over the past 7 days (see Appendix B for details). The rest of the details follow Table 1.

Table A.8: Predicted Average Treatment Effects for food outcomes (Δ_h) by group

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Food Security Index</i>				
Predicted	0.07	0.08	0.09	-0.01
Actual	0.08	0.14	0.12	0.02
				(-0.02,0.05)
<i>Panel B: Total household food consumption</i>				
Predicted	84	73	108	-35
Actual	100	73	131	-58
				(-109,-8)
<i>Panel C: Food consumption per capita</i>				
Predicted	21	23	28	-5
Actual	28	25	32	-7
				(-25,10)

Notes: This table reproduces Table 2 for food security-related outcomes. The food security index is an index of questions about the food consumption of adults and children over the past 7 days (see Appendix B for details). The rest of the details follow Table 2.

Table A.9: Within-village spillovers for ineligible households

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	93	90	113	-24
Actual	147	104	53	50
				(-74,175)
<i>Panel B: Assets</i>				
Predicted	84	72	107	-36
Actual	105	17	90	-73
				(-196,50)
<i>Panel C: Income</i>				
Predicted	-9	-19	18	-37
Actual	25	-32	80	-111
				(-235,12)

Notes: This table reproduces Table 2 for ineligible households located within treatment villages, in order to look at within-village spillover effects onto ineligible households. While ineligible households were not treated themselves, we make use of the treatment status of their village to estimate models in the same method as Table 2. $N = 2,434$.

Table A.10: Cross-village spillovers for control village transfer-eligible households

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	9	5	32	-27
Actual	32	-22	-119	97
				(19,393)
				[-6,199]
<i>Panel B: Assets</i>				
Predicted	27	21	40	-19
Actual	27	-12	5	-18
				(-89,154)
				[-80,45]
<i>Panel C: Income</i>				
Predicted	101	102	116	-14
Actual	110	97	-20	117
				(149,443)
				[39,195]

Notes: This table reproduces Table 2 for control village transfer-eligible households, in order to look at cross-village spillovers. Here, treatment is defined as whether the neighborhood treatment intensity (the amount transferred within 2 km of their village, from Egger et al. (2022)) for a household is above the median. The rest of the model estimation follows Table 2; we estimate causal forests using the indicator for above-median intensity as the definition of treatment. $N = 2,367$.

B Appendix: Data & variable construction

B.1 Baseline predictors

The baseline survey collected data on a number of household characteristics that might predict endline outcomes and treatment effects. From among these, we first selected a subset that have been documented as appearing in other proxy means tests used to target social protection programs in comparable low-income countries. Specifically, we retained all variables in the intersection of household-level variables in the PMTs studied by [Kidd and Wylde \(2011\)](#), [Alatas et al. \(2012\)](#), and [Niehaus et al. \(2013\)](#), for a total of 31 potential predictors. Among these we retained those that exhibit non-trivial amounts of variation in our data, yielding 24 potential predictors. [Table B.1](#) summarizes this selection procedure.

In our pre-analysis plan we planned to further narrow our feature selection by keeping predictors that increased the adjusted R -squared of a regression predicting baseline outcomes. This procedure is not well-defined, however (since whether or not a variable increases the adjusted R -squared depends on what other variables are included). It also creates further complications for inference, since it uses the data once to select predictors before then using them again to form predictors. Our preferred approach is therefore to use a list of 16 covariates selected by hand, prior to any analysis, based on our knowledge of the local context. These covariates are

1. Household size
2. Respondent a widow
3. Respondent female
4. Household has children
5. Household has school-aged children
6. Household has children 3 or under
7. Household has children 6 or under
8. Household has an elderly (65+) member
9. Household owns any livestock
10. Household owns any land
11. Household owns more than 0.25 acres of land
12. Household owns TV or radio
13. Number of meals eaten yesterday
14. Number of meals with protein yesterday
15. Respondent self-employed
16. Respondent employed

As a robustness check we also examine results using a data-selected subset of 24 candidate predictors. Specifically, we run LASSO regressions using these 24 variables to predict our four main outcomes, and retain all variables selected by LASSO in any of these four models. This yields a list of 15 variables that is in fact quite similar to our hand-selected list (see [Table B.1](#)). Re-estimating our core specifications using this alternative list of predictors, we obtain results that are generally quite similar to our main results ([Tables D.2](#), [D.3](#), and [D.4](#)).

