ONLINE APPENDIX

Land Rental Markets: Experimental Evidence from Kenya

Michelle Acampora
ETH Zurich

Lorenzo Casaburi
University of Zurich

Jack Willis
Columbia University

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A Listing and baseline analysis

This appendix presents additional statistics using listing and baseline survey data. First, we use listing data to compare characteristics of surveyed vs non-surveyed plot owners, among those expressing interest in the rental subsidy in the listing (see Section 3.2). Second, we compare owner and Target Plot characteristics in the stratum where, in the listing, owners said they were planning to cultivate the Target Plot in the first experimental season vs those who said they would not. Third, we present balance by treatment group, focusing on characteristics of owners, Target Plots, and other plots. Finally, we compare out sample to farmer samples in the World Bank LSMS.

A.1 Surveyed vs non-surveyed plot owners, among those expressing interest in the rental subsidy in the listing

Table A.1: Comparison of surveyed vs non-surveyed owners

	Surveyed [S]	Not Surveyed [NS]	[S-NS]	N
Male	0.68	0.69	-0.01	877
	[0.47]	[0.47]	[.03]	
Age	50.05	51.80	-1.75	875
	[14.87]	[15.10]	[1.0]	
Has a phone	0.90	0.91	-0.01	877
	[0.29]	[0.28]	[.01]	
No. plots owned	3.52	3.47	0.05	877
	[1.30]	[1.38]	[.09]	
Total acres owned [wins. 1%]	2.50	2.79	-0.29	877
	[1.88]	[2.36]	[.14]	
Renting out at least one plot [2019 LR]	0.10	0.13	-0.02	877
	[0.31]	[0.34]	[.02]	
No. plots rented out [2019 LR]	0.13	0.15	-0.02	877
	[0.40]	[0.42]	[.02]	
At least one plot left uncultivated [2019 LR]	0.39	0.35	0.04	877
	[0.49]	[0.48]	[.03]	
Proportion of land owned left uncultivated [2019 LR]	0.14	0.13	0.01	877
	[0.21]	[0.21]	[.01]	
Proportion of land cultivated w/ cash crops [2019 SR]	0.17	0.15	0.02	877
	[0.26]	[0.24]	[.01]	

Notes: The sample in the table includes plot owners who expressed interest for the rental subsidy in the listing (N=877). Within this sample, we compare those owners who were surveyed at baseline and eventually included in the study (N=521) to those who were not surveyed (N=356). The data comes from the listing survey. *Male* is a binary indicator equal to one if the respondent was male. *Age* is missing two observations relative to all other included variables, due to two large outlier age values. We winsorize *Acres Owned* at the top 1%. *Share of plots cultivated with cash crops* is the share of plots each owner is cultivating with groundnuts, tobacco or sugarcane. The *[S-NS]* columns are generated by a regression of each outcome on a surveyed dummy with robust standard errors.

A.2 Stratum C vs Stratum NC

Table A.2: Comparison of Stratum C vs Stratum NC

(A) Owner Characteristics	Plan to Cultivate [C]	Plan to Fallow [NC]	[C-NC]	N
Age	50.08	51.34	-1.25	521
	[14.35]	[15.98]	[1.42]	
Male	0.70	0.70	0.00	521
	[0.46]	[0.46]	[0.04]	
Family Size	5.86	5.35	0.51	521
	[2.72]	[2.70]	[0.25]	
High School Educated	0.24	0.22	0.01	521
	[0.43]	[0.42]	[0.04]	
Agricultural Training	0.29	0.32	-0.04	521
	[0.45]	[0.47]	[0.04]	
Total acres owned in 2019 Long Rains	2.54	2.64	-0.10	521
	[1.93]	[2.03]	[0.18]	
Have maize stocks from own production, last 12 months	0.70	0.68	0.01	521
	[0.46]	[0.47]	[0.04]	
Number person-days spent working on other farms, last 7 months	25.41	20.07	5.33	521
	[73.77]	[69.17]	[6.53]	
Number person-days spent on non-ag work, last 12 months	21.25	24.23	-2.98	521
	[31.73]	[34.48]	[3.09]	
Taken a loan in last 12 months	0.63	0.61	0.01	521
	[0.48]	[0.49]	[0.04]	
5k Ksh in emergency savings	0.34	0.45	-0.11	521
	[0.48]	[0.50]	[0.05]	
Wealth index, assets- and amenities-based PCA	-0.05	0.09	-0.14	520
	[1.72]	[2.07]	[0.18]	
(B)Target Plot Characteristics				
Plot size	0.71	0.73	-0.01	521
	[0.46]	[0.47]	[0.04]	
Sandy clay soil	0.29	0.22	0.07	521
	[0.46]	[0.41]	[0.04]	
Erosion dummy	0.26	0.19	0.07	521
	[0.44]	[0.39]	[0.04]	
Cultivated in 2019 Long Rains	0.73	0.36	0.36	521
	[0.45]	[0.48]	[0.04]	
Rented out in 2019 Long Rains	0.13	0.08	0.05	521
	[0.34]	[0.28]	[0.03]	
Cultivated with maize in 2019 Long Rains	0.60	0.29	0.31	521
	[0.49]	[0.46]	[0.04]	
Cultivated with commercial crops in 2019 Long Rains	0.05	0.02	0.03	521
	[0.22]	[0.15]	[0.02]	
Value of agricultural inputs in 2019 Long Rains	37.9	22.3	15.60	520
	[66.0]	[59.1]	[5.70]	
Value of household labor in 2019 Long Rains	36.0	16.3	19.70	521
	[44.5]	[35.5]	[3.60]	
Value of hired labor in 2019 Long Rains	13.4	12.1	1.30	521
	[26.5]	[26.9]	[2.50]	
Cultivated in 2018 Short Rains	0.63	0.37	0.25	521
	[0.48]	[0.49]	[0.04]	
Rented out in 2018 Short Rains	0.10	0.08	0.02	521
	[0.30]	[0.28]	[0.03]	
Harvest value in 2018 Short Rains	78.2	29.0	49.2	521
	[167.8]	[71.1]	[10.5]	

Notes: The table presents a comparison of owner and Target Plot characteristics for owners that, in the listing, reported they were planning to cultivate the Target Plot for the first experimental agricultural season, i.e., the Short Rains 2019, (*Stratum C*, N=342) against those who were either planning to leave it fallow or still undecided (*Stratum NC*, N=179). The data comes from the owner baseline survey. *Male* is a binary indicator equal to one if the household head is male. *High School Educ household head* is a binary indicator equal to one if the highest level of education completed by the household head is high school or higher. *Agri Training household head* is a binary indicator equal to one if the household head received specific agricultural training in the past 3 years. *Total plots: total acres owned in 2019 long rains* is the sum of plot sizes across all plots owned at baseline, winsorized at the top 1%. *5k Ksh in emergency savings* is a binary indicator equal to one if the household had enough savings to cover an emergency expenditure of 5,000 Ksh ($50). *Wealth index, assets- and amenities-based PCA* is

the standardized principal component of a vector of assets and amenities (excluding land and livestock). It includes a missing value for when a respondent did not provide an answer to the relevant survey questions. *Cultivated with commercial crops in 2019 long rains* is a binary indicator equal to one if the Target Plot was cultivated with groundnuts, tobacco or sugarcane during the long rains 2019. Value of agricultural inputs, household labor, hired labor and harvest are expressed in USD (1 USD = 100 KSh) and winsorized at the top 1%. *Value of agricultural inputs in 2019 long rains* is the value of any seeds, compost, chemical fertilizer, and pesticides used on the Target Plot. There is one missing observation for when a respondent did not report the quantity of fertilizer used. *Value of hired labor in 2019 long rains* is the number of hired-work days valued at the median reported wage. *Value of household labor in 2019 long rains* is the number of household-member-work days valued at 60% of the median reported wage. Since we conducted the baseline survey while the 2019 Long Rains harvesting was ongoing, we do not have information on harvest amount for that season for most of the sample. The difference *[C-NC]* is the coefficient from a regression of each outcome on a binary indicator equal to one if the household was planning to cultivate the Target Plot in the short rains 2019.

A.3 Balance

Table A.3: Balance:

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
(A) Owners							
Age	49.38	51.81	50.34	-2.22	-0.95	1.40	521
	[15.19]	[15.19]	[14.38]	[1.60]	[1.64]	[1.61]	
Male	0.69	0.74	0.69	-0.06	-0.01	0.07	521
	[0.47]	[0.44]	[0.47]	[0.05]	[0.05]	[0.05]	
Family Size	5.37	5.83	5.85	-0.46	-0.42	0.06	521
	[2.83]	[2.71]	[2.61]	[0.30]	[0.30]	[0.28]	
High School Educated	0.26	0.21	0.23	0.05	0.01	-0.01	521
	[0.44]	[0.41]	[0.42]	[0.04]	[0.05]	[0.05]	
Agricultural Training	0.32	0.25	0.33	0.07	0.01	-0.06	521
	[0.47]	[0.44]	[0.47]	[0.05]	[0.05]	[0.05]	
Compare agricultural experience to avg. farmer (1-5)	2.84	2.78	2.89	0.04	-0.03	-0.10	521
	[0.89]	[0.82]	[0.92]	[0.09]	[0.09]	[0.09]	
No. plots owned in 2019 Long Rains	3.49	3.53	3.65	-0.05	-0.21	-0.15	521
	[1.28]	[1.34]	[1.29]	[0.14]	[0.14]	[0.14]	
Total acres owned in 2019 Long Rains	2.48	2.64	2.59	-0.17	-0.11	0.06	521
	[1.87]	[2.07]	[1.96]	[0.18]	[0.17]	[0.20]	
Have maize stocks from own production, last 12 months	0.69	0.70	0.68	0.00	0.01	0.01	521
	[0.46]	[0.46]	[0.47]	[0.04]	[0.04]	[0.05]	
Experienced a hunger period, last 12 months	0.34	0.36	0.37	-0.02	-0.04	-0.01	521
	[0.48]	[0.48]	[0.48]	[0.05]	[0.05]	[0.05]	
Own oxen or cow	0.69	0.67	0.61	0.02	0.07	0.05	521
	[0.46]	[0.47]	[0.49]	[0.05]	[0.05]	[0.05]	
No. person-days spent working on other farms, last 7 months	20.04	20.14	30.46	-1.62	-10.26	-8.90	521
	[70.39]	[56.06]	[86.67]	[6.68]	[8.78]	[6.98]	
No. person-days spent on non-ag work, last 12 months	20.90	20.21	25.68	1.06	-6.58	-6.76	521
	[31.16]	[31.62]	[35.05]	[3.22]	[3.53]	[3.63]	
Taken a loan in last 12 months	0.66	0.57	0.63	0.10	0.03	-0.06	521
	[0.48]	[0.50]	[0.48]	[0.05]	[0.05]	[0.05]	
Total borrowed, last 12 months	53.0	88.8	69.5	-32.8	-23.1	14.9	521
	[123.6]	[233.4]	[145.9]	[19.1]	[14.7]	[21.1]	
Participate in ROSCA	0.48	0.45	0.52	0.01	-0.04	-0.06	521
	[0.50]	[0.50]	[0.50]	[0.05]	[0.05]	[0.06]	
Have bank account	0.25	0.26	0.28	0.00	-0.03	-0.02	521
	[0.43]	[0.44]	[0.45]	[0.05]	[0.05]	[0.05]	
Total amount saved	64.3	74.1	78.7	-5.1	-16.8	-4.4	521
	[155.5]	[170.2]	[175.0]	[17.9]	[17.4]	[18.8]	
5k Ksh in emergency savings	0.38	0.34	0.41	0.03	-0.03	-0.06	521
	[0.49]	[0.48]	[0.49]	[0.05]	[0.05]	[0.05]	
Wealth index, assets- and amenities-based PCA	0.17	0.01	-0.18	0.15	0.33	0.21	520
	[2.07]	[1.79]	[1.65]	[0.22]	[0.19]	[0.18]	
(B) Target Plots							
Plot size	0.71	0.76	0.69	-0.04	0.02	0.07	521
	[0.44]	[0.52]	[0.43]	[0.03]	[0.03]	[0.03]	
Inherited	0.91	0.91	0.93	0.01	-0.02	-0.02	521
	[0.28]	[0.29]	[0.26]	[0.03]	[0.03]	[0.03]	
Certificate of title/customary ownership	0.76	0.67	0.67	0.10	0.10	0.00	521
	[0.43]	[0.47]	[0.47]	[0.05]	[0.05]	[0.05]	
Respondent's homestead in different village than plot	0.02	0.02	0.01	0.00	0.01	0.01	521
	[0.13]	[0.13]	[0.08]	[0.01]	[0.01]	[0.01]	
Sandy loam soil	0.53	0.53	0.55	-0.01	0.00	0.00	521
	[0.50]	[0.50]	[0.50]	[0.05]	[0.05]	[0.05]	
Sandy clay soil	0.27	0.26	0.26	0.02	0.01	-0.02	521
	[0.45]	[0.44]	[0.44]	[0.05]	[0.05]	[0.05]	
Soil quality index (1-3)	2.56	2.56	2.64	-0.01	-0.08	-0.07	521
	[0.54]	[0.53]	[0.53]	[0.06]	[0.06]	[0.05]	
Swampy/dry index (1-3)	2.42	2.39	2.41	0.03	-0.02	0.01	509
	[0.60]	[0.61]	[0.60]	[0.07]	[0.07]	[0.07]	
Erosion dummy	0.21	0.21	0.29	0.00	-0.07	-0.09	521
	[0.41]	[0.41]	[0.46]	[0.04]	[0.04]	[0.04]	
Irrigation dummy	0.05	0.05	0.07	0.00	-0.02	-0.01	521
	[0.21]	[0.22]	[0.26]	[0.02]	[0.02]	[0.03]	
Cultivated in 2019 Long Rains	0.63	0.60	0.57	0.04	0.06	0.04	521
	[0.48]	[0.49]	[0.50]	[0.05]	[0.05]	[0.05]	

