Land Rental Markets: Experimental Evidence from Kenya

Michelle Acampora (HKS)

Lorenzo Casaburi (Zurich)
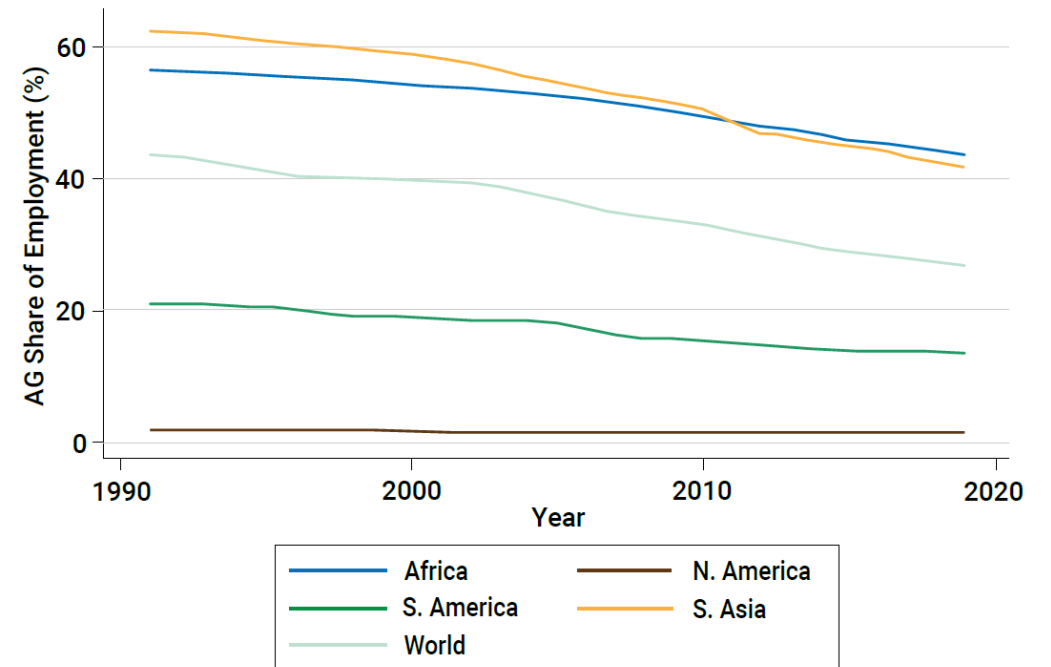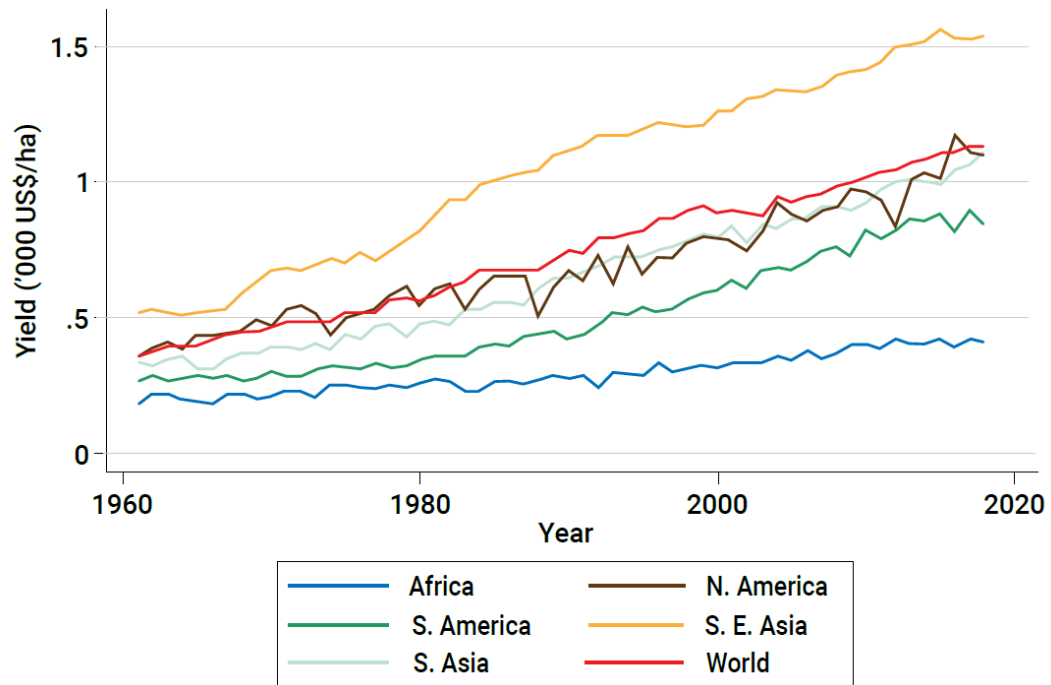
Jack Willis (Columbia)