B.2 Outcomes

The endline survey contained detailed modules on economic activities such as household expenditures and crop production, asset ownership, psychological well-being, health and nutrition, and female respondents

surveyed by a female enumerator were also administered a module on female empowerment and gender-based violence. We construct four aggregate outcomes using this data: consumption expenditure, income, assets, and a food security index.

Consumption expenditure is defined as the total annualized household expenditure. Income is total annualized household income, given by the sum of agricultural profits, profits from self-employment, and wage earnings. Assets is equal to the total value of household's assets, excluding land and houses. Each of these variables is winsorized at the 99th percentile and expressed in USD PPP terms.

The food security index is a weighted average of standardized food security covariates constructed according to [Anderson \(2008\)](#). The index is calculated using the following variables:

1. Number of days adults skipped or cut the amount of meals in the past 7 days
2. Number of days children skipped or cut the amount of meals in the past 7 days
3. Number of days adults went the entire day without meals in the past 7 days
4. Number of days children went the entire day without meals in the past 7 days
5. Number of days adults went to bed hungry in the last 7 days
6. Number of days children went to bed hungry in the past 7 days
7. Number of meals eaten yesterday that included meat, fish, or eggs

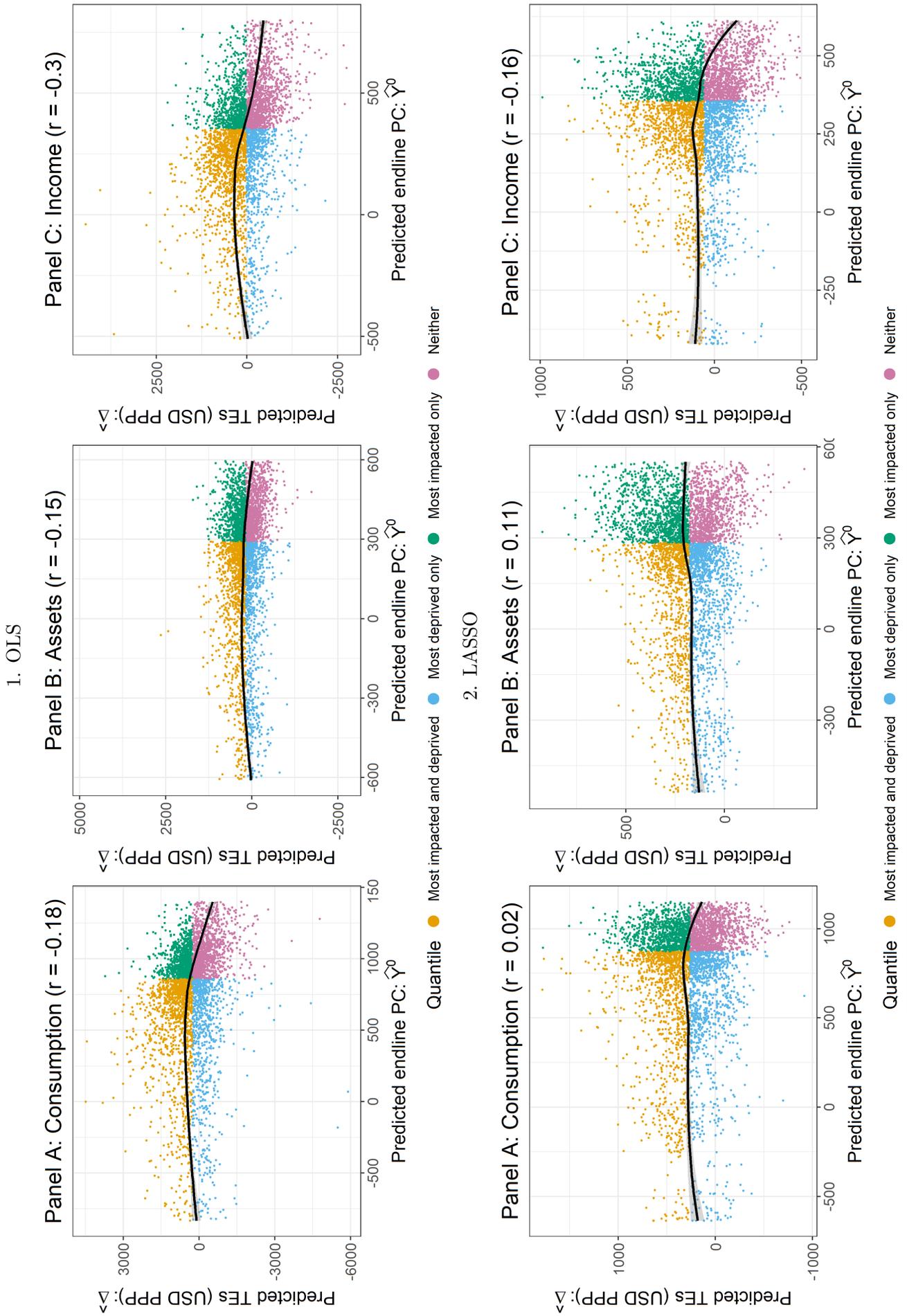
Table B.1: Selecting Proxy Means Test (PMT) Variables