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
Rented out in 2019 Long Rains	0.13	0.10	0.12	0.03	0.01	-0.02	521
	[0.33]	[0.31]	[0.33]	[0.03]	[0.04]	[0.03]	
Cultivated with maize in 2019 Long Rains	0.53	0.49	0.46	0.05	0.07	0.03	521
	[0.50]	[0.50]	[0.50]	[0.05]	[0.05]	[0.05]	
Cultivated with commercial crops in 2019 Long Rains	0.04	0.05	0.04	-0.01	0.00	0.01	521
	[0.20]	[0.21]	[0.20]	[0.02]	[0.02]	[0.02]	
Value of agricultural inputs in 2019 Long Rains	36.6	38.2	22.9	-1.1	14.6	17.2	520
	[71.7]	[71.2]	[45.2]	[6.8]	[6.4]	[6.2]	
Value of household labor in 2019 Long Rains	32.10	26.28	29.47	6.82	4.70	-1.28	521
	[45.58]	[35.33]	[46.20]	[4.36]	[4.88]	[4.31]	
Value of hired labor in 2019 Long Rains	16.2	11.7	11.1	4.3	5.8	1.8	521
	[30.3]	[24.7]	[24.4]	[3.0]	[2.8]	[2.7]	
Cultivated in 2018 Short Rains	0.53	0.56	0.53	-0.02	0.00	0.04	521
	[0.50]	[0.50]	[0.50]	[0.05]	[0.05]	[0.05]	
Rented out in 2018 Short Rains	0.09	0.09	0.10	0.01	-0.01	-0.01	521
	[0.29]	[0.29]	[0.30]	[0.03]	[0.03]	[0.03]	
Harvest value in 2018 Short Rains	60.7	72.4	50.7	-8.5	10.5	18.6	521
	[125.2]	[176.4]	[124.1]	[16.3]	[14.0]	[16.6]	
(C) Non-Target Plots							
No. plots owned in 2019 Long Rains	2.49	2.53	2.65	-0.05	-0.21	-0.15	521
	[1.28]	[1.34]	[1.29]	[0.14]	[0.14]	[0.14]	
Total acres owned in 2019 Long Rains	1.77	1.88	1.90	-0.12	-0.12	-0.01	521
	[1.69]	[1.83]	[1.76]	[0.18]	[0.17]	[0.19]	
No. plots rented out in 2019 Long Rains	0.10	0.15	0.22	-0.05	-0.12	-0.06	521
	[0.34]	[0.44]	[0.53]	[0.04]	[0.05]	[0.05]	
Cultivated in 2019 Long Rains	2.10	1.94	2.18	0.17	-0.10	-0.27	521
	[1.33]	[1.21]	[1.25]	[0.13]	[0.14]	[0.13]	
Cultivated with maize in 2019 Long Rains	1.15	1.16	1.26	-0.03	-0.13	-0.12	521
	[0.97]	[0.88]	[0.97]	[0.10]	[0.10]	[0.09]	
Cultivated with commercial crops in 2019 Long Rains	0.27	0.20	0.23	0.07	0.04	-0.01	521
	[0.52]	[0.44]	[0.55]	[0.05]	[0.06]	[0.06]	
Value of agricultural inputs in 2019 Long Rains	114.0	88.6	92.9	26.9	19.0	-0.3	521
	[205.6]	[189.8]	[170.2]	[19.1]	[19.3]	[18.7]	
Value of household labor in 2019 Long Rains	28.90	24.53	28.48	3.59	2.57	-3.85	521
	[44.86]	[32.44]	[41.50]	[4.34]	[4.80]	[4.11]	
Value of hired labor in 2019 Long Rains	8.8	9.6	8.8	-1.7	-0.2	1.5	520
	[17.2]	[19.8]	[18.5]	[2.2]	[1.9]	[2.1]	
Cultivated in 2018 Short Rains	1.85	1.71	1.87	0.16	-0.05	-0.20	521
	[1.32]	[1.23]	[1.31]	[0.13]	[0.14]	[0.14]	
Harvest value in 2018 Short Rains	216.4	216.6	231.4	8.1	-6.4	-24.6	521
	[493.4]	[495.2]	[539.0]	[57.6]	[56.3]	[55.3]	

Notes: The table presents the baseline balance for owners' socio-demographic characteristics and non-agricultural outcomes (Panel A), Target Plots (Panel B) and Non-target plots (Panel C). The data comes from the owner baseline survey. **Panel A:** *Male* is a binary indicator equal to one if the household head is male. *High School Educated* is a binary indicator equal to one if the highest level of education completed by the household head is high school or higher. *Agricultural Training* is a binary indicator equal to one if the household head received specific agricultural training in the past 3 years. *Compare agricultural experience to avg. farmer* comes from a question asking owners to assess their experience relative to the average farmer in their village on a 5-point scale, from "much less experience" to "much more experience". *Own oxen or cow* is a binary indicator equal to one if the household owns any cows or oxen. *5k Ksh in emergency savings* is a binary indicator equal to one if the household had enough savings to cover an emergency expenditure of 5,000 Ksh ($50). *Wealth index, assets- and amenities-based PCA* is the standardized principal component of a vector of assets and amenities (excluding land and livestock). It includes a missing value for when a respondent did not provide an answer to relevant survey questions. **Panel B:** *Plot size* is the average between plot size reported by the owner and plot size measured at baseline by enumerators using hand-held GPS devices. The unit is acres. *Certificate of title/customary ownership* is a binary indicator equal to one if the owner has either a certificate of title or of customary ownership for the Target Plot. *Soil quality index* is a soil quality index self-reported by the respondent and it could take values 1 = poor, 2 = fair, 3 = good. *Swampy/dry index* could take values of 1 = swampy, 2 = mix, 3 = dry. Nine observations are missing for when respondent's were not aware of the swampy/dry condition of the Target Plot. *Cultivated with commercial crops in 2019 long rains* is a binary indicator equal to one if the Target Plot was cultivated with groundnuts, tobacco or sugarcane during the long rains 2019. Value of agricultural inputs, household labor, hired labor and harvest are expressed in USD (1 USD = 100 KSh) and winsorized at the top 1%. *Value of agricultural inputs in 2019 long rains* is the value of any seeds, compost, chemical fertilizer, and pesticides used on the Target Plot. There is one missing observation for when a respondent did not report the quantity of fertilizer used. *Value of hired labor in 2019 long rains* is the number of hired-work days valued at the median reported wage. *Value of household labor in 2019 long rains* is the number of household-member-work days valued at 60% of the median reported wage. Since we conducted the baseline survey while the 2019 Long Rains harvesting was ongoing, we do not have information on harvest amount for that season for most of the sample. **Panel C:** *Owned in 2019 long rains* and *Rented out in 2019 long rains* is the number of Non-target plots owned and rented out at baseline, respectively. *Total acres owned in 2019 long rains* is the sum of self-reported plot sizes across all Non-target plots and is winsorized at the top 1%. *Cultivated in 2019 long rains* and *Cultivated in 2018 short rains* are the total number of Non-target plots cultivated at baseline (2019 long rains) and in the previous agricultural season (2018 short rains), respectively. *Cultivated with commercial crops in 2019 long rains* is the total number of Non-target plots cultivated with groundnuts, tobacco or sugarcane during the long rains 2019. Value of agricultural inputs and harvest is the sum of the respective values across all Non-target plots. Value of hired and household labor is

the value for the largest Non-target plot. There is one missing for when no hired labor information was provided on the largest Non-target plot. They are expressed in USD (1 USD = 100 KSh) and winsorized at the top 1%. The values in three difference columns are generated by a regression of each outcome for whether the owner was assigned to the Rental Subsidy treatment (cols. 4-5) or the Cash Drop treatment (col. 6). Only the two treatment groups identified in the column header were included in the regression sample. Robust standard errors are included in parentheses.

Table A.4: Balance: Stratum C

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
(A) Owners							
Age	49.70	51.19	49.39	-1.78	0.08	1.71	342
	[15.01]	[13.41]	[14.64]	[1.91]	[2.02]	[1.95]	
Male	0.68	0.75	0.68	-0.07	-0.01	0.09	342
	[0.47]	[0.43]	[0.47]	[0.06]	[0.06]	[0.06]	
Family Size	5.58	6.02	5.98	-0.39	-0.36	0.11	342
	[2.93]	[2.63]	[2.60]	[0.37]	[0.37]	[0.33]	
High School Educated	0.23	0.22	0.26	0.01	-0.04	-0.03	342
	[0.42]	[0.42]	[0.44]	[0.05]	[0.06]	[0.06]	
Agricultural Training	0.28	0.27	0.30	0.01	-0.02	-0.02	342
	[0.45]	[0.45]	[0.46]	[0.06]	[0.06]	[0.06]	
Compare agricultural experience to avg. farmer (1-5)	2.83	2.84	2.85	-0.03	-0.03	-0.03	342
	[0.90]	[0.79]	[0.88]	[0.11]	[0.11]	[0.10]	
No. plots owned in 2019 Long Rains	3.50	3.50	3.53	-0.01	-0.09	-0.04	342
	[1.31]	[1.30]	[1.27]	[0.17]	[0.17]	[0.17]	
Total acres owned in 2019 Long Rains	2.52	2.78	2.31	-0.33	0.14	0.46	342
	[1.91]	[2.21]	[1.62]	[0.23]	[0.20]	[0.22]	
Have maize stocks from own production, last 12 months	0.72	0.72	0.66	0.01	0.06	0.06	342
	[0.45]	[0.45]	[0.48]	[0.05]	[0.05]	[0.06]	
Experienced a hunger period, last 12 months	0.35	0.31	0.36	0.04	0.00	-0.04	342
	[0.48]	[0.46]	[0.48]	[0.06]	[0.06]	[0.06]	
Own oxen or cow	0.68	0.72	0.60	-0.05	0.06	0.12	342
	[0.47]	[0.45]	[0.49]	[0.06]	[0.06]	[0.07]	
No. person-days spent working on other farms, last 7 months	21.97	22.82	31.27	-0.64	-8.58	-5.10	342
	[77.20]	[56.04]	[84.98]	[8.73]	[10.89]	[8.64]	
No. person-days spent on non-ag work, last 12 months	17.73	20.34	25.58	-2.34	-9.49	-6.03	342
	[29.87]	[29.48]	[35.17]	[3.99]	[4.33]	[4.29]	
Taken a loan in last 12 months	0.65	0.59	0.64	0.07	0.01	-0.04	342
	[0.48]	[0.49]	[0.48]	[0.07]	[0.06]	[0.06]	
Total borrowed, last 12 months	43.2	115.6	66.6	-62.9	-24.1	43.0	342
	[67.1]	[281.5]	[133.4]	[25.7]	[14.0]	[29.3]	
Participate in ROSCA	0.42	0.44	0.49	-0.04	-0.07	-0.04	342
	[0.50]	[0.50]	[0.50]	[0.07]	[0.06]	[0.07]	
Have bank account	0.22	0.30	0.29	-0.07	-0.07	0.01	342
	[0.42]	[0.46]	[0.46]	[0.06]	[0.06]	[0.06]	
Total amount saved	55.0	91.3	65.8	-33.5	-10.3	26.3	342
	[147.9]	[199.1]	[146.2]	[22.4]	[18.3]	[23.4]	
5k Ksh in emergency savings	0.29	0.35	0.39	-0.06	-0.10	-0.04	342
	[0.46]	[0.48]	[0.49]	[0.06]	[0.06]	[0.06]	
Wealth index, assets- and amenities-based PCA	-0.06	0.17	-0.26	-0.28	0.17	0.46	341
	[1.59]	[1.87]	[1.67]	[0.24]	[0.22]	[0.23]	
(B) Target Plots							
Plot size	0.72	0.76	0.66	-0.04	0.05	0.09	342
	[0.47]	[0.51]	[0.40]	[0.04]	[0.03]	[0.03]	
Inherited	0.93	0.88	0.93	0.07	0.00	-0.06	342
	[0.26]	[0.33]	[0.25]	[0.04]	[0.03]	[0.04]	
Certificate of title/customary ownership	0.79	0.69	0.66	0.10	0.12	0.02	342
	[0.41]	[0.46]	[0.47]	[0.06]	[0.06]	[0.06]	
Respondent's homestead in different village than plot	0.01	0.02	0.01	-0.01	0.00	0.01	342
	[0.09]	[0.13]	[0.09]	[0.01]	[0.01]	[0.02]	
Sandy loam soil	0.58	0.57	0.54	-0.01	0.05	0.05	342
	[0.50]	[0.50]	[0.50]	[0.06]	[0.07]	[0.06]	
Sandy clay soil	0.28	0.27	0.32	0.04	-0.04	-0.07	342
	[0.45]	[0.45]	[0.47]	[0.05]	[0.06]	[0.06]	
Soil quality index (1-3)	2.52	2.61	2.59	-0.07	-0.06	0.01	342
	[0.57]	[0.52]	[0.56]	[0.07]	[0.08]	[0.07]	
Swampy/dry index (1-3)	2.44	2.44	2.41	-0.02	0.01	0.05	333
	[0.58]	[0.58]	[0.59]	[0.08]	[0.08]	[0.08]	
Erosion dummy	0.22	0.25	0.32	-0.03	-0.08	-0.08	342
	[0.42]	[0.43]	[0.47]	[0.05]	[0.05]	[0.05]	
Irrigation dummy	0.04	0.07	0.08	-0.03	-0.02	0.01	342
	[0.21]	[0.26]	[0.27]	[0.03]	[0.03]	[0.04]	
Cultivated in 2019 Long Rains	0.70	0.73	0.74	-0.03	-0.04	0.00	342
	[0.46]	[0.44]	[0.44]	[0.06]	[0.06]	[0.06]	
Rented out in 2019 Long Rains	0.18	0.11	0.12	0.08	0.06	-0.02	342
	[0.38]	[0.31]	[0.33]	[0.05]	[0.05]	[0.04]	
Cultivated with maize in 2019 Long Rains	0.58	0.60	0.61	-0.01	-0.02	-0.01	342