Motivation: low productivity and incomplete land markets

- In Sub-Saharan Africa, agriculture is both particularly unproductive and the largest sector
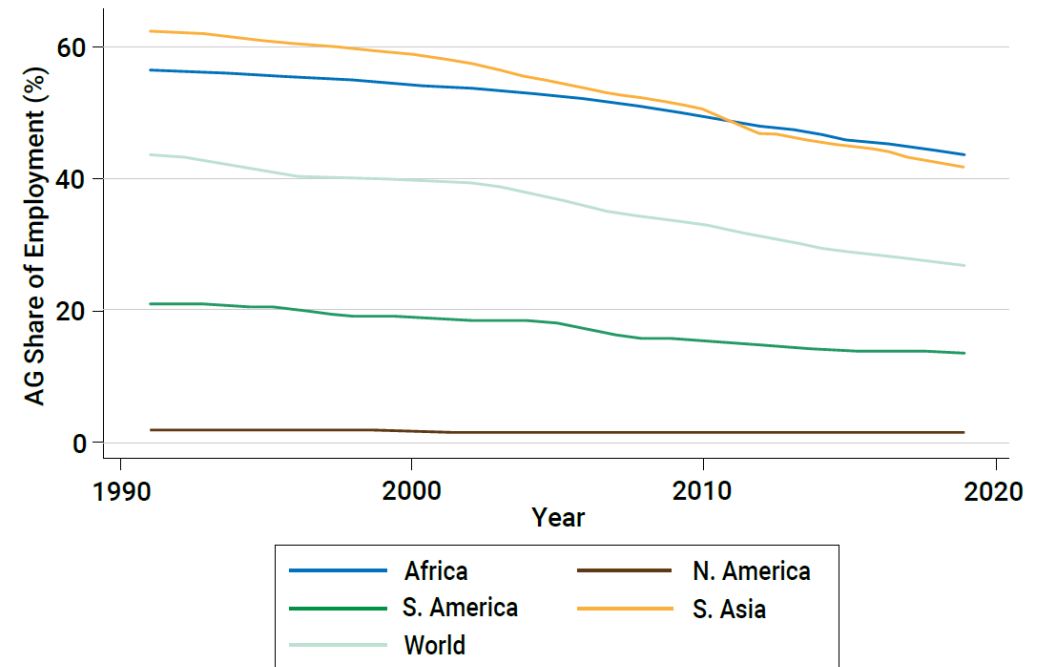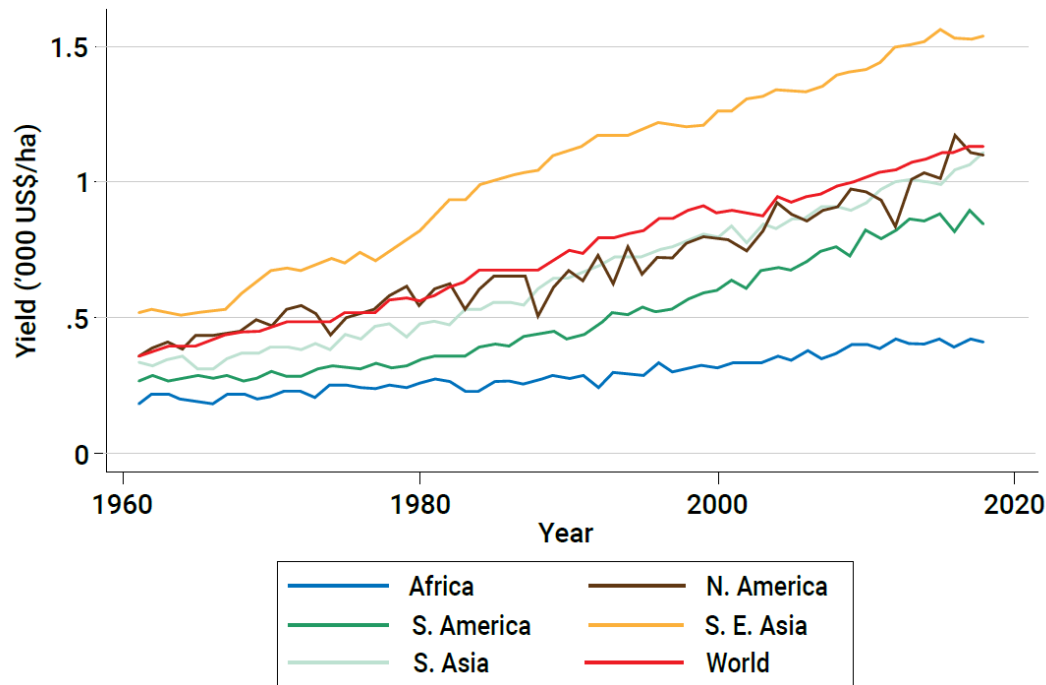
Motivation: low productivity and incomplete land markets

- In Sub-Saharan Africa, agriculture is both particularly unproductive and the largest sector

- Markets in agriculture's key input, land, function far from perfectly
  - Rental markets exist, but are subject to many frictions; sales markets are sparse

Are these facts related?

- The implications of (the lack of) market-based land reallocation for productive efficiency are actively debated:

  - Large dispersion in agricultural productivity across farmers, hence large gains from reallocating land to more productive farmers *(Restuccia and Santaulalia-Lopis, 2017)*

    vs.

  - Productivity dispersion reflects measurement error and unobserved plot heterogeneity, hence small gains from reallocation *(Gollin and Udry, 2021)*

This paper: experimental evidence on land rentals

- We provide the first experimental evidence on the effects of land *rental* markets

This paper: experimental evidence on land rentals

- We provide the first experimental evidence on the effects of land *rental* markets

- RCT in rural Kenya: we subsidize landowners to rent out one of their plots, thus inducing marginal land rentals

  - Additional treatment to benchmark income effect: unconditional cash transfer to owners

  - We study who selects into land markets on the margin, and the effects of the marginal rentals on agricultural investment, production, and owner outcomes

Related literature

- Large non-experimental literature on land rentals
  - Observational studies (e.g., Deininger *et al.*, 2008, Deininger and Jin, 2005; Jin and Jayne, 2013); quantitative analyses (e.g., Adamopoulos *et al.* 2021); reforms to land rights / registries leading to more rentals (Chari *et al.,* 2021; Chen *et al.,* 2021; Beg, 2022)

- Other related work:
  - Separation (Benjamin 1992, LaFave and Thomas 2016)
  - Land property rights (Besley and Ghatak, 2010; Agyei-Holmes *et al.,* 2020, Barker 2021)
  - Lab-in-the-field experiment on market design and land consolidation (Bryan *et al.,* 2022)
  - Field experiment on tenants' output shares (Burchardi *et al.,* 2019)
  - Land reform (Banerjee *et al.,* 2002; Adamopoulos and Restuccia, 2020; Montero, 2020)

1. **Background: Land rentals in Kenya**

2. **Experimental design**

3. **Take-up of the subsidy and induced rentals**

   Understanding sources of land market frictions

4. **Effects on agricultural outcomes**

   Understanding sources of gains from rentals

   Linking gains from rentals with land market frictions

5. **Effects on owners**

1. Background: Land rentals in Kenya

Land rental markets in Western Kenya

- Private, but imperfect, property rights

- 10% of households rent out a plot (similar to other SSA countries, Christiaensen 2017)

- Rentals often last multiple seasons

  - 1 or 2 years, with 2 seasons each (Long Rains and Short Rains)

- Upfront cash payment (no sharecropping)

  - Rental price per acre per season: $30-40.