(1)	(2)	(3)	(4)	(5)	(6)
Measure	Source	Collected in GE Baseline (1/0)	Variation in GE baseline data (1/0)	Selected (preferred) PMT list	Selected via LASSO (robustness check)
<i>Panel A: Human Capital</i>					
Education of Household Head	KW, A	1	1		Indicator for above median edu for HH head
Highest level of education in household	KW, A	1	1		Indicator for above median edu for highest in HH
Female literacy	KW	0	–		
Number of children in school	KW, A	1	1		Number of children in school
<i>Panel B: Demographic Characteristics</i>					
Household Size	KW, A	1	1	Household size	Household size
Number of Children	KW, A	1	1	Indicator for children; Indicator for child under 3; Indicator for child under 6; Indicator for school-age children	Indicator for has children
Gender/marital status of head (e.g. widow)	KW, A	1	1	Respondent is female; Respondent is widow	Female household head; Respondent is widow
Age of household head	KW, A	1	1	Household has elderly member	Household head age; Household has elderly member
Dependency ratio	KW, A	1	1		
<i>Panel C: Household assets</i>					
Own home	KW, A	1	0		
Wall material	KW, A	1	0		
Roofing material	KW, A	1	0		
Floor material	A	1	0		
Number of rooms / floor space per-capita	KW, A	1	1		
Type of latrine / toilet	KW, A	1	0		
Water source	A, N	1	1		
Access to electricity	KW, A	1	0		
Gas connection	N	0	–		
Type of cooking fuel	KW, A	0	–		
Radio, television	KW, N	1	1	Indicator for owning TV or radio	Indicator for owning TV or radio
Telephone / Mobile phone	KW, N	1	1		Indicator for mobile phone
Cooker, heater, fan, air conditioning	KW	1	1		Above median appliance value
Furniture	KW	1	1		Above median furniture value
Bicycle, car, motorcycle	KW, N	1	1		Indicator for owning bicycle
Access to microcredit	A	1	1		
<i>Panel D: Productive assets</i>					
Landholding size	KW, N	1	1	Household owns land; Household owns more than 0.25 acres of land	
Livestock	KW	1	1	Indicator for owning livestock	Indicator for owning livestock
Use of fertilizer	KW	1	1		
<i>Panel E: Livelihood options</i>					
Agricultural or non-farm wage labor	KW	1	1	Respondent employed	Respondent employed
Non-farm independent business	KW	1	1	Respondent self-employed	Respondent self-employed
Agricultural production of cash or staple crops	KW	1	0		
Receipt of foreign remittances	KW	0	–		
Sector of work (informal, industry, or agriculture)	KW, A	1	1		
Annual income threshold	N	1	1		Above median total income
Government employee	N	0	–		
Food security (adults, children)		1	1	Number of meals eaten yesterday; Number of meals with protein yesterday	
<i>Total variables</i>		31	24	16	18

Notes: This table outlines variables that have been included in proxy means tests (PMTs) and their overlap with variables in this study’s baseline survey. Column (1) reports the measures from the sources in Column (2), namely [Kidd and Wylde \(2011\)](#) (KW), [Alatas et al. \(2012\)](#) (A), and [Niehaus et al. \(2013\)](#) (N). Columns (3) and (4) denote whether or not similar variables were collected as part of the GE baseline survey, and if so, whether there is meaningful variation in the variable. Column (5) includes our preferred list of PMT-like variables, and column (6) reports the set of variables selected via LASSO among those in column (4).