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
	[0.50]	[0.49]	[0.49]	[0.07]	[0.06]	[0.07]	
Cultivated with commercial crops in 2019 Long Rains	0.05	0.07	0.03	-0.02	0.02	0.04	342
	[0.23]	[0.26]	[0.18]	[0.03]	[0.03]	[0.03]	
Value of agricultural inputs in 2019 Long Rains	41.4	47.5	25.0	-4.9	19.0	25.0	342
	[74.2]	[78.3]	[36.5]	[8.8]	[7.8]	[7.0]	
Value of household labor in 2019 Long Rains	34.35	33.91	39.76	0.94	-3.12	-3.57	342
	[44.40]	[38.70]	[49.71]	[5.47]	[6.27]	[5.92]	
Value of hired labor in 2019 Long Rains	14.4	14.8	11.1	-0.4	3.4	5.2	342
	[29.2]	[28.6]	[21.2]	[4.0]	[3.4]	[3.5]	
Cultivated in 2018 Short Rains	0.58	0.65	0.66	-0.07	-0.08	0.00	342
	[0.50]	[0.48]	[0.48]	[0.06]	[0.06]	[0.06]	
Rented out in 2018 Short Rains	0.12	0.09	0.10	0.04	0.01	-0.03	342
	[0.32]	[0.29]	[0.31]	[0.04]	[0.04]	[0.04]	
Harvest value in 2018 Short Rains	73.0	95.6	66.2	-16.5	9.6	25.3	342
	[145.7]	[204.7]	[146.8]	[23.2]	[20.1]	[23.9]	
(C) Non-Target Plots							
No. plots owned in 2019 Long Rains	2.50	2.50	2.53	-0.01	-0.09	-0.04	342
	[1.31]	[1.30]	[1.27]	[0.17]	[0.17]	[0.17]	
Total acres owned in 2019 Long Rains	1.80	2.02	1.65	-0.28	0.09	0.36	342
	[1.76]	[2.01]	[1.41]	[0.23]	[0.19]	[0.22]	
No. plots rented out in 2019 Long Rains	0.12	0.17	0.23	-0.06	-0.12	-0.06	342
	[0.37]	[0.48]	[0.53]	[0.06]	[0.06]	[0.06]	
Cultivated in 2019 Long Rains	2.09	1.91	2.06	0.20	0.01	-0.15	342
	[1.36]	[1.21]	[1.26]	[0.16]	[0.18]	[0.16]	
Cultivated with maize in 2019 Long Rains	1.07	1.08	1.18	-0.02	-0.16	-0.12	342
	[0.91]	[0.88]	[1.04]	[0.12]	[0.13]	[0.13]	
Cultivated with commercial crops in 2019 Long Rains	0.31	0.28	0.22	0.03	0.11	0.09	342
	[0.55]	[0.51]	[0.57]	[0.07]	[0.07]	[0.07]	
Value of agricultural inputs in 2019 Long Rains	89.4	82.5	71.1	6.5	19.7	13.1	342
	[138.4]	[177.1]	[133.3]	[21.6]	[17.4]	[19.3]	
Value of household labor in 2019 Long Rains	31.15	24.31	27.02	7.30	6.06	-2.55	342
	[47.23]	[29.63]	[41.58]	[5.36]	[5.99]	[4.88]	
Value of hired labor in 2019 Long Rains	6.2	10.8	7.9	-5.6	-1.7	3.5	341
	[13.0]	[21.2]	[17.6]	[2.5]	[2.1]	[2.5]	
Cultivated in 2018 Short Rains	1.85	1.73	1.84	0.15	0.00	-0.10	342
	[1.30]	[1.28]	[1.34]	[0.16]	[0.18]	[0.17]	
Harvest value in 2018 Short Rains	209.2	286.7	192.4	-69.6	32.5	98.4	342
	[480.5]	[599.4]	[441.4]	[75.5]	[60.0]	[65.3]	

Notes: The table presents the baseline balance for Stratum C owners' socio-demographic characteristics and non-agricultural outcomes (Panel A), Target Plots (Panel B) and Non-target plots (Panel C). Details on the data sources and construction of the variables are included in the notes of Table A.3. The values in three difference columns are generated by a regression of each outcome for whether the owner was assigned to the Rental Subsidy treatment (cols. 4-5) or the Cash Drop treatment (col. 6). Only the two treatment groups identified in the column header were included in the regression sample. Robust standard errors are included in parentheses.

Table A.5: Balance: Stratum NC

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
(A) Owners							
Age	48.78	52.97	52.20	-3.08	-3.03	0.81	179
	[15.66]	[18.09]	[13.78]	[2.93]	[2.82]	[2.85]	
Male	0.69	0.72	0.69	-0.05	-0.01	0.03	179
	[0.46]	[0.45]	[0.46]	[0.09]	[0.08]	[0.08]	
Family Size	4.97	5.49	5.59	-0.59	-0.55	-0.03	179
	[2.62]	[2.85]	[2.63]	[0.50]	[0.51]	[0.53]	
High School Educated	0.31	0.20	0.17	0.12	0.10	0.03	179
	[0.46]	[0.40]	[0.38]	[0.08]	[0.08]	[0.08]	
Agricultural Training	0.39	0.21	0.37	0.19	0.05	-0.15	179
	[0.49]	[0.41]	[0.49]	[0.09]	[0.09]	[0.09]	
Compare agricultural experience to avg. farmer (1-5)	2.85	2.67	2.95	0.18	-0.04	-0.24	179
	[0.89]	[0.87]	[0.99]	[0.16]	[0.18]	[0.19]	
No. plots owned in 2019 Long Rains	3.49	3.61	3.88	-0.12	-0.44	-0.36	179
	[1.22]	[1.43]	[1.33]	[0.24]	[0.22]	[0.23]	
Total acres owned in 2019 Long Rains	2.40	2.38	3.14	0.14	-0.61	-0.71	179
	[1.79]	[1.74]	[2.42]	[0.29]	[0.33]	[0.37]	
Have maize stocks from own production, last 12 months	0.64	0.67	0.73	-0.02	-0.08	-0.07	179
	[0.48]	[0.47]	[0.45]	[0.08]	[0.08]	[0.08]	
Experienced a hunger period, last 12 months	0.32	0.44	0.39	-0.13	-0.10	0.04	179
	[0.47]	[0.50]	[0.49]	[0.09]	[0.08]	[0.09]	
Own oxen or cow	0.71	0.57	0.63	0.14	0.08	-0.09	179
	[0.46]	[0.50]	[0.49]	[0.10]	[0.11]	[0.09]	
No. person-days spent working on other farms, last 7 months	16.34	15.18	28.86	-3.53	-13.65	-16.22	179
	[55.49]	[56.21]	[90.64]	[9.79]	[14.78]	[11.85]	
No. person-days spent on non-ag work, last 12 months	26.97	19.98	25.88	7.64	-0.72	-8.17	179
	[32.89]	[35.51]	[35.10]	[5.34]	[6.05]	[6.75]	
Taken a loan in last 12 months	0.68	0.54	0.63	0.16	0.07	-0.09	179
	[0.47]	[0.50]	[0.49]	[0.08]	[0.08]	[0.10]	
Total borrowed, last 12 months	71.9	39.3	75.2	25.5	-21.2	-39.2	179
	[189.2]	[72.6]	[169.0]	[23.0]	[35.4]	[21.8]	
Participate in ROSCA	0.59	0.48	0.58	0.12	0.01	-0.10	179
	[0.50]	[0.50]	[0.50]	[0.08]	[0.09]	[0.10]	
Have bank account	0.31	0.20	0.25	0.13	0.07	-0.07	179
	[0.46]	[0.40]	[0.44]	[0.08]	[0.08]	[0.08]	
Total amount saved	82.2	42.1	104.0	49.6	-29.9	-63.5	179
	[168.9]	[89.1]	[220.3]	[28.3]	[38.5]	[30.4]	
5k Ksh in emergency savings	0.56	0.34	0.46	0.21	0.11	-0.12	179
	[0.50]	[0.48]	[0.50]	[0.09]	[0.09]	[0.09]	
Wealth index, assets- and amenities-based PCA	0.59	-0.28	-0.02	0.97	0.63	-0.27	179
	[2.73]	[1.61]	[1.63]	[0.44]	[0.40]	[0.29]	
(B) Target Plots							
Plot size	0.68	0.76	0.74	-0.05	-0.06	0.03	179
	[0.37]	[0.54]	[0.48]	[0.06]	[0.05]	[0.07]	
Inherited	0.88	0.97	0.92	-0.09	-0.05	0.06	179
	[0.33]	[0.18]	[0.28]	[0.05]	[0.06]	[0.05]	
Certificate of title/customary ownership	0.71	0.64	0.68	0.11	0.04	-0.05	179
	[0.46]	[0.48]	[0.47]	[0.08]	[0.08]	[0.08]	
Respondent's homestead in different village than plot	0.03	0.02	0.00	0.01	0.03	0.02	179
	[0.18]	[0.13]	[0.00]	[0.03]	[0.02]	[0.02]	
Sandy loam soil	0.44	0.46	0.56	-0.02	-0.11	-0.09	179
	[0.50]	[0.50]	[0.50]	[0.09]	[0.09]	[0.09]	
Sandy clay soil	0.25	0.25	0.15	-0.01	0.09	0.06	179
	[0.44]	[0.43]	[0.36]	[0.09]	[0.07]	[0.08]	
Soil quality index (1-3)	2.63	2.48	2.73	0.12	-0.11	-0.23	179
	[0.49]	[0.54]	[0.45]	[0.08]	[0.08]	[0.08]	
Swampy/dry index (1-3)	2.40	2.31	2.42	0.12	-0.09	-0.08	176
	[0.65]	[0.65]	[0.63]	[0.13]	[0.13]	[0.13]	
Erosion dummy	0.19	0.15	0.24	0.04	-0.05	-0.10	179
	[0.39]	[0.36]	[0.43]	[0.06]	[0.07]	[0.06]	
Irrigation dummy	0.05	0.02	0.07	0.04	-0.01	-0.06	179
	[0.22]	[0.13]	[0.25]	[0.03]	[0.05]	[0.04]	
Cultivated in 2019 Long Rains	0.51	0.34	0.24	0.18	0.27	0.11	179
	[0.50]	[0.48]	[0.43]	[0.08]	[0.09]	[0.09]	
Rented out in 2019 Long Rains	0.03	0.10	0.12	-0.07	-0.09	-0.01	179
	[0.18]	[0.30]	[0.33]	[0.04]	[0.04]	[0.05]	
Cultivated with maize in 2019 Long Rains	0.42	0.28	0.17	0.17	0.27	0.11	179

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
	[0.50]	[0.45]	[0.38]	[0.08]	[0.08]	[0.08]	
Cultivated with commercial crops in 2019 Long Rains	0.02	0.00	0.05	0.01	-0.03	-0.05	179
	[0.13]	[0.00]	[0.22]	[0.02]	[0.03]	[0.03]	
Value of agricultural inputs in 2019 Long Rains	27.3	21.0	18.6	6.3	5.8	1.9	178
	[66.3]	[52.1]	[59.1]	[10.3]	[11.4]	[12.3]	
Value of household labor in 2019 Long Rains	27.79	12.14	9.24	18.20	20.43	3.13	179
	[47.84]	[22.15]	[29.60]	[6.93]	[7.06]	[5.06]	
Value of hired labor in 2019 Long Rains	19.5	6.0	11.1	13.4	10.6	-4.8	179
	[32.4]	[13.4]	[29.9]	[4.3]	[5.3]	[4.3]	
Cultivated in 2018 Short Rains	0.46	0.39	0.27	0.06	0.15	0.10	179
	[0.50]	[0.49]	[0.45]	[0.09]	[0.08]	[0.09]	
Rented out in 2018 Short Rains	0.05	0.10	0.10	-0.06	-0.06	0.01	179
	[0.22]	[0.30]	[0.30]	[0.04]	[0.05]	[0.05]	
Harvest value in 2018 Short Rains	37.2	29.6	20.2	7.1	12.4	5.9	179
	[66.0]	[93.0]	[45.5]	[14.3]	[9.8]	[12.9]	
(C) Non-Target Plots							
No. plots owned in 2019 Long Rains	2.49	2.61	2.88	-0.12	-0.44	-0.36	179
	[1.22]	[1.43]	[1.33]	[0.24]	[0.22]	[0.23]	
Total acres owned in 2019 Long Rains	1.72	1.62	2.39	0.19	-0.54	-0.73	179
	[1.58]	[1.44]	[2.23]	[0.27]	[0.31]	[0.35]	
No. plots rented out in 2019 Long Rains	0.07	0.11	0.19	-0.04	-0.12	-0.06	179
	[0.25]	[0.37]	[0.54]	[0.06]	[0.08]	[0.08]	
Cultivated in 2019 Long Rains	2.14	2.00	2.41	0.11	-0.32	-0.50	179
	[1.28]	[1.21]	[1.21]	[0.22]	[0.22]	[0.22]	
Cultivated with maize in 2019 Long Rains	1.31	1.30	1.41	-0.06	-0.07	-0.11	179
	[1.05]	[0.86]	[0.79]	[0.18]	[0.17]	[0.12]	
Cultivated with commercial crops in 2019 Long Rains	0.20	0.05	0.27	0.15	-0.09	-0.21	179
	[0.45]	[0.22]	[0.52]	[0.07]	[0.09]	[0.08]	
Value of agricultural inputs in 2019 Long Rains	161.2	99.8	135.9	66.3	17.5	-26.2	179
	[290.1]	[212.3]	[221.0]	[37.8]	[48.2]	[41.4]	
Value of household labor in 2019 Long Rains	24.59	24.95	31.35	-3.59	-4.46	-6.35	179
	[39.96]	[37.34]	[41.54]	[7.34]	[7.89]	[7.64]	
Value of hired labor in 2019 Long Rains	13.7	7.3	10.5	5.9	2.8	-2.5	179
	[22.6]	[17.1]	[20.2]	[3.9]	[3.9]	[3.7]	
Cultivated in 2018 Short Rains	1.86	1.67	1.95	0.19	-0.15	-0.40	179
	[1.38]	[1.14]	[1.27]	[0.23]	[0.22]	[0.23]	
Harvest value in 2018 Short Rains	230.3	86.8	308.0	158.3	-84.8	-261.5	179
	[521.1]	[99.7]	[690.1]	[79.3]	[122.5]	[96.7]	

Notes: The table presents the baseline balance for Stratum NC owners' socio-demographic characteristics and non-agricultural outcomes (Panel A), Target Plots (Panel B) and Non-target plots (Panel C). Details on the data sources and construction of the variables are included in the notes of Table A.3. The values in three difference columns are generated by a regression of each outcome for whether the owner was assigned to the Rental Subsidy treatment (cols. 4-5) or the Cash Drop treatment (col. 6). Only the two treatment groups identified in the column header were included in the regression sample. Robust standard errors are included in parentheses.