  - Average plot size: 0.7 acres

Frictions in land rental markets in Western Kenya

- **Owner frictions:** search costs (53%), soil exploitation (50%), land disputes (40%), fees to chiefs (20%)

- **Renter frictions:** search costs, asymmetric info over land quality, land disputes, credit constraints, fees to chiefs

- Mix of one-off and per-period costs

2. Experimental Design

List ~7,000 farmers in ~160 villages, collect information on their plots and plots' planned use for next season (cultivate, fallow, rent out)

- We focus on those **farmers with at least two plots** (75%)
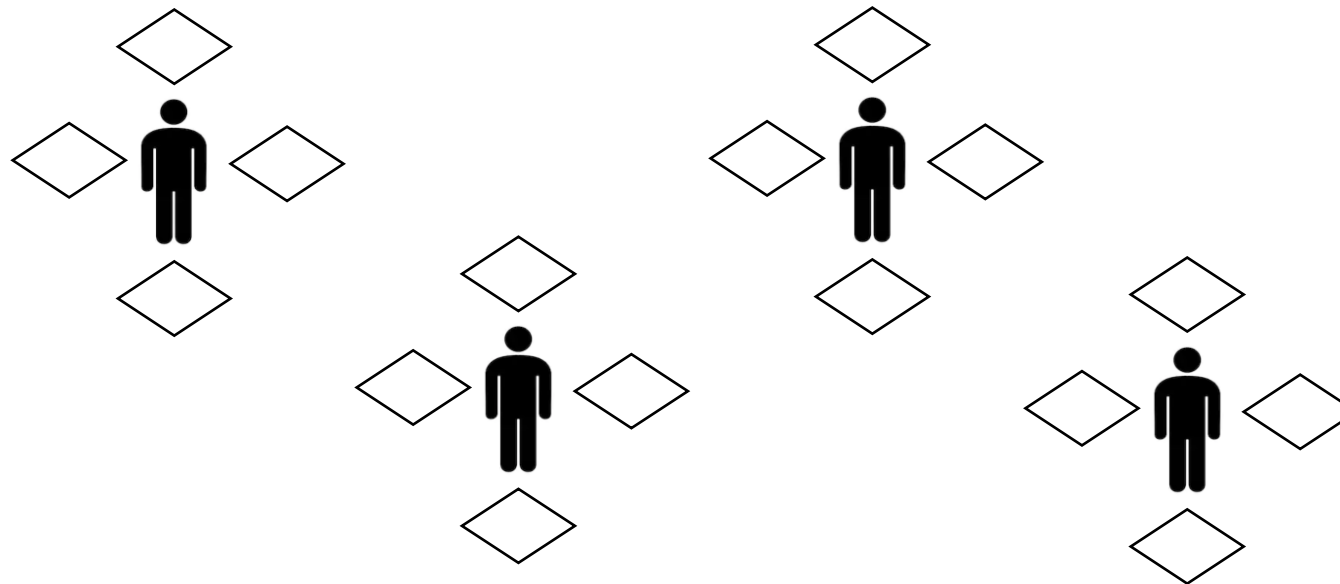
If we offer a subsidy on top of the rent you would get from the renter, would you rent out an *extra plot,* among those you do not plan to rent out (in step 1)?

- Subsidy of **30% of average rental rate** (i.e., $10 per acre per season), for **max three seasons**
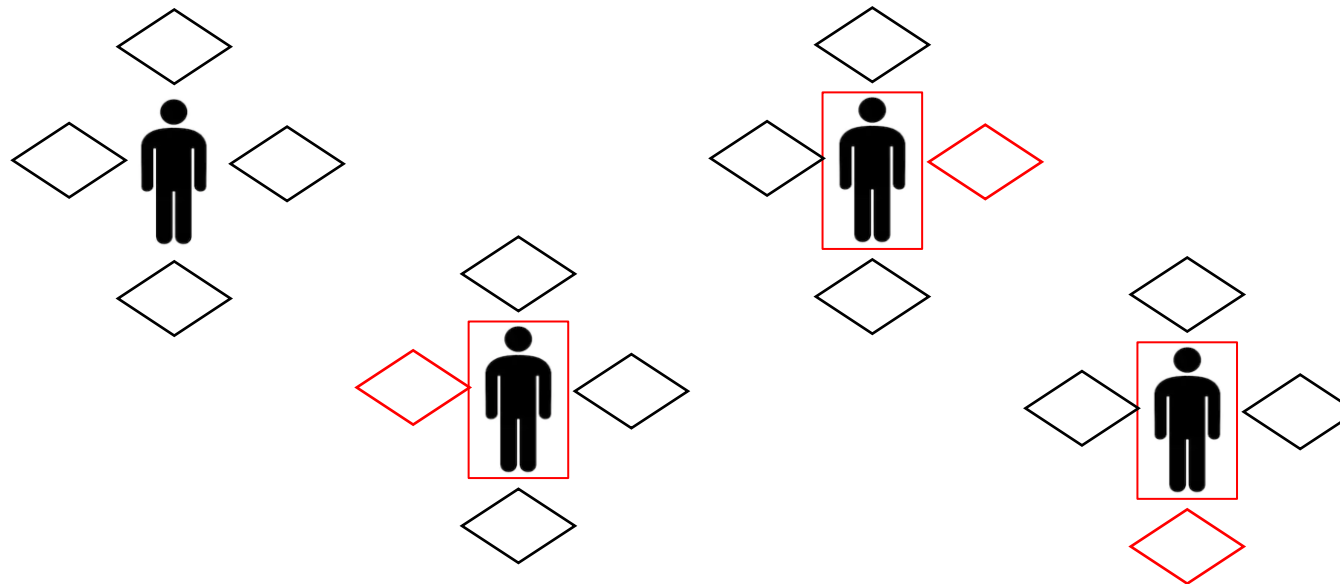
3. Restricting the sample to potential compliers

Restrict sample to: i) those owners who say yes and ii) the "**Target Plot**" they mention
→ **we restrict the sample to (potential) compliers**