C Appendix: Alternative learning models

Figure C.1: Predicted treatment effects ($\hat{\Delta}_h$) plotted against the predicted untreated per capita values (\hat{y}_h^0) for OLS and LASSO predictions



Notes: These figures re-create Figure 1 using OLS (Row 1) and LASSO (Row 2) as prediction methods in contrast to generalized random forests.

Table C.1: Predicted per capita untreated outcomes (y_h^0) by group using OLS for prediction

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	722	392	667	-275
Actual	729	517	750	-233
				(-276,-191)
<i>Panel B: Assets</i>				
Predicted	214	19	208	-189
Actual	213	69	255	-186
				(-212,-160)
<i>Panel C: Income</i>				
Predicted	298	101	246	-146
Actual	297	187	294	-107
				(-135,-80)

Notes: This table reproduces Table 1 but replaces GRF predictions for each fold by ordinary least squares (OLS) predictions. See Table 1 for more details.

Table C.2: Predicted Average Treatment Effects (Δ_h) by group using OLS for prediction

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	263	450	821	-371
Actual	310	335	351	-16
				(-85,52)
<i>Panel B: Assets</i>				
Predicted	195	236	450	-214
Actual	182	147	179	-32
				(-71,6)
<i>Panel C: Income</i>				
Predicted	55	236	487	-251
Actual	85	136	146	-11
				(-64,42)

Notes: This table reproduces Table 2 but replaces GRF predictions for each fold by ordinary least squares (OLS) predictions. See Table 2 for more details.

Table C.3: Predicted per capita untreated outcomes (y_h^0) by group using LASSO

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	725	467	730	-264
Actual	729	491	760	-269
				(-315,-224)
<i>Panel B: Assets</i>				
Predicted	213	37	242	-206
Actual	213	54	254	-200
				(-227,-173)
<i>Panel C: Income</i>				
Predicted	297	151	283	-131
Actual	297	176	302	-126
				(-156,-97)

Notes: This table reproduces Table 1 but with LASSO predictions replacing GRF predictions for each fold.

Table C.4: Predicted Average Treatment Effects (Δ_h) by group using LASSO

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	272	290	494	-204
Actual	310	322	314	7
				(-65,80)
<i>Panel B: Assets</i>				
Predicted	192	179	303	-123
Actual	182	158	210	-53
				(-93,-12)
<i>Panel C: Income</i>				
Predicted	76	103	221	-117
Actual	85	89	103	-14
				(-69,41)

Notes: This table reproduces Table 2 but with LASSO predictions replacing GRF predictions for each fold.

D Appendix: Robustness checks

Table D.1: Overlap of socially optimal households with most deprived and most impacted using CRRA utility

CRRA: ρ	(1) Most deprived	(2) Most impacted	(3) Choice	(4) ρ_c
<i>Panel A: Consumption</i>				
0.0000	0.26	1.00	I	
0.5000	0.29	0.93	I	
1.0000	0.31	0.89	I	←-- 1.822
2.0000	0.33	0.85	D	
4.0000	0.35	0.82	D	
<i>Panel B: Assets</i>				
0.0000	0.26	1.00	I	
0.5000	0.43	0.68	I	
1.0000	0.47	0.61	I	←-- 1.123
2.0000	0.50	0.56	D	
4.0000	0.51	0.54	D	
<i>Panel C: Income</i>				
0.0000	0.45	0.99	I	
0.5000	0.50	0.86	I	
1.0000	0.53	0.78	I	←-- 1.302
2.0000	0.57	0.71	D	
4.0000	0.59	0.65	D	

Notes: This table reproduces the social welfare analysis of Table 4, but using constant relative risk aversion (CRRA) utility. Since CRRA is not defined for negative values, we truncate the data at 1USD. Column 1 (2) reports the share of households belonging to I (D) that are also “socially optimal” for a planner to treat. Socially optimal households are those in the top 50% of households ranked by potential gains from treatment using a CRRA utility function for the risk aversion parameter (ρ) given in the row label. Reported shares are the mean of 150 5-fold GRF iterations; median ratios are similar (not shown). Column 3 reports the welfare maximizing choice between targeting the most impacted (I) and the most deprived (D) for a given ρ value. Column (4) reports ρ_c , the mean minimum value of ρ required to rationalize a policy targeting the most deprived instead of targeting the most impacted across the 150 estimated models. Formally, $\rho_c = \min(\{\rho : SW(D; \rho) \geq SW(I; \rho)\})$.