A.4 Comparison between our samples and LSMS data

Table A.6: Comparison of study samples

	LSMS-ISA						Kenya in Study Sample		
	Ethiopia	Malawi	Niger	Nigeria	Tanzania	Uganda	Listing	Baseline	Renters
Family size	5.24	4.96	6.78	6.82	5.55	6.64	.	5.69	5.60
Male household head	0.81	0.77	0.92	.	0.75	0.71	0.59	0.70	0.82
Household head's age	44.58	43.04	44.90	50.60	48.88	47.35	49.60	50.40	42.82
Proportion of households renting out	0.05	0.00	0.01	0.00	0.01	0.00	0.04	0.22	0.02
No. plots owned	3.02	1.74	2.74	1.75	2.22	1.88	2.96	3.56	1.60
Area owned (acres)	2.81	1.58	11.98	.	5.31	3.29	1.84	2.62	1.05
Proportion of land left uncultivated	.	0.00	0.10	0.00	0.30	0.10	0.08	0.18	0.06
Households w/ formal certificate/documentation	0.38	0.01	0.11	.	0.14	0.19	.	0.75	.
Proportion of plots w/ male manager	0.80	0.71	0.53	0.81	0.27	0.09	.	0.67	0.70
Cultivated area (acres)	2.70	1.92	13.62	.	2.20	2.98	1.78	1.94	1.01
Irrigated area (acres)	0.04	0.00	0.09	0.08	.	0.11	.	0.15	0.04

Notes: The table provides summary statistics of agricultural households from six other countries in Sub-Saharan Africa, based on data from the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA), alongside the same statistics for our sample, to investigate external validity. For our sample, we report statistics for the sample of farmers we reached in the listing exercise (our most representative sample, but for which we have relatively little data), for our experimental owners (those who expressed interest in the subsidy at listing, and for whom we did a full baseline), and for our experimental renters (for whom we also did a full baseline). The LSMS-ISA based statistics are taken from three references which analyze LSMS-ISA data from between 2008 and 2011, depending on the country and variable: Deininger et al. (2017); Dillon and Barrett (2017) and Binswanger-Mkhize and Savastano (2017).

B Empirical strategy

The experimental analysis focuses on treatment effects on Target Plots and their owners. In this appendix, we describe in detail the First, we document the effect of the rental subsidy and unconditional cash transfer treatments on the likelihood that the Target Plot is rented out. Second, we examine how treatments affect agricultural production on the Target Plot, including cultivation choices, investments, output, and soil quality. To illustrate potential mechanisms behind these effects, we also study how the treatments, by inducing a reallocation of land from owners to renters. affect characteristics of farmers managing the Target Plot. Third, we study treatment effects on owners' outcomes, including agricultural outcomes on non-Target Plots and non-agricultural outcomes.

B.1 Target Plot: rentals

We examine the impact of the treatments on the likelihood that the Target Plot is rented out:

$$TargetPlotRentedOut_{is}^{t} = \beta_0 + \beta_1 RentalSubsidy_i + \beta_2 CashTransfer_i + \delta x_i^0 + \eta_s + \eta^t + \epsilon_i^t, \tag{B.1}$$

where the outcome is a dummy for whether the Target Plot i is rented out in crop season $t = 1, 2, 3, 4, 5$, η^t is a vector of crop-season fixed effects, η_s is a vector of strata fixed effects, x_i^0 is a vector of baseline controls that includes the size of the Target Plot and the value of the outcome variable in the two pre-experimental seasons for which we have data (2018 Long Rains and 2019 Short Rains). Data comes mostly from the follow-up surveys.[1] In a handful of cases, we collected information on the rental status even if we could not conduct a full follow-up survey for the plot.

We present these results both by season and pooling across seasons. Importantly, we have information on the rental status of the Target Plot in crop seasons 4 and 5, which enables us to test whether rental relationships induced by the treatment persisted after the rental subsidy intervention ended (in season 3). We also examine whether renting out the Target Plot may substitute for renting out other plots.

B.2 Target Plot: agricultural outcomes

We use information from the four rounds of follow-up surveys with the Target Plot managers to study the treatment effects on Target Plot outcomes. The ITT regressions is:

$$y_{is}^{t} = \beta_0 + \beta_1 RentalSubsidy_i + \beta_2 CashTransfer_i + \delta x_i^0 + \eta_s + \eta^t + \epsilon_i^t, \tag{B.2}$$

where the notation follows Equation B.1, except that we have Target Plot outcomes for four seasons, not five. We cluster standard errors by Target Plot. For continuous outcomes, we focus on winsorized (1%) outcomes in levels and on the inverse hyperbolic sine (IHS) transformation of the total outcome across rounds.[2]

Since there is imperfect compliance in the rental subsidy treatment (see Section 4.2), we also estimate the Treatment-on-Treated (TOT). As paying a rental subsidy in season t may affect rental status and other plot outcomes in season $t+1$, we consider as endogenous variables dummies capturing whether the respondent received any rental subsidy or unconditional cash transfer payment during the study (as opposed to season-specific payment status), and we use the treatment assignment as an instrument. Section 4 provides more details on take up by crop season and thus on the interpretation of the TOT.

The estimating equation for the TOT is thus:

$$y_{is}^{t} = \gamma_0 + \gamma_1 \widehat{RentalSubsidyPaid}_i + \gamma_2 \widehat{CashTransferPaid}_i + \delta x_i^0 + \eta_s + \eta^t + \epsilon_i^t. \tag{B.3}$$

As we discussed in detail in Section 3.7, the TOT coefficient γ_1 measures the effects of offsetting the rental frictions through the payment of the conditional subsidy to the owners. In addition, under plausible assumptions, the comparison of γ_1 to γ_2 is a lower bound of the effect of the rental subsidy on compliers in this group controlling for the income effect

Another question of interest would be what is the effect of the rentals induced by the subsidy, absent any income effects the subsidy induces? As is common in conditional subsidy designs, we cannot estimate the LATE of the actual rental status of the Target Plot, because the exclusion restriction fails: the rental subsidy may affect the Target Plot outcomes not only by inducing rentals, but also because of an income effect, on both marginal and inframarginal rentals. However, we can bound the LATE of renting out the target plot, absent the income effect of the subsidy, as follows. First, comparing the rental subsidy group to the control group gives the effect of rentals on compliers, plus income effects on compliers and always takers. Second, comparing the rental subsidy group to the cash drop group gives the effect of rentals on compliers, minus the income effect on never takers (plus any effect of the income effect potentially being passed through to compliers in the rental subsidy group —a negative income effect on the owner and a positive one on the renter). Assuming that income effects have the same average sign in these three groups (always takers, compliers, and never takers), we therefore can partially identify the treatment effect of renting out as lying in the interval between the two LATEs, both of which instrument renting out by the rental subsidy: 1) in a comparison between rental subsidy and control groups, and 2) in a comparison between rental subsidy and cash drop groups. In practice, IV estimates when using a dummy for whether the Target Plot is rented as endogenous variable are about 40% larger than when using the dummy for whether the rental subsidy was paid (i.e., the TOT results we present in the paper).

B.2.1 Target Plot: manager characteristics

The treatment may affect who manages the Target Plot, and thus the manager's observable characteristics. We are interested in whether rentals change manager characteristics such as demographics (e.g., age, gender, education), wealth (agricultural land owned, non-land wealth), baseline use of agricultural inputs, and agricultural productivity.

We study whether rentals induce changes in *baseline* characteristics of the Target Plot managers. For this purpose, we use two sources of data. If (in the first experimental season) the Target Plot manager is the owner, we use information from baseline owner survey, which we collected toward the end of the 2019 Long Rains (i.e., the last season before the intervention began); if the Target Plot manager is a renter, we use information from the baseline renter survey, conducted at the very beginning of the 2019 Short Rains, right after the rental began.

[1] We collect data on rentals for the upcoming season 5 in the follow-up survey we conduct at the end of season 4.

[2] Season-specific outcomes contain sizable shares of zeros (e.g., mostly because some plots are not cultivated in certain seasons) and, thus, we cannot use IHS in that case (Bellemare and Wichman, 2020)

Our analysis thus explores whether, by affecting rental probabilities, the rental subsidy may change baseline characteristics of managers of the Target Plot through a treatment effect on the identity of the manager.[3]

We examine the impact of the treatments on the baseline characteristics of the manager of the Target Plot in the first season. We present TOT results.

$$x_{is}^{Manager} = \gamma_0 + \gamma_1 \widehat{RentalSubsidyPaid}_i + \gamma_2 \widehat{CashTransferPaid}_i + \delta x_i^0 + \eta_s + \epsilon_i, \tag{B.4}$$

Where $x_{is}^{Manager}$ is the characteristic of the renter if the Target Plot is rented out and of the owner otherwise, x_i^0 is the value of the owner characteristic from the baseline owner survey (equal to the dependent variable $x_i^{Manager}$ if the Target Plot is not rented out), we instrument again $RentalSubsidyPaid_i$, a dummy for whether any rental subsidy was paid, with the treatment assignment $RentalSubsidy_i$, and $CashTransferPaid_i$ with the $CashTransfer$ treatment assignment, and the rest of the notation follows Equation B.1.

B.3 Owner outcomes

We use information from the four rounds of follow-up surveys to study the effect of the treatment on Target Plot owners. Regardless of whether they managed the Target Plot in a given season, we asked the owners questions on agricultural outcomes on their non-Target Plots, food security, non-agricultural activities, assets and amenities, and household finances.

Agricultural outcomes on Non-Target Plots. For the analysis of outcomes on non-Target Plots, we reshape our data at the plot level and run the following TOT regression:

$$y_{pis}^t = \beta_0 + \beta_1 \widehat{RentalSubsidyPaid}_i + \beta_2 \widehat{CashTransferPaid}_i + \delta x_p^0 + \eta_s + \eta^t + \epsilon_p^t, \tag{B.5}$$

where we consider outcomes for non-Target Plot p of owner i in crop season t. The rest of the notation follows the previous equations. Standard errors are clustered at the owner level. We only measure outcomes of non-Target Plots if the owner manages them, not if she rents them out (because we do not interview the renters of non-Target Plots). Therefore, we first report treatment effects on the likelihood that the non-Target Plot is rented out and then we report treatment effects on other non-Target Plot outcomes (cultivation, crop choice, inputs, output, and value added) only if the plot is not rented out.

Non-agricultural owner outcomes. For the analysis of non-agricultural owner outcomes, we present TOT estimates following Equation (**??**) respectively, where the index i now refers to Target Plot's owners instead of the Target Plot.

[3]While we conducted the owner baseline survey at the end of season 0, we could only run the renter baseline survey at the inception of season 1, as soon as the rentals were agreed. Most of the analysis of manager characteristics focuses on time-invariant characteristics or on production choices for season 0, which are unlikely to be affected by this difference in timing. Finally, since managing the Target Plot may have treatment effects on some of the characteristics of interest, we cannot conduct the same analysis for later experimental seasons.

C Subsidy take up and Target Plot rentals

This appendix presents additional results on take up of the subsidy and rentals of the target plot (see Section 4 for the main results on these outcomes). First, we compare characteristics among owners in the rental subsidy treatment group who took up the rental subsidy (N=121) vs those who did not (N=51). Second, we present treatment effects on the likelihood that the Target Plot is rented out by season (1-5) and by stratum (C vs NC). We then compare plot characteristics and rental terms among rentals in the rental subsidy group and those in the control and cash drop groups. Finally, we look at learning and persistence, by comparing rentals that persist and those that do not.

Table C.1: Comparison of Rental Subsidy compliers and non-compliers

	Subsidy Taker [T]	Subsidy Non-Taker [NT]	[T-NT]	N
Age	48.86	50.63	-1.77	172
	[14.57]	[16.67]	[2.68]	
Male	0.67	0.73	-0.06	172
	[0.47]	[0.45]	[0.08]	
Family Size	5.56	4.92	0.64	172
	[2.75]	[3.00]	[0.49]	
High School Educated	0.30	0.16	0.14	172
	[0.46]	[0.37]	[0.07]	
Agricultural Training	0.40	0.14	0.26	172
	[0.49]	[0.35]	[0.07]	
Compare agricultural experience to avg. farmer (1-5)	2.93	2.61	0.33	172
	[0.91]	[0.80]	[0.14]	
No. plots owned in 2019 Long Rains	3.49	3.51	-0.02	172
	[1.25]	[1.36]	[0.22]	
Total plots: total acres owned in 2019 Long Rains	2.69	1.97	0.72	172
	[1.99]	[1.43]	[0.27]	
Have maize stocks from own production, last 12 months	0.74	0.57	0.18	172
	[0.44]	[0.50]	[0.08]	
Experienced a hunger period, last 12 months	0.31	0.41	-0.10	172
	[0.47]	[0.50]	[0.08]	
Own oxen or cow	0.74	0.59	0.15	172
	[0.44]	[0.50]	[0.08]	
Number person-days spent working on other farms, last 7 months	23.81	11.10	12.71	172
	[80.84]	[33.82]	[8.74]	
Number person-days spent on non-ag work, last 12 months	23.11	15.65	7.46	172
	[32.15]	[28.27]	[4.91]	
Taken a loan in last 12 months	0.70	0.55	0.15	172
	[0.46]	[0.50]	[0.08]	
Total borrowed, last 12 months	68.85	15.52	53.33	172
	[143.81]	[24.03]	[13.52]	
Participate in ROSCA	0.51	0.39	0.12	172
	[0.50]	[0.49]	[0.08]	
Have bank account	0.28	0.18	0.10	172
	[0.45]	[0.39]	[0.07]	
Total amount saved	69.41	52.33	17.08	172
	[161.20]	[141.68]	[24.61]	
5k Ksh in emergency savings	0.41	0.31	0.10	172
	[0.49]	[0.47]	[0.08]	
Wealth index, assets- and amenities-based PCA	0.39	-0.37	0.76	171
	[2.24]	[1.47]	[0.29]	
Plot size	0.78	0.54	0.24	172
	[0.47]	[0.29]	[0.06]	
Inherited	0.91	0.92	-0.01	172
	[0.29]	[0.27]	[0.05]	
Certificate of title/customary ownership	0.75	0.78	-0.03	172
	[0.43]	[0.42]	[0.07]	
Respondent's homestead in different village than plot	0.02	0.00	0.02	172
	[0.16]	[0.00]	[0.01]	
Sandy loam soil	0.56	0.47	0.09	172
	[0.50]	[0.50]	[0.08]	
Sandy clay soil	0.26	0.31	-0.06	172
	[0.44]	[0.47]	[0.08]	
Soil quality index (1=poor, 2=fair, 3=good)	2.57	2.53	0.04	172
	[0.55]	[0.54]	[0.09]	
Swampy/dry index (1=swampy, 2=mix, 3=dry)	2.43	2.41	0.02	170
	[0.62]	[0.57]	[0.10]	
Erosion dummy	0.22	0.18	0.05	172
	[0.42]	[0.39]	[0.07]	
Irrigation dummy	0.06	0.02	0.04	172
	[0.23]	[0.14]	[0.03]	