- These are the "**owners**" (N = 521)
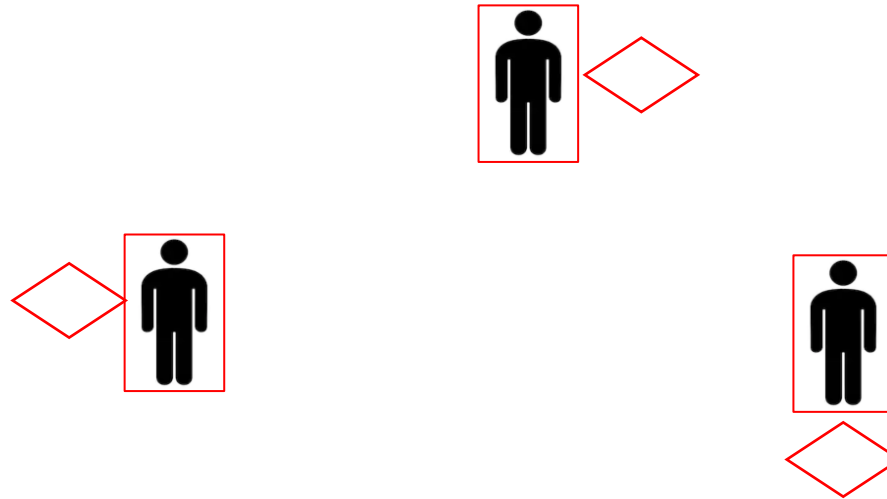
- Randomize the owners into three groups:

    1. Conditional rental subsidy for renting out the Target Plot

    2. Unconditional cash drop of same amount

    3. Pure control

4. Randomization and data collection

- Randomize the owners into three groups:

    1. Conditional rental subsidy for renting out the Target Plot

    2. Unconditional cash drop of same amount

    3. Pure control
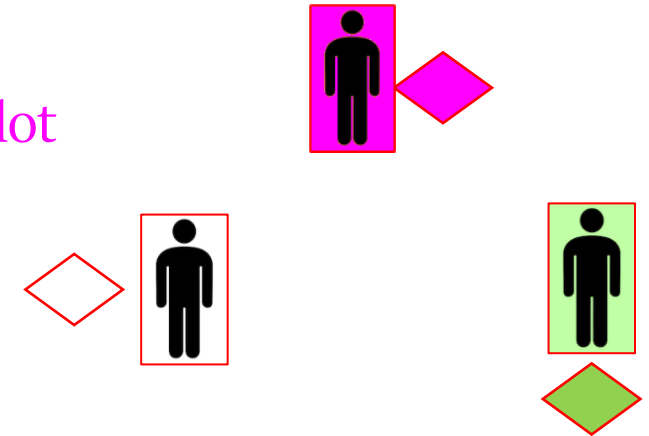
- The rental subsidy is paid to owners, if they find a renter. "Organic" matching:

    - Provides a counterfactual for Target Plot and owners, but not for renters
    - *Alternative designs?* Search costs make it hard to have both a renter counterfactual & strong 1st stage

    [Spillovers]

4. Randomization and data collection

- Randomize the owners into three groups:

  1. Conditional rental subsidy for renting out the Target Plot

  2. Unconditional cash drop of same amount

  3. Pure control
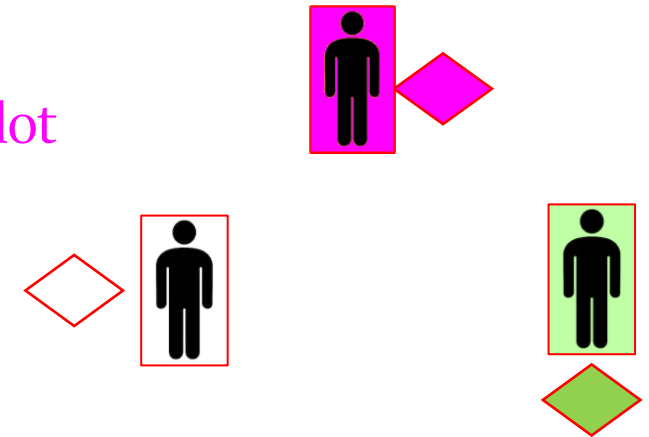
- The rental subsidy is paid to owners, if they find a renter. "Organic" matching:

  - Provides a counterfactual for Target Plot and owners, but not for renters

  - *Alternative designs?* Search costs make it hard to have both a renter counterfactual & strong 1st stage

    [Spillovers]

- **Data collection:** baseline & follow-up surveys (4 seasons) with owners and renters

  - Owners: all plots; Renters: all plots for baseline, only Target Plot for follow ups

  - Also soil tests on Target Plot in seasons 1 & 4

    [Timeline]

Extra details on the experiment

- Verification of land rentals for subsidy disbursement:

  1. Confirmation interview with renter

  2. Rental confirmation from chief (we also paid token to the chief for this service)

- Randomization stratification:

  - County; plot size; **planned use of Target Plot for the next season:** cultivate *(Stratum C, 65%)* vs. fallow/undecided *(Stratum NC, 35%)*

- The randomization mostly achieved balance, but some exceptions: [Tables]

  - Control plots have lower inputs, but good balance between cash drop and rental subsidy

  - We use ANCOVA specifications. Robustness to PDS Lasso control selection. [Measurement]

Conceptualizing the experiment: which trades do we induce?

- Design is purposefully agnostic about which frictions it targets. The subsidy could offset several at once (e.g., search costs, expropriation risk, soil exhaustion)

- Simple framework:

  - Consider a potential rental: Gains from trade $\mathbf{\Delta}$ vs. Rental friction $\boldsymbol{\tau}$

  - Without frictions, trade occurs if $\Delta > 0$. With frictions, trade occurs if $\Delta > \tau$

- Subsidy s induces **marginal trades**, i.e., those with $\Delta \in (\tau - s, \tau]$

  - Trades induced by a large institutional reform may differ

  - If the subsidy is not too large ($s < \tau$), it reduces misallocation by inducing trades which would be efficient absent rental frictions ($\Delta > 0$)
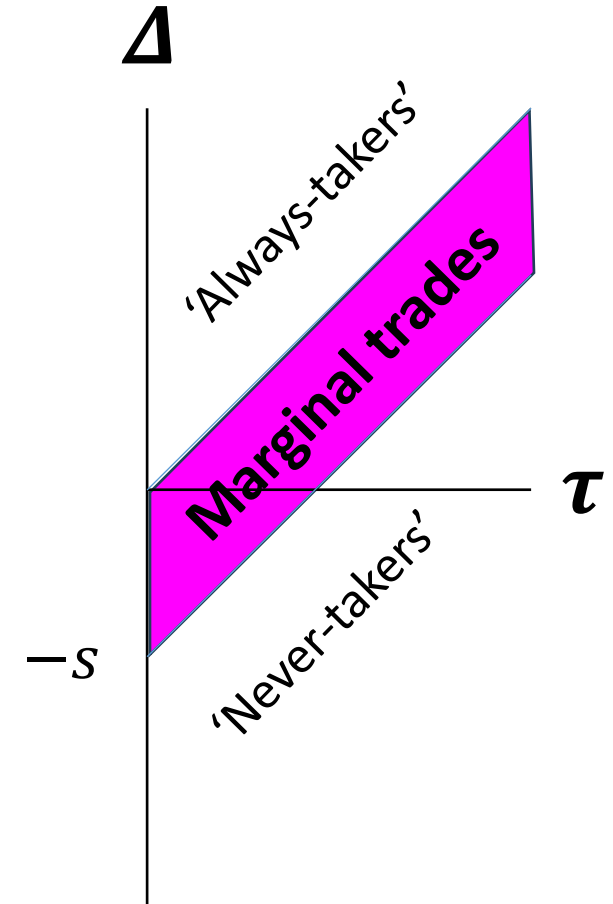
3. Take-up of the subsidy and induced rentals