Table D.2: Predicted per capita untreated outcomes (y_h^0) by group with LASSO selected covariates

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	752	548	914	-366
Actual	729	500	912	-412
				(-471,-353)
<i>Panel B: Assets</i>				
Predicted	234	78	332	-254
Actual	213	37	328	-290
				(-321,-259)
<i>Panel C: Income</i>				
Predicted	303	186	315	-129
Actual	297	155	323	-168
				(-211,-124)

Notes: This table reproduces Table 1 but with covariates (features) selected via LASSO (see Table B.1).

Table D.3: Predicted Average Treatment Effects (Δ_i) by group with LASSO selected covariates

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	259	240	298	-59
Actual	310	308	397	-89
				(-173,-4)
<i>Panel B: Assets</i>				
Predicted	181	171	197	-26
Actual	182	176	181	-5
				(-52,42)
<i>Panel C: Income</i>				
Predicted	61	61	83	-22
Actual	85	95	102	-7
				(-69,56)

Notes: This table reproduces Table 2 but with covariates (features) selected via LASSO (see Table B.1).

Table D.4: Overlap of socially optimal households with most deprived and most impacted with LASSO selected covariates

	(1)	(2)	(3)	(4)	(5)
CARA: α	CE	Most deprived	Most impacted	Choice	α_c
<i>Panel A: Consumption</i>					
0.0000	\$50	0.32	1.00	I	
0.0005	\$49	0.33	0.92	I	
0.0010	\$49	0.35	0.88	I	
0.0075	\$41	0.41	0.76	I	$\leftarrow \dots 0.013$
0.0150	\$33	0.42	0.74	D	
<i>Panel B: Assets</i>					
0.0000	\$50	0.30	1.00	I	
0.0005	\$49	0.35	0.89	I	
0.0010	\$49	0.40	0.80	I	$\leftarrow \dots 0.005$
0.0075	\$41	0.60	0.53	D	
0.0150	\$33	0.62	0.50	D	
<i>Panel C: Income</i>					
0.0000	\$50	0.49	1.00	I	
0.0005	\$49	0.51	0.96	I	
0.0010	\$49	0.53	0.92	I	
0.0075	\$41	0.64	0.70	I	$\leftarrow \dots 0.008$
0.0150	\$33	0.67	0.64	D	

Notes: This table reproduces the social welfare analysis of Table 4 but with features selected via LASSO (Table B.1), as in Tables D.2 and D.3. See Table 4 for more details.

Table D.5: Predicted per capita untreated outcomes (y_h^0) by group using untreated data for endline predictions

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	724	511	896	-385
Actual	729	505	910	-405
				(-468,-341)
<i>Panel B: Assets</i>				
Predicted	214	66	325	-259
Actual	213	54	337	-282
				(-313,-252)
<i>Panel C: Income</i>				
Predicted	294	177	303	-126
Actual	297	171	323	-151
				(-185,-118)

Notes: This table reproduces Table 1 by generating prediction models for endline outcomes using only data from transfer-eligible households in control villages. Due to computational limitations we only compute the bootstrap CIs for our main results. Following Chernozhukov et al. (2018), we report the confidence intervals using the median standard error for the actual statistic, clustered at the village level. See Table 1 for more details.

Table D.6: Predicted Average Treatment Effects (Δ_i) by group using untreated data for endline predictions

	(1)	(2)	(3)	(4)
Statistic	All	Most deprived (D)	Most impacted (I)	Difference (D)-(I)
<i>Panel A: Consumption</i>				
Predicted	277	250	326	-76
Actual	310	274	405	-132
				(-216,-47)
<i>Panel B: Assets</i>				
Predicted	189	178	207	-28
Actual	182	151	188	-37
				(-85,11)
<i>Panel C: Income</i>				
Predicted	69	69	94	-25
Actual	85	89	94	-4
				(-64,56)

Note: This table reproduces Table 2 where the classification of most deprived comes from models trained using only untreated data (i.e. transfer-eligible households in control villages), and shows results remain similar. The process for classifying most impacted households is the same as in Table 2. Following Chernozhukov et al. (2018), we report the confidence intervals using the median standard error for the actual statistic, clustered at the village level. See Table 2 for more details.