	Subsidy Taker [T]	Subsidy Non-Taker [NT]	[T-NT]	N
Cultivated in 2019 Long Rains	0.61	0.69	-0.07	172
	[0.49]	[0.47]	[0.08]	
Rented out in 2019 Long Rains	0.16	0.06	0.10	172
	[0.37]	[0.24]	[0.05]	
Cultivated with maize in 2019 Long Rains	0.53	0.53	-0.00	172
	[0.50]	[0.50]	[0.08]	
Cultivated with commercial crops in 2019 Long Rains	0.04	0.04	0.00	172
	[0.20]	[0.20]	[0.03]	
Value of agricultural inputs in 2019 Long Rains	40.54	27.14	13.40	172
	[76.66]	[57.74]	[10.66]	
Value of household labor in 2019 Long Rains	35.60	23.80	11.80	172
	[48.54]	[36.72]	[6.77]	
Value of hired labor in 2019 Long Rains	15.78	17.09	-1.31	172
	[29.36]	[32.83]	[5.30]	
Cultivated in 2018 Short Rains	0.54	0.53	0.01	172
	[0.50]	[0.50]	[0.08]	
Rented out in 2018 Short Rains	0.11	0.06	0.05	172
	[0.31]	[0.24]	[0.04]	
Plan cultivate in 2019 Long Rains (Listing)	0.65	0.67	-0.01	172
	[0.48]	[0.48]	[0.08]	
Harvest value in 2018 Short Rains	61.89	58.02	3.87	172
	[111.48]	[154.15]	[23.77]	

Notes: The table presents a comparison of socio-demographic characteristics and non-agricultural outcomes and Target Plot characteristics of owners who took up the rental subsidy vs those who did not take up, among those owners randomly assigned to the rental subsidy treatment group. The data comes from the owner baseline survey and the listing survey. Details on the construction of the variables are included in the notes of Table A.3. The values in the column *Difference* are generated by a regression of each outcome on a dummy for whether the farmer took up the rental subsidy for any season of the sample. Robust standard errors are included in parentheses.

Table C.2: Target Plot Rented Out

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rental Subsidy	0.46	0.44	0.46	0.37	0.34	0.41	0.42	0.43
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.04]	[0.05]	[0.06]
Cash Drop	0.06	0.03	0.06	0.02	0.03	0.04	0.04	0.06
	[0.05]	[0.05]	[0.05]	[0.05]	[0.05]	[0.04]	[0.05]	[0.06]
Rent - Cash	*0.40*	*0.40*	*0.40*	*0.35*	*0.31*	*0.37*	*0.38*	*0.37*
	[0.05]	*[0.05]*	*[0.05]*	*[0.05]*	*[0.05]*	*[0.04]*	*[0.05]*	*[0.06]*
Crop Season	1	2	3	4	5	All	All	All
Strata	All	All	All	All	All	All	C	NC
Mean Y in Control Group	0.23	0.24	0.22	0.20	0.22	0.22	0.21	0.24
Observations	521	512	507	499	489	2528	1660	868

Notes: The table reports the treatment effects on the likelihood the Target Plot is rented out. The data comes from follow-up surveys we run at the end of seasons 1 to 4 with the manager of the Target Plot. Data for Season 5 (col. 5) comes from the survey we ran at the end of Season 4. Columns 7 and 8 report results for Stratum C and NC, respectively. *Rent - Cash* reports the difference between the *Rental Subsidy* and *Cash Drop* coefficients and its standard error. We run an ANCOVA regression of the rented out dummy on treatment dummies, controlling for baseline rental status and plot size, and including stratum dummies for all columns (See Equation (1) in the paper). Columns 6-8 also include survey-round dummies. We use robust standard errors for columns 1-5 and we cluster standard errors by the Target Plot for columns 6-8.

Table C.3: Characteristics of Target Plot rentals

	Rental Subsidy [RS]	Cash Drop & Control [CD&C]	[RS-(CD&C)]	N
(A) Target Plot characteristics				
Plot size (avg reported-GPS)	0.77	0.78	-0.01	212
	[0.48]	[0.54]	[0.07]	
Sandy loam soil	0.57	0.59	-0.01	212
	[0.50]	[0.50]	[0.07]	
Sandy clay soil	0.25	0.22	0.03	212
	[0.43]	[0.41]	[0.06]	
Soil quality index (1=poor, 2=fair, 3=good)	2.56	2.59	-0.03	212
	[0.56]	[0.54]	[0.08]	
Swampy/dry index (1=swampy, 2=mix, 3=dry)	2.42	2.52	-0.10	210
	[0.62]	[0.58]	[0.08]	
Erosion dummy	0.23	0.28	-0.06	212
	[0.42]	[0.45]	[0.06]	
Irrigation dummy	0.05	0.07	-0.02	212
	[0.22]	[0.25]	[0.03]	
Formal certificate available	0.82	0.77	0.05	212
	[0.38]	[0.42]	[0.06]	
Rented out at any point in 2019	0.22	0.33	-0.11	212
	[0.41]	[0.47]	[0.06]	
(B) Renters and rental contracts				
Rental contract duration (months)	20.69	21.29	-0.60	202
	[16.36]	[16.08]	[2.31]	
Cash amount agreed for rental contract	93.21	95.70	-2.49	202
	[86.75]	[111.42]	[14.50]	
Taken a loan to rent in	0.08	0.05	0.03	202
	[0.27]	[0.21]	[0.03]	
Renter's homestead in different village than Target Plot	0.21	0.21	0.00	203
	[0.41]	[0.41]	[0.06]	
Renter is a family member	0.35	0.27	0.08	202
	[0.48]	[0.45]	[0.07]	
Renter is a friend	0.32	0.38	-0.05	202
	[0.47]	[0.49]	[0.07]	
Renter is a neighbor	0.29	0.34	-0.05	202
	[0.46]	[0.48]	[0.07]	
Rented in before from same owner	0.19	0.27	-0.08	202
	[0.39]	[0.45]	[0.06]	
Rented the Target Plot before	0.16	0.29	-0.13	202
	[0.37]	[0.46]	[0.06]	
Renting in other plots at baseline (2019 Long Rains)	0.29	0.34	-0.05	203
	[0.46]	[0.48]	[0.07]	

Notes: The table presents a comparison of Target Plot rentals that occurred in the *Rental Subsidy* (N=120) group against those that occurred in the *Cash Drop* and *Control* (N=92) group. Due to the small number of rentals in the Cash Drop and in the Control group and the similar rental rates in the two groups, we pool them together to gain power in the comparison. The sample is based on the subset of Target Plots which were rented out in the first experimental season, the short rains 2019. The data in Panel A comes from the owner baseline survey and reports average Target Plots characteristics for the rented plots (N=212). *Plot Size* is the average between the Target Plot size reported by the owner and the size measured at baseline by enumerators using hand-held GPS devices. The unit is acres. *Target Plot: formal certificate available* is a binary indicator equal to one if the owner has a formal certificate of ownership over the Target Plot. *Target Plot: rented out at any point in 2019* is a binary indicator equal to one if the Target Plot was rented out at baseline, at any point during 2019, before the first experimental season (the short rains 2019). The data in Pabel B comes from the renter baseline survey and reports average renters and contract characteristics (N=202). Reported characteristics are for the rental contracts started or in place during the short rains 2019. The difference *[RS-(CD & C)]* is the coefficient from a regression of each outcome on a binary indicator equal to one if the owner belongs to the *Rental Subsidy* group. Robust standard errors are reported in parentheses.

Table C.4: Learning and persistence: comparing rentals that persist to those that do not

	Continued Rentals [CR]	Terminated Rentals [TR]	[CR-TR]	N
Plot size	0.86	0.59	0.26	450
	[0.49]	[0.36]	[.08]	
Baseline soil quality	1.48	1.36	0.12	114
	[0.57]	[0.55]	[.11]	
Baseline revenue	66.36	49.60	3.88	114
	[114.86]	[78.88]	[19.07]	
Rental rate	42.45	46.63	-4.18	114
	[31.34]	[37.92]	[7.42]	
Target Plot cultivated (Seasons 1-3)	0.95	0.93	0.02	450
	[0.22]	[0.26]	[.02]	
Revenue (Seasons 1-3)	168.01	83.87	50.50	450
	[232.64]	[155.24]	[24.12]	
Value addded (Seasons 1-3)	24.59	-7.15	21.47	450
	[222.52]	[126.21]	[17.41]	

Notes: The table compares outcomes for Target Plots that were rented out in Season 1 and where the initial renter-owner relationship continued for all four seasons vs Target Plots that were rented out in Season 1 and where the owner rented to a different renter or stopped renting before Season 4. The data comes from the owner baseline survey and the follow-up surveys we run at the end of seasons 1 to 3 with the manager of the Target Plot. *Target Plot Size* is the average of the farmer reported size of the Target Plot and the size calculated by enumerators with GPS instruments. *Baseline soil quality* is a self-reported index of soil quality. *Rental rate* is the rental rate of the Targer Plot per season. *Baseline revenue* and *Revenue* are winsorized at the top 1% level and *Value Added* is also winsorized at the bottom 1%. Regression for these outcomes control for *Target Plot Size* The values in the column *Difference* are generated by a regression of each outcome on a dummy for whether the renter-owner relationship did not continue in the fourth season. Standard errors, included in parantheses, are robust for variables with only observation for one season. Otherwise, we cluster standard errors by the Target Plot.

D Target Plot outcomes

This appendix presents additional results on treatment effects on Target Plot outcomes (see Section 5 for the main results on these outcomes). Appendix D.1 presents results on additional outcomes, including treatment effects on TFP, soil tests and specific non-labor inputs, quantile treatment effects, breakdowns of treatment effects by crop season. Appendix D.2 presents robustness to alternative specifications and Lee Bounds.

D.1 Target plot outcomes: Additional results

D.1.1 TFP

Table D.1: TFP results and robustness tests

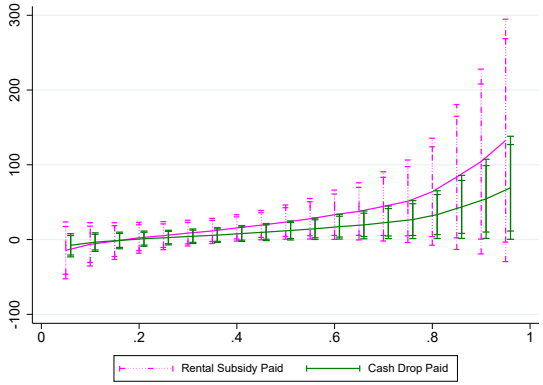
	(1)	(2)	(3)	(4)	(5)
	Core	Stratum C	Alternate Calibrations		
Rental Subsidy Paid	6.54	7.31	10.65	6.39	5.52
	[2.70]	[3.28]	[4.91]	[2.58]	[2.06]
Cash Drop Paid	1.36	1.21	1.53	1.49	1.67
	[2.01]	[2.56]	[3.67]	[1.92]	[1.53]
Rent - Cash	*5.18*	*6.10*	*9.12*	*4.90*	*3.85*
	[2.69]	*[3.34]*	*[4.89]*	*[2.56]*	*[2.06]*
Mean Y in Control Group	16.51	16.55	33.67	16.11	12.57
Land Share	.53	.53	.61	.39	.18
Labor Share	.43	.43	.26	.42	.46
Observations	1608	1131	1608	1608	1608

Notes: The table reports treatment effects on the TFP of the Target Plot. The construction of the TFP variable is detailed in Section 5.2.2. The table includes our core specification of TFP (col. 1), a specification restricted to stratum C (col. 2), and a range of alternatively calibrated TFP based on different factor shares (col. 3-5). Observations are restricted to farmers reporting a positive harvest value and labor quantity. TFP is calibrated using factor shares estimated in Gollin and Udry (2021) for Uganda (col. 1 and 2) and Tanzania (col. 3). Chen et al. (2023) include factor shares for Malawi and Valentinyi and Herrendorf (2008) for the U.S., which are used in column 4 and column 5, respectively. *Rent - Cash* reports the difference between the *Rental Subsidy Paid* and *Cash Drop Paid* coefficients and its standard error. For each panel we run an ANCOVA regression, instrumenting for whether the plot owner took up the treatment in any of the four seasons with the treatment assignment dummies, controlling for baseline values of the outcome, plot size, survey-round dummies, and stratum dummies (see Equation (2) in the paper). We cluster standard errors by the Target Plot.