Understanding sources of land market frictions

Listing and selection: Who is interested in the subsidy?

16% of farmers (with 2+ plots) would like to rent out an extra plot if subsidized

- **Interested owners** (vs non-interested): own more plots, higher share fallow, more rental experience

- **Target Plots** (vs non-Target): more often fallowed or rented before, but comparable size, soil, distance

(Table)

	Interested		Not Interested		Difference	
	Mean	St.Dev.	Mean	St.Dev.	Beta	S.E.
Male	0.68	0.47	0.62	0.49	.07***	(.01)
Age	50.76	14.98	49.33	15.78	.10	(.57)
Has a Phone	0.91	0.29	0.84	0.37	.06***	(.01)
No. Plots Owned	3.50	1.33	2.87	1.05	.66***	(.04)
Acres Owned (wins. 1%)	4.09	3.60	3.58	3.87	.44***	(.13)
Renting out at least one plot	0.09	0.28	0.03	0.16	.04***	(.01)
No. Plots Rented Out	0.10	0.35	0.03	0.20	.05***	(.01)
Share of plots fallowed	0.08	0.16	0.02	0.10	.04***	(.00)
Cultivates Commercial Crops	0.37	0.48	0.40	0.49	.00	(.01)
Observations	878		4,607		5,485	

Listing and selection: Who is interested in the subsidy?

16% of farmers (with 2+ plots) would like to rent out an extra plot if subsidized

- **Interested owners** (vs non-interested): own more plots, higher share fallow, more rental experience

- **Target Plots** (vs non-Target): more often fallowed or rented before, but comparable size, soil, distance

  (Table)

- Reasons to rent out: need cash, no inputs to cultivate

	Interested		Not Interested		Difference	
	Mean	St.Dev.	Mean	St.Dev.	Beta	S.E.
Male	0.68	0.47	0.62	0.49	.07***	(.01)
Age	50.76	14.98	49.33	15.78	.10	(.57)
Has a Phone	0.91	0.29	0.84	0.37	.06***	(.01)
No. Plots Owned	3.50	1.33	2.87	1.05	.66***	(.04)
Acres Owned (wins. 1%)	4.09	3.60	3.58	3.87	.44***	(.13)
Renting out at least one plot	0.09	0.28	0.03	0.16	.04***	(.01)
No. Plots Rented Out	0.10	0.35	0.03	0.20	.05***	(.01)
Share of plots fallowed	0.08	0.16	0.02	0.10	.04***	(.00)
Cultivates Commercial Crops	0.37	0.48	0.40	0.49	.00	(.01)
Observations	878		4,607		5,485	

Reasons for renting out

Listing and selection: Who is interested in the subsidy?

16% of farmers (with 2+ plots) would like to rent out an extra plot if subsidized

- **Interested owners** (vs non-interested): own more plots, higher share fallow, more rental experience

- **Target Plots** (vs non-Target): more often fallowed or rented before, but comparable size, soil, distance

(Table)

	Interested		Not Interested		Difference	
	Mean	St.Dev.	Mean	St.Dev.	Beta	S.E.
Male	0.68	0.47	0.62	0.49	.07***	(.01)
Age	50.76	14.98	49.33	15.78	.10	(.57)
Has a Phone	0.91	0.29	0.84	0.37	.06***	(.01)
No. Plots Owned	3.50	1.33	2.87	1.05	.66***	(.04)
Acres Owned (wins. 1%)	4.09	3.60	3.58	3.87	.44***	(.13)
Renting out at least one plot	0.09	0.28	0.03	0.16	.04***	(.01)
No. Plots Rented Out	0.10	0.35	0.03	0.20	.05***	(.01)
Share of plots fallowed	0.08	0.16	0.02	0.10	.04***	(.00)
Cultivates Commercial Crops	0.37	0.48	0.40	0.49	.00	(.01)
Observations	878		4,607		5,485	

- Reasons to rent out: need cash, no inputs to cultivate

- Search costs: only 43% of interested farmers think it's "very likely" that they will find a renter

Reasons for renting out

18
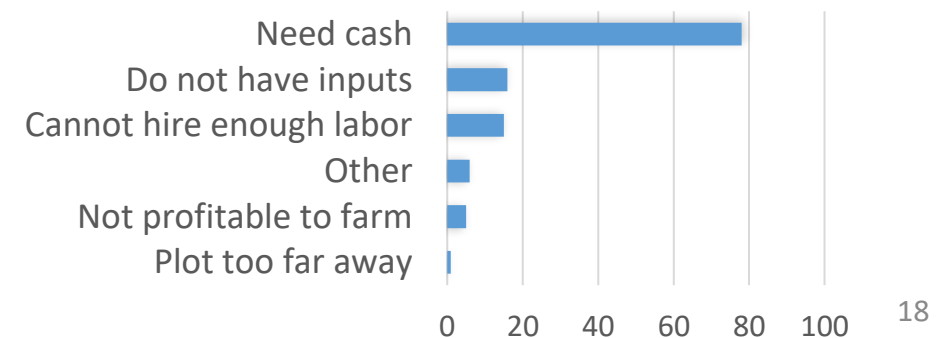
Take up of rental subsidy and cash drop

Rental subsidy

- 70% of eligible owners take up the subsidy (Selection)

  - Of these: 76% for three seasons, 18% for two seasons, 6% for one season.