Table D.7: Overlap of socially optimal households with most impacted and deprived using untreated data for endline predictions

	(1)	(2)	(3)	(4)
CARA: α	Most deprived	Most impacted	Choice	α_c
<i>Panel A: Consumption</i>				
0.0000	0.28	1.00	I	
0.0005	0.30	0.95	I	
0.0010	0.31	0.92	I	
0.0075	0.37	0.82	I	
0.0150	0.38	0.80	I	\leftarrow 0.017
<i>Panel B: Assets</i>				
0.0000	0.27	1.00	I	
0.0005	0.31	0.91	I	
0.0010	0.35	0.83	I	
0.0075	0.48	0.59	I	\leftarrow 0.008
0.0150	0.50	0.56	D	
<i>Panel C: Income</i>				
0.0000	0.49	1.00	I	
0.0005	0.50	0.96	I	
0.0010	0.50	0.93	I	
0.0075	0.56	0.74	I	\leftarrow 0.013
0.0150	0.57	0.68	D	

Notes: This table reproduces the social welfare analysis of Table 4, but using the results based on estimating endline outcomes with untreated data from Tables D.5 and D.6. See Table 4 for more details.

E Appendix: Algorithms

Algorithm 2:

Result: Mean statistic of the most impacted and most deprived

```
for  $i$  in 1...150 do
  Split data randomly into 5 folds*;
  for  $k$  in 1...5 do
    test data  $\leftarrow$  fold( $k$ );
    train data  $\leftarrow$  fold(- $k$ );
    rf  $\leftarrow$  randomforest(train data);
    cf  $\leftarrow$  causalforest(train data);
     $\hat{Y}^0(X_i) \leftarrow$  predict(rf, test data);
     $\hat{\Delta}(X_i) \leftarrow$  predict(cf, test data);
     $HH_k \leftarrow$  Households  $\cap$  fold( $k$ );
    for  $h$  in  $HH_k$  do
      if  $\hat{Y}^0(X_i)[h] \leq \text{median}(\hat{Y}^0(X_i))$  then
        | deprived[ $h$ ] = 1
      end
      if  $\hat{\Delta}(X_i)[h] > \text{median}(\hat{\Delta}(X_i))$  then
        | impacted[ $h$ ] = 1
      end
    end
  end
  results[ $i$ ]  $\leftarrow$  statistic(deprived, impacted, data);
end
result  $\leftarrow$  mean(results);
```

* The random splits into 5 folds can be done separately for random forests and causal forests, or they can share the same splits. Our preferred results use the same splits but we include results from the alternative option as a robustness check.

Algorithm 3: Randomization inference

Result: RI test (p)

STATISTIC \leftarrow result[Algorithm 2 on actual data]

Generate a GRID of values in the 99.9% CI of the ATE

for ATE in $GRID$ **do**

 Construct potential outcomes under the null of a homogeneous treatment effect **if** *household* i

was treated **then**

 | $Y_0 = Y_{obs} - ATE$

 | $Y_1 = Y_{obs}$

else

 | $Y_0 = Y_{obs}$

 | $Y_1 = Y_{obs} + ATE$

end

for $ITERATION$ in $1 \dots NUMBER_RI_ITERATIONS$ **do**

 Randomly assign $\frac{1}{2}$ of villages a treatment status of 1

if $treatment = 1$ **then**

 | $Y = Y_1$ for all households in the village

else

 | $Y = Y_0$ for all households in the village

end

 Run Algorithm 2 using the simulated outcome data Y

 RIresults[i] \leftarrow result[Algorithm 2 on simulated data]

end

$pvals[i] \leftarrow \frac{1}{len(RIresults)} \cdot |\{R \in RIresults : R > STATISTIC\}|$

end

$p \leftarrow \max \{x : x \in pvals\}$