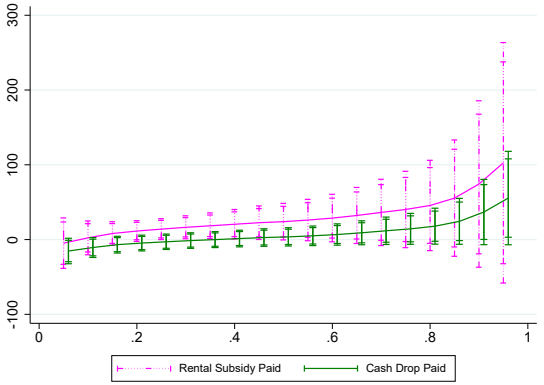
D.1.2 Quantile regressions

Figure D.1: Quantile regression results

(1) Harvest Value



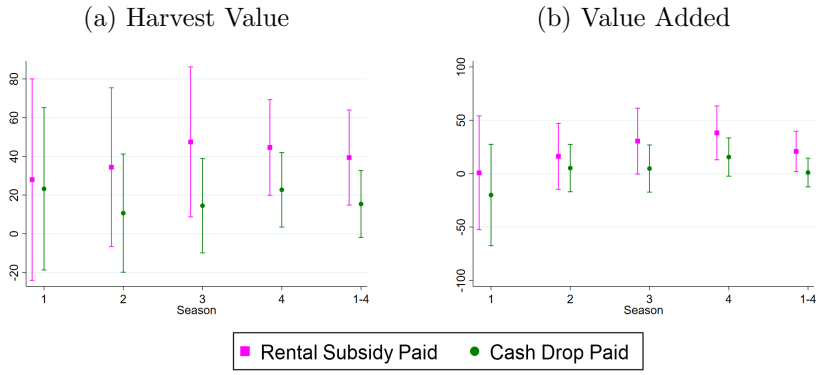
(2) Value Added



Notes: The figure reports coefficients from instrumental variable quantile regressions of agricultural outcomes on the Target Plot. Each dependent variable is the average across four seasons, with one observation per Target Plot. We run an ANCOVA regression controlling for baseline values of the outcome and we instrument dummies for whether the plot owner took up the treatment in any of the four seasons with the treatment assignment dummies. Additional details on the construction of the variables are included in the notes of Table 2.

D.1.3 Results by season

Figure D.2: Results by season



Notes: These figures present the estimated TOT effects on the Target Plot. In each graph, the marker identifies each TOT coefficient with bars showing the 95% confidence interval around each coefficient. For details on how each estimate is generated, see Table 2.

D.1.4 Soil sample analysis

Table D.2: Soil test results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Index	Nitrogen	Potassium	Phosphorus	Organic Carbon	pH	Index			
Rental Subsidy Paid	-0.04	-0.02	-0.15	-0.05	0.30	-0.04	0.01	-0.10	0.06	-0.18
	[0.09]	[0.06]	[0.29]	[1.71]	[0.89]	[0.05]	[0.13]	[0.09]	[0.12]	[0.12]
Cash Drop Paid	-0.01	-0.07	0.23	1.45	-0.10	0.09	-0.07	0.05	0.03	-0.05
	[0.06]	[0.04]	[0.21]	[1.25]	[0.57]	[0.04]	[0.08]	[0.07]	[0.08]	[0.08]
Rent - Cash	*-0.03*	*0.06*	*-0.38*	*-1.51*	*0.40*	*-0.13*	*0.08*	*-0.15*	*0.03*	*-0.12*
	[0.07]	*[0.05]*	*[0.25]*	*[1.53]*	*[0.78]*	*[0.05]*	*[0.11]*	*[0.08]*	*[0.10]*	*[0.11]*
Endline Round	1&4	1&4	1&4	1&4	1&4	1&4	1	4	1&4	1&4
Strata	All	All	All	All	All	All	All	All	C	NC
Mean Y in Control Group	0.00	1.39	5.89	21.56	22.51	5.60	0.00	-0.00	0.00	-0.00
Observations	967	967	967	967	967	967	489	478	640	327

Notes: The table reports treatment effects on agricultural outcomes on the Target Plot. The soil index in column (1) comes from two rounds of soil testing that we conducted at the end of seasons 1 and 4. The index combines the standardized versions of the 5 additional variables included in the table (nitrogen, potassium, phosphorus, organic carbon and pH value). The index is standardized against the control group. Columns (7) and (8) present results from season 1 and 4 individually. In columns (2)-(6) we winsorize the top 1%, while in columns (1), (7) and (8) we winsorize the top and bottom 1%. *Rent - Cash* reports the difference between the *Rental Subsidy Paid* and *Cash Drop Paid* coefficients and its standard error. We run an ANCOVA regression controlling for baseline values of the outcome and instrumenting for whether the plot owner took up the treatment in any of the four seasons with the treatment assignment dummies.

D.1.5 Non-labor inputs

Table D.3: Target Plot: Inputs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Inputs	Seeds	Improved Seeds	Compost		Inorganic Fertilizer		Pesticide	
	Value	Value	Use	Use	Value	Use	Value	Use	Value
(A) Full Sample									
Rental Subsidy Paid	9.20	5.19	0.09	-0.06	-0.86	0.08	2.97	0.03	0.28
	[3.57]	[1.73]	[0.04]	[0.03]	[0.52]	[0.04]	[1.97]	[0.02]	[0.24]
Cash Drop Paid	5.25	3.84	0.05	0.01	0.44	0.02	0.34	0.01	-0.02
	[2.54]	[1.36]	[0.03]	[0.02]	[0.42]	[0.03]	[1.37]	[0.01]	[0.15]
Rent - Cash	*3.96*	*1.35*	*0.04*	*-0.07*	*-1.30*	*0.05*	*2.63*	*0.02*	*0.29*
	[3.21]	*[1.65]*	*[0.03]*	*[0.02]*	*[0.47]*	*[0.03]*	*[1.72]*	*[0.02]*	*[0.21]*
Mean Y in Control Group	31.57	11.52	0.59	0.15	2.47	0.63	16.21	0.06	0.54
Observations	1957	1957	1957	1957	1957	1957	1957	1957	1957
(B) Stratum C									
Rental Subsidy Paid	8.28	7.10	0.06	-0.10	-1.48	0.01	1.58	0.03	0.09
	[4.49]	[2.34]	[0.05]	[0.03]	[0.63]	[0.04]	[2.49]	[0.02]	[0.36]
Cash Drop Paid	4.31	4.97	0.01	-0.02	0.05	-0.04	-0.22	0.01	-0.06
	[2.90]	[1.86]	[0.04]	[0.02]	[0.49]	[0.03]	[1.70]	[0.02]	[0.24]
Rent - Cash	*3.97*	*2.13*	*0.05*	*-0.08*	*-1.53*	*0.05*	*1.80*	*0.02*	*0.15*
	[4.08]	*[2.25]*	*[0.04]*	*[0.03]*	*[0.54]*	*[0.04]*	*[2.23]*	*[0.02]*	*[0.32]*
Mean Y in Control Group	33.88	12.43	0.66	0.19	2.93	0.71	17.46	0.06	0.69
Observations	1289	1289	1289	1289	1289	1289	1289	1289	1289
(C) Stratum NC									
Rental Subsidy Paid	13.54	4.18	0.12	0.02	0.78	0.20	5.94	0.04	0.59
	[5.63]	[2.61]	[0.07]	[0.04]	[0.98]	[0.07]	[3.02]	[0.02]	[0.29]
Cash Drop Paid	7.82	3.05	0.12	0.06	1.41	0.13	1.46	0.00	-0.05
	[4.62]	[1.93]	[0.05]	[0.03]	[0.81]	[0.05]	[2.17]	[0.02]	[0.18]
Rent - Cash	*5.72*	*1.13*	*0.00*	*-0.04*	*-0.63*	*0.07*	*4.48*	*0.04*	*0.63*
	[5.12]	*[2.42]*	*[0.06]*	*[0.04]*	*[0.92]*	*[0.06]*	*[2.72]*	*[0.02]*	*[0.27]*
Mean Y in Control Group	27.13	9.98	0.46	0.08	1.64	0.48	13.79	0.05	0.32
Observations	668	668	668	668	668	668	668	668	668

The table reports treatment effects on the inputs used on the Target Plot. The value of inputs variable (used in col. 1) is a composite of the value of seeds, compost, inorganic fertilizer and pesticide used on the Target Plot. The value of each input is included in columns (2), (5), (7) and (9). The remaining columns (3, 4, 6 and 8) are indicator variables which equal one for when a farmer applies the input to the Target plot. Details on the data sources are included in the notes of Table 2. **Panel A** reports results for the full sample. **Panel B** and **Panel C** report results for Stratum C and NC respectively. *Rent - Cash* reports the difference between the *Rental Subsidy Paid* and *Cash Drop Paid* coefficients and its standard error. We instrument for whether the respondent took up the treatment in any of the four seasons with the treatment assignment dummies.

D.2 Target plot outcomes: Robustness

D.2.1 ITT

Table D.4: Target Plot Outcomes: ITT

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Cultivated	Input Value		Labor Value		Output Value		Value Added
Rental Subsidy	0.06	6.71	0.24	0.33	0.10	28.80	0.30	15.20
	[0.02]	[2.73]	[0.13]	[2.77]	[0.13]	[9.54]	[0.14]	[7.28]
Cash Drop	0.06	5.22	0.17	4.66	0.13	15.40	0.13	1.07
	[0.02]	[2.62]	[0.13]	[3.10]	[0.14]	[9.08]	[0.16]	[7.07]
Rent - Cash	*-0.00*	*1.49*	*0.07*	*-4.33*	*-0.03*	*13.39*	*0.17*	*14.13*
	[0.02]	*[2.72]*	*[0.13]*	*[2.98]*	*[0.13]*	*[9.95]*	*[0.15]*	*[8.07]*
Mean Y in Control Group	0.82	31.57	IHS	59.40	IHS	94.06	IHS	3.23
Observations	1957	1957	509	1957	509	1957	509	1957

Notes: The table reports treatment effects on plot cultivation and agricultural outcomes for the Target Plot. To generate these results we run an ANCOVA regression of the outcome on treatment dummies, controlling for baseline values of the outcome, plot size, survey-round dummies, and strata dummies (see Equation (1) in the paper). *Rent - Cash* reports the difference between the *Rental Subsidy* and *Cash Drop* coefficients and its standard error. All other details are as described in Table 2.

D.2.2 Alternative specifications

Table D.5: Robustness: Alternative Specifications

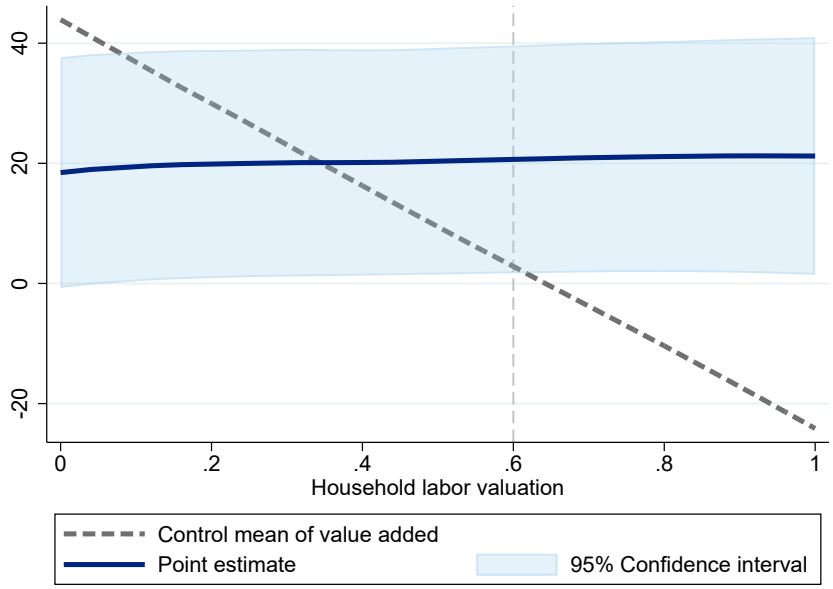
	(1)	(2)	(3)	(4)	(5)
(A) Target Plot Cultivated					
Rental Subsidy Paid	0.08	0.09	0.09	0.06	
	[0.03]	[0.03]	[0.03]	[0.03]	
Cash Drop Paid	0.06	0.07	0.07	0.06	
	[0.02]	[0.02]	[0.02]	[0.02]	
Rent - Cash	*0.02*	*0.02*	*0.02*	*0.00*	
	[0.02]	*[0.03]*	*[0.03]*	*[0.02]*	
Mean Y in Control Group	0.82	0.82	0.82	0.82	
Controls	Main	Size	None	PDS	
Observations	1957	1957	1957	1957	
(B) Labor Value					
Rental Subsidy Paid	1.43	1.43	2.24	-0.67	
	[3.76]	[3.76]	[3.75]	[3.57]	
Cash Drop Paid	4.61	4.61	6.07	3.79	
	[3.04]	[3.04]	[3.08]	[2.89]	
Rent - Cash	*-3.18*	*-3.18*	*-3.83*	*-4.46*	
	[3.47]	*[3.47]*	*[3.53]*	*[3.41]*	
Mean Y in Control Group	59.40	59.40	59.40	59.40	
Controls	Main	Size	None	PDS	
Observations	1957	1957	1957	1957	
(C) Value of Inputs					
Rental Subsidy Paid	9.20	10.02	11.55	9.53	
	[3.57]	[3.53]	[3.77]	[3.54]	
Cash Drop Paid	5.25	5.82	8.59	5.47	
	[2.54]	[2.60]	[2.83]	[2.56]	
Rent - Cash	*3.96*	*4.19*	*2.96*	*4.06*	
	[3.21]	*[3.20]*	*[3.48]*	*[3.21]*	
Mean Y in Control Group	31.57	31.57	31.57	31.57	
Controls	Main	Size	None	PDS	
Observations	1957	1957	1957	1957	
(D) Output Value					
Rental Subsidy Paid	39.38	40.45	44.87	38.20	40.16
	[12.52]	[12.49]	[12.95]	[12.37]	[12.92]
Cash Drop Paid	15.37	16.75	24.72	14.03	19.64
	[8.82]	[8.85]	[9.51]	[8.66]	[9.33]
Rent - Cash	*24.01*	*23.70*	*20.15*	*24.16*	*20.52*
	[11.81]	*[11.84]*	*[12.54]*	*[11.71]*	*[12.43]*
Mean Y in Control Group	94.06	94.06	94.06	94.06	94.06
Controls	Main	Size	None	PDS	Planned
Observations	1957	1957	1957	1957	1957
(E) Value Added					
Rental Subsidy Paid	20.82	22.76	24.76	20.97	19.82
	[9.65]	[9.58]	[9.77]	[9.62]	[9.83]
Cash Drop Paid	1.04	3.27	6.88	1.41	1.61
	[6.88]	[6.92]	[7.10]	[6.85]	[6.95]
Rent - Cash	*19.79*	*19.49*	*17.88*	*19.57*	*18.21*
	[9.60]	*[9.51]*	*[9.71]*	*[9.49]*	*[9.72]*
Mean Y in Control Group	3.23	3.23	3.23	3.23	3.23
Controls	Main	Size	None	PDS	Planned

Observations	1957	1957	1957	1957	1957

Notes: The table reports robustness tests on plot cultivation and agricultural Target Plot variables. Each test is generated by varying the control variables. Details on the construction and data sources of each of the dependent variables are included in the notes of Table 2. Column 1 includes the result as presented in Table 2. Along with results under the core specification (col. 1), the table includes results when, in addition to controlling for survey-round dummies and stratum dummies, only plot size is controlled for (col. 2), when no other variables are controlled for (col. 3), and when, following Belloni et al. (2014), we control for Target Plot variables selected via post-double-selection (PDS) (col. 4). In column (5) of Panels D and E, we control for a dummy capturing non-verified planned harvests (see discussion in Section 3.4). *Rent - Cash* reports the difference between the *Rental Subsidy Paid* and *Cash Drop Paid* coefficients and its standard error. We cluster standard errors by the Target Plot.