  - Almost no churn in who they rent to

- Main reasons not to take up: couldn't find a renter; changed mind about renting out

Unconditional cash drop

- We match the rental subsidy's amount, number of seasons, and timing of payments

- ~ Perfect compliance (99%)

The rental subsidy increased renting out of Target Plot

Intervention seasons

- Large effect of subsidy; little effect of cash drop

- No crowding out of rentals of owners' other (non-Target) plots (Table)

- Rental terms and owner-renter relation similar across groups (Table)

  - No counterfactual for pass-through

The rental subsidy increased renting out of Target Plot

Intervention seasons

Season 1
N=521

Season 2
N=512

Season 3
N=507

Post-Intervention seasons

Season 4
N=499

Season 5
N=483
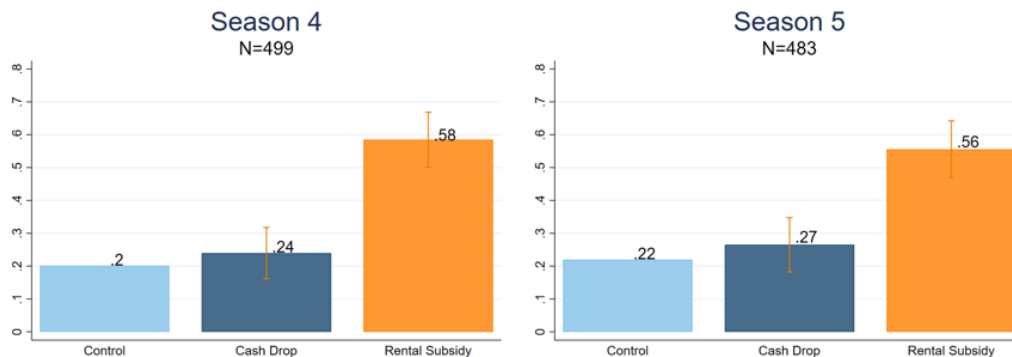
- Large effect of subsidy; little effect of cash drop

- No crowding out of rentals of owners' other (non-Target) plots (Table)

- Rental terms and owner-renter relation similar across groups (Table)

  - No counterfactual for pass-through

- **Persistence:** Rental subsidy increased rentals *even after it ended* (seasons 4&5) and also over longer run (seasons 8&9)

  - Suggests **FIXED COSTS OR LEARNING**

Search costs

Search is time-consuming and not always successful

- Median time spent searching a renter was three weeks

- 30% of rental subsidy owners did not take up subsidy → 87% of them could not find a renter

Search is limited to family and acquaintances

- 68% asked *friends*, *neighbors*, or *relatives* if they wanted to rent out

- 64% asked them if they knew someone interested

- Only 21% asked to spread the word beyond this circle

- 90% decided the renter was trustworthy because they already knew them as friend or relative

- 90% did not know other people interested in renting out

Learning from experimentation

Little evidence confirming owners' baseline concerns

- Little evidence of soil degradation from soil quality data

- Only 4% of owners report land disputes in season 9, concerning terms of payment

Evidence of owners learning

- Report substantially lower concerns (land disputes, soil exploitation, fertilizer use)

- Pay attention to performance of new crops (75%) + consider growing them in the future (62%)

Evidence of renters learning

- Rentals ending after three seasons have substantially lower endline revenues and value added

- Similar rental prices + baseline revenues → learning about match-specific productivity

4. Effects on agricultural outcomes

Understanding sources of gains from rentals

Linking gains from rentals with rental frictions

Target Plot outcomes: Estimation - ITT

- ITT pooling observations from Target Plot manager surveys across 4 seasons (t=1-4):

$$y_{is}^t = \beta_0 + \textcolor{magenta}{\beta_1 Rental\ Subsidy_i} + \textcolor{green}{\beta_2 Cash\ Drop_i} + \delta\ y_i^0 + \eta_s + \eta^t + \epsilon_i^t$$

  - η_s: stratum FE. η_t: survey round FE

- Instrumenting payments *at any time during the intervention* with treatments

$$y_{is}^t = \gamma_0 + \gamma_1 \ \boldsymbol{Rental \ \widehat{Subsidy \ Paid}_i} + \gamma_2 \ Cash \ \widehat{Drop} \ Paid_i + \delta \ y_i^0 + \eta_s + \eta^t + \epsilon_i^t$$

- γ_1 : effect of offsetting rental market frictions with subsidy, for those who take it up
  - The coefficient would also include any potential effects of chief confirmation

- γ_1 vs γ_2 compares return per disbursement of rental subsidy vs cash drop
  - Policy question, noting that compliers differ among treatments (imperfect compliance in RS)
  - Under plausible assumptions, γ_1 vs γ_2 also gives a lower bound on the effect of paying the rental subsidy on compliers, *controlling for the income effect*   (More on identification)
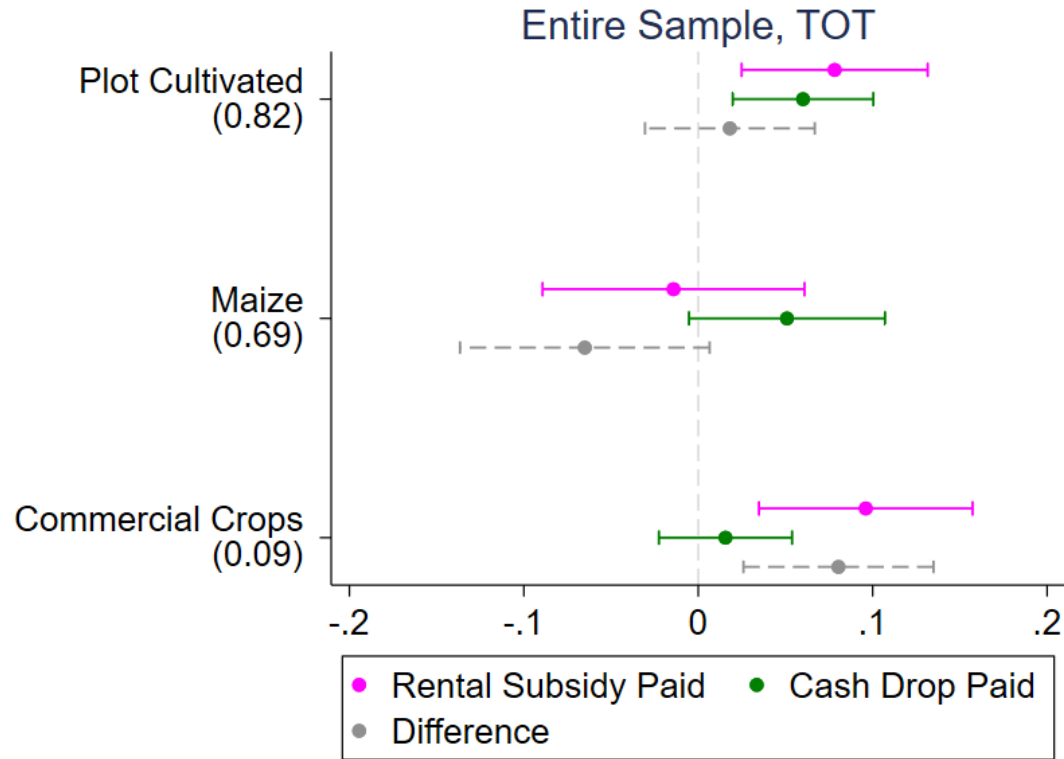
Entire Sample, TOT