D.2.3 Alternative valuations of household labor

Figure D.3: Value Added TOT Coefficients by Household Labor Value



Notes: The figure includes the Rental Subsidy treatment effect on value added under different valuations of household labor. Valuation refers to how household labor is valued relative to hired labor. A valuation of 0 indicates that household labor is zero, while a valuation of 1 indicates household labor is valued the same as hired labor. The data used to construct the different variables comes from follow-up surveys we run at the end of seasons 1 to 4 with the manager of the Target Plot and are measured in USD. In the main results of the paper, we use a 60% value of household labor (based on Agness et al., 2022), the vertical line indicates results at this valuation. We winsorize the top and bottom 1% of the outcome variable. To generate the coefficients used in the graph, we run an ANCOVA regression controlling for baseline values of each variable, plot size, survey-round dummies and stratum dummies. We instrument for whether the respondent took up the treatment in any of the four seasons with the treatment assignment dummies (see Equation (2) in the paper). We cluster standard errors by the Target Plot.

D.2.4 Attrition

Table D.6: Attrition across surveys

	(1)	(2)	(3)	(4)	(5)	(6)
	S0-2019 LR	S1-2019 SR	S2-2020 LR	S3-2020 SR	S4-2021 LR	S1-4
(A) Manager Characteristics						
Rental Subsidy	0.01					
	[0.02]					
Cash Drop	0.02					
	[0.01]					
Rent - Cash	*-0.01*					
	[0.01]					
Mean Y in Control Group	0.97					
Observations	521					
(B) Target Plot Follow-up						
Rental Subsidy		-0.02	-0.01	-0.02	-0.02	-0.02
		[0.03]	[0.02]	[0.03]	[0.03]	[0.02]
Cash Drop		0.03	0.03	0.03	0.03	0.03
		[0.02]	[0.02]	[0.02]	[0.03]	[0.02]
Rent - Cash		*-0.05*	*-0.04*	*-0.05*	*-0.05*	*-0.05*
		[0.02]	*[0.02]*	*[0.03]*	*[0.03]*	*[0.02]*
Mean Y in Control Group		0.94	0.95	0.93	0.91	0.93
Observations		521	521	521	521	2084
(C) Soil Samples						
Rental Subsidy		-0.05			-0.05	-0.05
		[0.02]			[0.03]	[0.02]
Cash Drop		-0.00			0.02	0.01
		[0.02]			[0.02]	[0.02]
Rent - Cash		*-0.05*			*-0.07*	*-0.06*
		[0.02]			*[0.03]*	*[0.02]*
Mean Y in Control Group		0.98			0.94	0.96
Observations		521			521	1042
(D) Owner Follow-up						
Rental Subsidy		-0.03	-0.04	-0.06	-0.06	-0.04
		[0.02]	[0.02]	[0.03]	[0.03]	[0.02]
Cash Drop		0.00	0.00	0.02	0.02	0.01
		[0.01]	[0.02]	[0.02]	[0.02]	[0.01]
Rent - Cash		*-0.03*	*-0.04*	*-0.08*	*-0.08*	*-0.06*
		[0.02]	*[0.02]*	*[0.02]*	*[0.03]*	*[0.02]*
Mean Y in Control Group		0.98	0.98	0.97	0.94	0.97
Observations		521	521	521	521	2084

Notes: The table reports completion rates across the different data collection activities included in the study. *Panel A* presents results from the baseline owner survey and the baseline renter survey. Data from the baseline owner survey is used where the Target Plot wasn't rented out in the first crop season. Where the Target Plot was rented out, data from the baseline renter survey is used. *Panel B* uses data from the follow-up surveys, asked at the end of each crop season, where we asked agricultural activity questions to each Target Plot manager: the owner if the plot was not rented out and the renter if it was rented out. Results in *Panel C* come from the two rounds of soil sampling completed during the first and the fourth crop seasons. *Panel D* presents the attrition results of each of the owner follow-up surveys where we asked owners, regardless of whether they rented out the Target Plot, questions concerning their other plots, non-agricultural activities, food security, assets and household finances. As soil samples were only collected in the first and fourth crop seasons, the pooled estimate in column 6 only includes 1,042 observations. *Rent - Cash* reports the difference between *Rental Subsidy*and *Cash Drop* coefficients and its standard error. We run an ANCOVA regression of a completion dummy on treatment dummies and include stratum dummies for all columns. Column (6) also includes survey-round dummies. We use robust standard errors for Columns (1)-(5) and we cluster standard errors by the Target Plot for column (6).

Table D.7: Lee Bounds

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Cultivated	Maize	Commercial Crops	Input Value	Labor Value	Output Value	Value Added
Rental Subsidy Paid (Lower)	0.05	-0.02	0.09	7.77	-1.07	36.62	13.60
	[0.03]	[0.04]	[0.03]	[3.54]	[3.68]	[12.64]	[9.45]
Cash Drop Paid (Lower)	0.08	0.08	0.02	5.81	5.69	17.70	5.59
	[0.02]	[0.03]	[0.02]	[2.58]	[3.01]	[9.05]	[6.71]
Rental Subsidy Paid	0.08	0.00	0.09	9.19	0.44	39.35	20.82
	[0.03]	[0.04]	[0.03]	[3.56]	[3.66]	[12.51]	[9.65]
Cash Drop Paid	0.06	0.05	0.02	5.25	4.68	15.38	1.04
	[0.02]	[0.03]	[0.02]	[2.54]	[3.01]	[8.82]	[6.88]
Rental Subsidy Paid (Upper)	0.08	0.01	0.12	12.84	3.94	55.55	33.33
	[0.03]	[0.04]	[0.03]	[3.27]	[3.53]	[11.56]	[9.12]
Cash Drop Paid (Upper)	0.06	0.05	0.00	1.85	1.99	4.81	-8.52
	[0.02]	[0.03]	[0.02]	[1.95]	[2.57]	[6.23]	[5.16]
Difference Rent - Cash (Lower)	*-0.02*	*-0.09*	*0.06*	*1.96*	*-6.75*	*18.92*	*8.01*
	[0.02]	*[0.04]*	*[0.03]*	*[3.20]*	*[3.42]*	*[11.86]*	*[9.31]*
Difference Rent - Cash	*0.02*	*-0.05*	*0.07*	*3.94*	*-4.25*	*23.97*	*19.78*
	[0.02]	*[0.04]*	*[0.03]*	*[3.21]*	*[3.43]*	*[11.82]*	*[9.60]*
Difference Rent - Cash (Upper)	*0.02*	*-0.04*	*0.12*	*10.99*	*1.94*	*50.73*	*41.85*
	[0.03]	*[0.04]*	*[0.03]*	*[2.90]*	*[3.24]*	*[10.83]*	*[9.10]*
Mean Y in Control Group (Lower)	0.88	0.73	0.12	37.54	62.98	114.75	15.91
Mean Y in Control Group	0.82	0.69	0.09	31.57	59.40	94.06	3.23
Mean Y in Control Group (Upper)	0.86	0.71	0.10	33.12	58.50	98.88	0.54
Observations (Lower)	1,916	1,916	1,916	1,916	1,916	1,916	1,916
Observations	1,957	1,957	1,957	1,957	1,957	1,957	1,957
Observations (Upper)	1,916	1,916	1,916	1,916	1,916	1,916	1,916

Notes: The table reports the bounded treatment effects following Lee (2009), with bounds created for each variable by trimming the top and bottom of the control and cash drop group, as these groups had the lowest attrition. For each cell in the table, results are ordered as follows: unbounded, lower bound and upper bound. Details on the data sources and construction of the variables are included in the notes of Table 2. *Rent - Cash* reports the difference between the *Rental Subsidy Paid* and *Cash Drop Paid* coefficients and its standard error. We run an ANCOVA regression controlling for baseline values of the outcome and we instrument dummies for whether the respondent took up the treatment in any of the four seasons with the treatment assignment (see Equation (2) in the paper). We cluster standard errors by the Target Plot.

E Comparing our treatment effects to the predictions of a misallocation exercise based on baseline productivity dispersion

A common misallocation exercise is to quantify the predicted effect of a *full* reallocation of land, until its marginal productivity is equalized across farmers, where the reallocations and their predicted effects are based on baseline estimates of productivity and a production function (Chen et al., 2023; Adamopoulos et al., 2022). This is a different exercise, and potentially a very different set of land trades, from the *marginal* reallocation induced by our experiment.

In this appendix, we compare our treatment effects to the predicted effects from full reallocation, and explore where differences arise. We make the comparison in three steps. First, based on baseline measures of productivity, we compare the predicted effect on output from fully reallocating land among farmers (as per the misallocation exercise, until the marginal product of land is equalized across farmers), to the predicted effect of the actual rentals induced by the subsidy. Second, we decompose both predicted effects on several dimensions, to understand the source of predicted gains. For induced rentals, we separate out predicted gains from diminishing returns to land from predicted gains from differences in renters' vs owners' estimated productivity. For full reallocation, we separate our predicted gains from increasing cultivation from predicted gains conditional on cultivating (in line with our analysis separating the C and NC strata in Section 5), and we also quantify the effect of restricting reallocation to within county, giving a more realistic set of potential trades. Third, for the induced rentals, we compare their predicted effects on output on the Target Plot to their experimental treatment effects on the Target Plot.

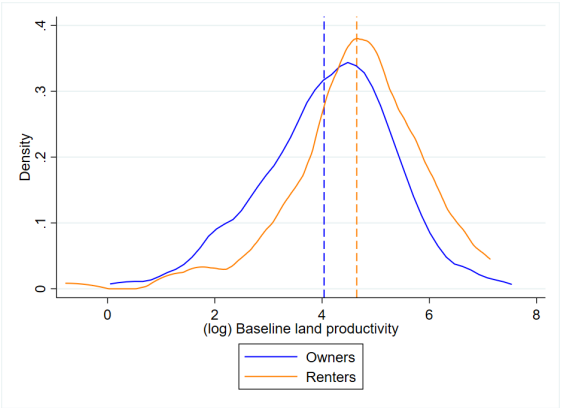
For the exercise, when necessary, we assume a Cobb-Douglas production function at the farm level, for farmer i: $Y_i = A_i L_i^{\alpha}$, where Y_i is total revenue, L_i is total land, A_i is TFP (estimated as a residual, using baseline data), and α, assumed constant across farmers, is the returns to scale.[4] Under full reallocation, land is reallocated across farmers until the marginal product of land, $\alpha Y_i/L_i$, is equalized across farmers. We calibrate $\alpha = 0.54$ based on Adamopoulos et al., 2022; results are similar if we instead estimate α from the data ($\hat{\alpha} = 0.59$), but we do not have instruments for input use as in Gollin and Udry, 2021 and so are vulnerable to well-known biases in production function estimation when doing so.

E.1 Comparing predicted effects of induced trades vs. full reallocation

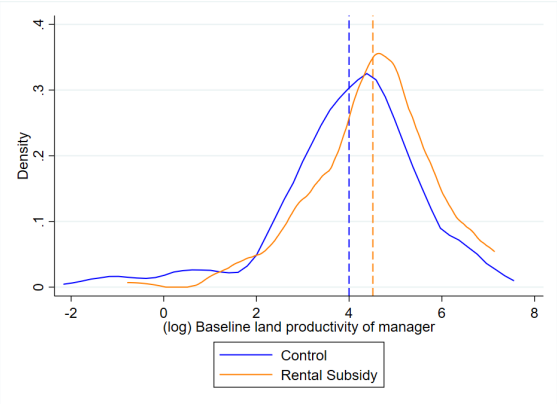
As a first step, in Figure E.1, we plot the distribution of the (log) marginal product of land across farmers, defined simply as $log(Y_i/L_i)$. Panel a) shows a comparison of the distribution of baseline land productivity among owners vs. renters whenever the Target Plot was rented out, pooling across the control and rental subsidy groups. Renters have higher productivity than owners on average — the distribution is shifted to the right — showing that rentals are on average predicted to increase output and decrease misallocation. Panel b) shows a comparison of the distribution of baseline land productivity of managers of the Target Plot in the control group vs. the rental subsidy group. In this case, the shift to the right of the distribution shows that marginal

[4] As we explained in Section 3.2, in order to leave sufficient time to subsequently induce rentals, we conducted the listing and the owner baseline while harvesting for the 2019 Long Rains was still ongoing. Thus, we are missing information on the harvest amount for a large portion of the sample for that season. In this section, we thus use harvest amount in the previous season, i.e., the 2018 Short Rains crop season. However, we do not have information on input values for that season, so we cannot include it in the production function. We also do not add labor in the production function, or normalize by it, due to similar limitations in baseline data. For these reasons, throughout this section, we use a one-input (land) production function, one of several shortcomings in this section compared with the best-executed studies of misallocation in agriculture. We highlight that our analysis in Section 5.2.2 does not suffer from this shortcoming, where we computed *endline* TFP using also labor and non-labor inputs. We also only have soil test data for Target Plots, and only at endlines seasons 1 and 4, so we do not control for soil quality in the analysis.

rentals — those induced by our rental subsidy — are also predicted to decrease misallocation. In both cases, the dotted lines show the mean marginal product of each group, which are clearly higher for renters than owners. However, from these figures alone, it is difficult to infer how much of the potential gains from full reallocation are predicted to be achieved by the rentals that occur – full reallocation involves redistributing land across farmers until these two distributions converge to a single point (and it is unclear from the figure how much land would be redistributed to achieve it), while the gap between owner and renter productivity distributions simply demonstrates the gains from an average rental.