- Both the Rental Subsidy and the Cash Drop increased cultivation, driven by stratum *NC* *(Graphs)*

- **Only the Rental Subsidy induced a shift from maize to commercial crops**
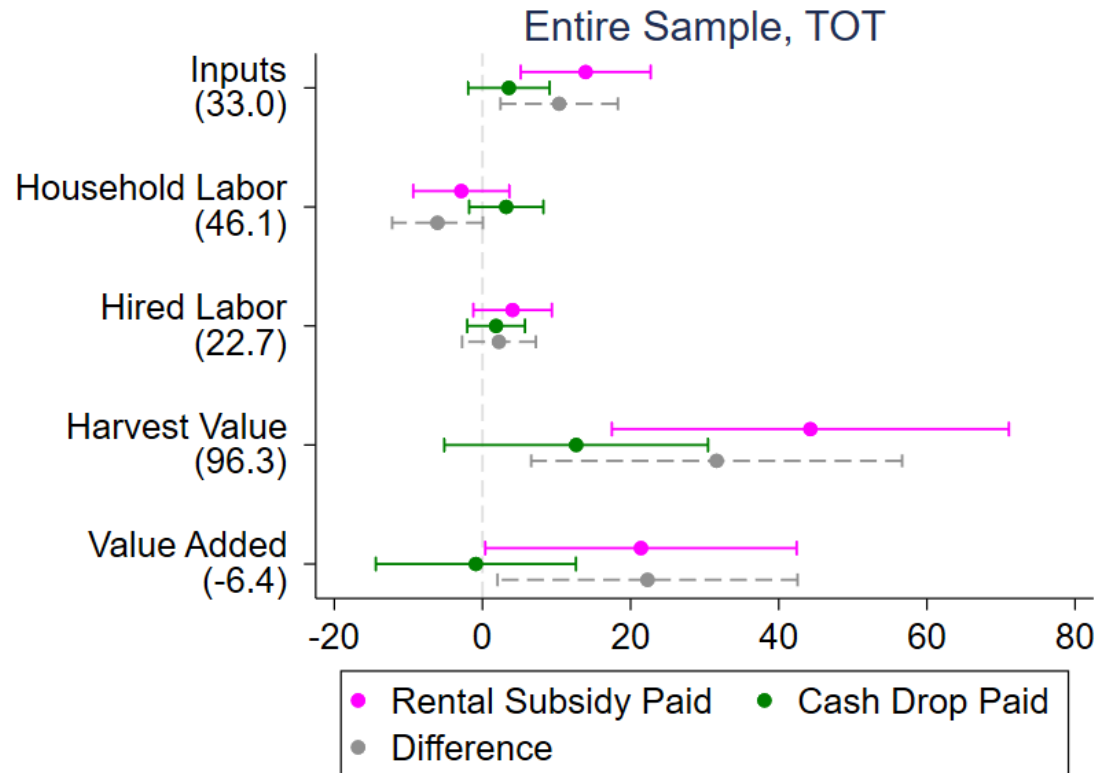
(ITT & TOT)

Inputs, output, and value added ($) – *TOT*

Entire Sample, TOT

- Winsorize 1%
- Value non-traded inputs and output with market prices
- Value Added effect robust to different hh labor valuation

(ITT & TOT)

- **Rental Subsidy: more inputs (seeds, fertilizer), same labor, higher harvest and real value added (& TFP)**
  - Results on inputs & harvest also in stratum *C* (i.e., not just an increase in cultivation in stratum *NC*)　　　(Strata)

Inputs, output, and value added ($) – *TOT*
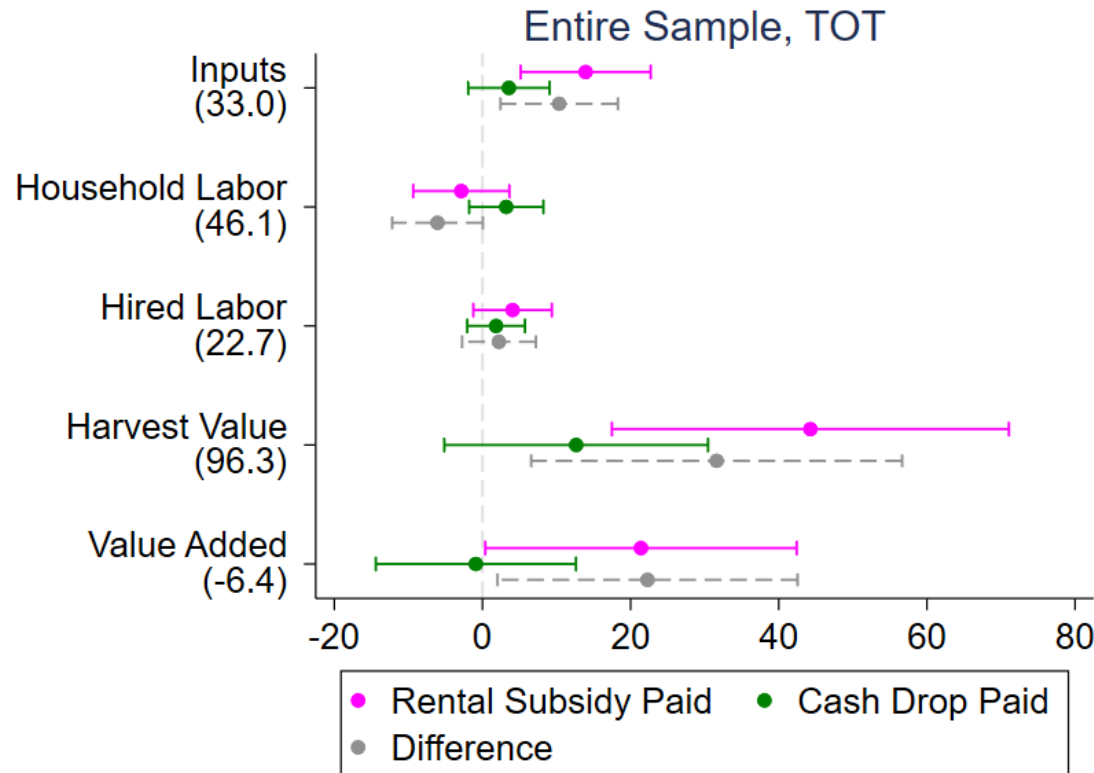
- Winsorize 1%
- Value non-traded inputs and output with market prices
- Value Added effect robust to different hh labor valuation