(a) Owners vs. Renters



(b) Managers, Control group vs. Rental subsidy group

Figure E.1: Baseline dispersion in (log) land productivity

Notes: These figures show the dispersion in the farm-level marginal product of land, $log(Y_i/L_i)$, among different groups of farmers from our experimental sample, measured at baseline. Figure a) compares the distribution among owners, in blue, to the distribution among renters in the first intervention season (induced or not), in orange, when the Target Plot is rented out. The dashed lines show the means of the two distributions. Figure b) compares the distribution of the baseline productivity of whoever manages the Target Plot in the first intervention season. The blue line is for managers in the control group, while the orange line is for managers in the rental subsidy group. The shift to the right comes from renters being more productive than owners on average, among rentals induced by the subsidy.

E.1.1 Computing predicted gains from induced rentals

To compute the predicted gains from a given Target Plot rental, we estimate the productivity of both the owner and the renter of the Target Plot, based on baseline data, and then calculate the predicted change in their combined revenue when reallocating the Target Plot from the owner to the renter:

$$\text{Predicted gain from a rental} = (A_r((L_r + L_{TP})^\alpha - L_r^\alpha) - (A_o(L_o^\alpha - (L_o - L_{TP})^\alpha)$$

where r denotes renter, o owner, and TP target plot. We then sum these predicted gains across all rentals that occur in the rental subsidy group (in the first endline season), to compute the predicted gains from rentals in the rental subsidy group. This, however, is an overestimate of the predicted gains from the reallocation *induced* by the rental subsidy, since some of the rentals in the rental subsidy group would have occurred absent the subsidy (the 'always-takers'). We cannot identify induced rentals ('compliers') from 'always-takers' in the rental subsidy group; instead, to net out the gains from these always-takers, we compute the predicted gains from the rentals that occur

in the control group. The predicted treatment effect of the induced rentals is then the difference between the predicted gains from the rentals in the rental subsidy group and the predicted gains from the rentals in the control group.

The gains are reported in Column (2) of Table E.1. For comparison, Column (1) reports the total baseline farm revenue of owner and renter households in the rental subsidy group. The induced rentals are predicted to increase total revenue by $1,960, corresponding to a 2.9% increase. We note that this increase arises from approximately 9% of the total land in the rental subsidy group changing management, since we only subsidized the rental of one plot per owner and have imperfect compliance.[5]

Decomposing predicted gains from induced rentals. We next decompose the predicted gains from inducing a change in who cultivates the Target Plot into gains coming from a change in TFP, $A_r - A_o$, and gains coming from diminishing returns to land and a change in total landholdings of the manager, L_r vs. L_o. To do so, we recalculate gains as above but assuming that the renter has the same TFP as the owner:

$$\text{Predicted gains arising from diminishing returns} = (A_o((L_r + L_{TP})^{\alpha} - L_r^{\alpha}) - (A_o(L_o^{\alpha} - (L_o - L_{TP})^{\alpha})$$

The predicted gains from diminishing returns alone are reported in Column (3). They are $280, compared to overall predicted gains of $1,960, showing that changes in productivity accounted for the majority (86%) of the gains. We note that the presence of diminishing returns may arise from several of the mechanisms that we discussed in Section 5. Most commonly, diminishing results are assumed to reflect labor market constraints, arising for instance from agency problems, but they can also reflect capital constraints. For the purpose of the exercise presented here, we do not need to take a stand on the source of diminishing returns.

Table E.1: Predicted treatment effects of induced reallocation on total revenue

	Revenue with no reallocation (1)	Induced rentals (2)	Induced rentals without Δ productivity (3)
Total revenue	66836	1966	280

Notes: This table shows the predicted gains in total revenue from the rentals induced by the rental subsidy, based on baseline productivity estimates. The details and caveats of the exercise are explained in the above text. Column (1) shows, for the sample of all owners and renters in the rental subsidy group, the total revenue at baseline. Column (2) shows the predicted gains in this total revenue from the rentals induced by the rental subsidy (which correspond to 9% of the total land of this group of farmers being reallocated). Column (3) shows the predicted gains if we assume that renters have the same productivity as owners, shutting down the potential for gains from productivity differences, to isolate the gains from diminishing returns to land.

E.1.2 Computing predicted gains from full reallocation

To calculate the predicted potential gains from full reallocation, we consider an output-maximizing relocation of land which equalizes the marginal product of land across farmers. We take as the set of farmers across which the reallocation can occur to be all owners and renters of the Target Plot in the rental subsidy group, the most inclusive set of farmers for which we have survey data.[6]

[5] The average Target Plot size is 0.7 acres, while the average landholdings are 2.7 acres for owners and 1.4 acres for renters (whom we have for 70% of owners), so Target Plots account for approximately 19% of total land; and the predicted ITT gains come from the 45% of Target Plots which are marginal.

[6] We could only collect detailed baseline data for our experimental sample, not for all farmers in the listing exercise.

Ideally, for the full reallocation exercise we would have the universe of farmers, another limitation of our full misallocation exercise relative to the frontier. If we are missing some very productive farmers —for example, because they were not interested in the small-scale rentals induced by our study, or because they travel a lot —then we are estimating a lower bound on the gains from reallocation. Solving for the optimum gives the following allocation, based on baseline estimates of TFP:

$$L_i^* = \frac{\hat{A}_i^{\frac{1}{1-\alpha}}}{\sum_j \hat{A}_j^{\frac{1}{1-\alpha}}} \sum_j L_j$$

We then compare predicted total revenue under this optimal allocation to predicted total revenue under the allocation in the control group, resulting in a predicted treatment effect which is comparable to that of the induced rentals.

The predicted gain from full reallocation is reported in Column (1) of Table E.2; total revenue of owners and renters in the rental subsidy group would increase by $85,400, a 128% increase. This is a very large increase, but not inconsistent with other estimates of gains from full reallocation (e.g. Chen et al., 2023). The predicted gain from full reallocation is thus around 40 times larger than the predicted gains from our induced rentals. However, induced rentals only reallocate 9% of land. Dividing the predicted gains from induced rentals by 0.09 gives $21,800, which is much less than the gains from full reallocation, demonstrating that the induced trades are not those with the largest potential revenue gains (as is also suggested by Figure E.1). This is perhaps not surprising, especially given the constraints on that set of rentals which our experiment can induce (only owners can rent out, and only up to one plot per owner).

One substantial caveat of our full reallocation exercise is that we base our measures of farm productivity on data from one (baseline) season, and thus cannot do the steps to remove measurement error undertaken in related papers; the resulting measurement error will bias us towards overestimating the potential gains from full reallocation.

Restricting the set of trades under 'full' reallocation. The full reallocation exercise likely contains many trades which could never happen in practice —where the trade friction, τ is extremely high —a point we consider further in the paper. Whether the gains from full reallocation mainly come from such infeasible trades, and hence whether restricting to a potentially feasible set of trades substantially reduces the potential gains from reallocation, is of central importance for considering the policy implications of the misallocation exercise. One such set of very unlikely trades in our sample is those across counties. Our sample contains four counties, spread over a substantial area of Western Kenya – it is unlikely that a farmer in one county could effectively cultivate a plot in another county. Following Chen et al. (2023), to test whether restricting to within-county reallocation substantially reduces potential gains, we rerun the above exercise, but separately for each county, and then sum the total gains. Results are reported in Column (2). We find gains to be $71,300, smaller than the $85,400 gains from full reallocation, but still substantial - restricting trades to be within counties does reduce overall gains, but our induced rentals still appear far from those with the largest gains in this restricted set.

Separating gains from cultivation from gains conditional on cultivation. The exercise above did not separate out the cultivation margin. Insofar as farmers were not cultivating some of their land, it loaded onto their productivity A. This mirrors our main experimental results on Target Plot revenue in Section 5, where we also did not explicitly separate out the cultivation margin. Subsequently in that section, to make progress on mechanisms, we did attempt to separate gains from the intensive margin (conditional on cultivation) from gains from the extensive margin (inducing cultivation), by splitting the analysis by stratum C and NC. We attempt a related decomposition here, for the gains from full reallocation, in three steps. First, we re-estimate

productivity A^c for each farmer based upon their *cultivated* land, L_c and output Y. Second, we re-estimate gains from fully reallocating this cultivated land L^c across farmers, according to the new distribution of productivities A^c, to test gains from only the intensive margin. Third, we re-estimate gains from fully reallocating and fully cultivating all land L, according to the new distribution of productivities A^c, to introduce the extensive margin of cultivation too. Column (3) reports results from full reallocation, but restricting to cultivating plots which were cultivated at baseline, i.e. turning off the extensive margin of cultivation. Gains are around 17% smaller, at \$70,600. If instead, we allow all plots to be cultivated, fully turning on the extensive margin of cultivation, gains are \$103,400 (Column (4)), demonstrating that inducing cultivation in this setting can increase the gains from misallocation by 46%, relative to when there is no extensive margin.

Table E.2: Predicted treatment effects of full reallocation on total revenue

	Full reallocation	Only within counties	Only within cultivated plots	Inducing cultivation of all plots
	(1)	(2)	(3)	(4)
Total revenue	85417	71285	70649	103426

Notes: This table shows the predicted gains in total revenue from full land reallocation for the same sample as Table E.2 (i.e. for all owners and renters in the rental subsidy group). The details and caveats of the exercise are explained in the above text. Column (1) shows the predicted gains from full reallocation among all farmers in this sample. Column (2) presents the gains when restricting reallocation to occur within county (of which there are four in our sample). Columns (3) and (4) explicitly account for, and attempt to isolate, the cultivation margin of gains from reallocation. Here we estimate baseline (farm-level) productivity only among plots that were cultivated at baseline. In Column (3), we shut down the cultivation margin, predicting gains from full reallocation only among plots that were cultivated at baseline. In Column (4), we turn on the cultivation margin, allowing for reallocation (and hence cultivation) among all plots, irrespective of whether they were cultivated at baseline.

E.2 Comparing predicted effects to experimental effects among induced rentals

We undertake this comparison for outcomes on the Target Plot, rather than at the farm level, because as explained in Section 3.3, the experimental design does not give a renter counterfactual (e.g., for renter's farms). We thus need to arrive at predictions for Target Plot outcomes using our farm-level production function, when calculating the predicted change in output for a given rental. We do so, in order to calculate predicted the predicted change in the Target Plot revenue, in three ways: 1) assuming owners and renters achieve their average output on the Target Plot:

$$A_r(L_r + L_{TP})^{\alpha}\frac{L_{TP}}{L_r + L_{TP}} - A_o(L_o)^{\alpha}\frac{L_{TP}}{L_o}$$

2) assuming that the Target Plot is marginal, in the sense that rentals induce no spillovers to outcomes on other plots of owners and renters (as we find empirically for owners), in which case the predicted farm-level treatment effect above is identical to the predicted treatment effect on the Target Plot:

$$(A_r(L_r + L_{TP})^{\alpha} - A_r L_r^{\alpha}) - (A_o L_o^{\alpha} - A_o(L_r - L_{TP})^{\alpha})$$

3) using a first order approximation, based on the difference in the marginal product of land:

$$(\alpha\frac{Y_r}{L_r} - \alpha\frac{Y_o}{L_o})L_{TP}$$

With these predictions for the effects of individual rentals on Target Plot revenue, we then need to compute a predicted treatment effect of the rental subsidy on (average) Target Plot revenue. We do so by comparing average predicted gains from rentals in the rental subsidy group (set to zero if there is no rental) to average predicted gains from rentals in the control subsidy group. As such we net out the effect of 'always-taker' rentals, to identify only the effect of induced rentals. These predicted treatment effects on average Target Plot revenue are reported in Table E.3, Columns (2)-(4) respectively. To benchmark them, Column (1) reports the average Target Plot revenue at baseline (short rains 2018). Predicted average treatment effects are estimated to be between \$12.3 and \$19.8, corresponding to a 20% to 32% increase. Column (5) reports the corresponding estimated average treatment effect based on our endline data— the treatment effects of the rental subsidy minus those of the cash drop to control for the income effect — which is \$24.0 corresponding to a 39% increase. The predicted treatment effects on Target Plot revenue are thus consistent with, and if anything slightly smaller than, the estimated treatment effects. This is an encouraging result for existing studies of land misallocation based on such predicted effects.

Table E.3: Treatment effects of induced rentals on average Target Plot revenue: predicted vs. experimental

	Baseline mean	Predicted effect			Experimental effect
		Production function average productivity	Production function marginal productivity	First-order approximation	
	(1)	(2)	(3)	(4)	(5)
Revenue on Target Plot	61.3	17.5	12.3	19.8	24

Notes: This tables compares the *predicted* revenue gains on the Target Plot from induced rentals, based on baseline estimates of productivity, to our experimentally measured treatment effects for the same rentals. The details and caveats of the exercise are explained in the above text. Column (1) shows the average revenue on the Target Plot at baseline. Columns (2) - (4) show predicted effects of the induced rentals. The three different predictions correspond to different assumptions for moving from farm-level predictions to predictions on the Target Plot, as explained above. Column (5) shows our experimental treatment effect of the rental subsidy on Target Plot revenue.

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