(ITT & TOT)

- **Rental Subsidy: more inputs (seeds, fertilizer), same labor, higher harvest and real value added (& TFP)**

  - Results on inputs & harvest also in stratum *C* (i.e., not just an increase in cultivation in stratum *NC*)   (Strata)

- **Soil quality index:** no negative impact, despite correlation with yield (+1 s.d.➜+18.5% yield)

Inputs, output, and value added ($) – *TOT*
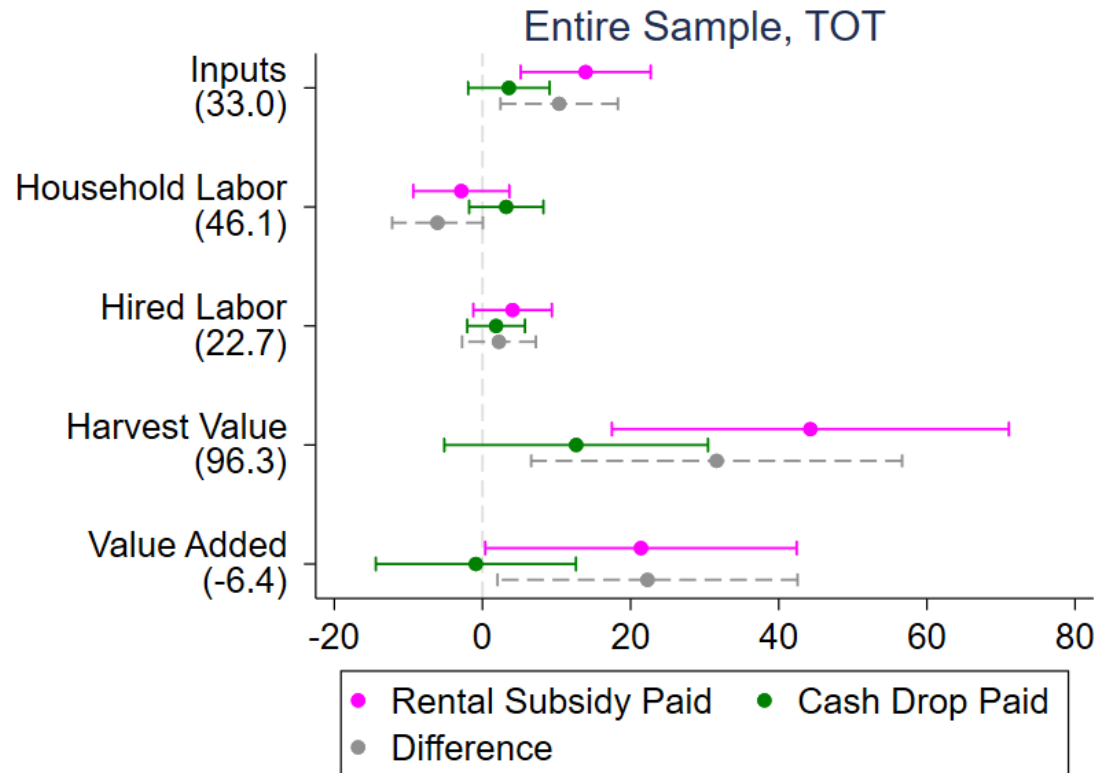
Entire Sample, TOT

- Winsorize 1%
- Value non-traded inputs and output with market prices
- Value Added effect robust to different hh labor valuation

- **Rental Subsidy: more inputs (seeds, fertilizer), same labor, higher harvest and real value added (& TFP)**

  - Results on inputs & harvest also in stratum *C* (i.e., not just an increase in cultivation in stratum *NC*)   (Strata)

- **Soil quality index:** no negative impact, despite correlation with yield (+1 s.d.➜+18.5% yield)

Extra results on Target Plot outcomes

- **Value-added effects seem to grow over time**, consistent with renters gradually learning how to better cultivate the Target Plot
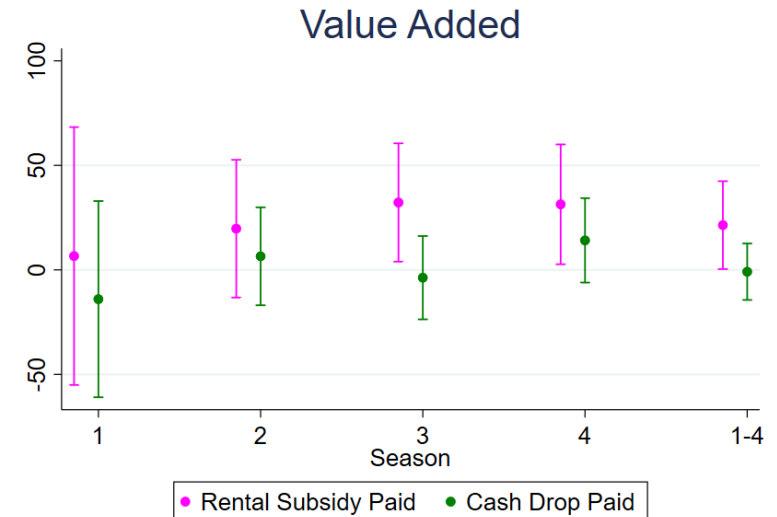
Value Added

Extra results on Target Plot outcomes

- **Value-added effects seem to grow over time**, consistent with renters gradually learning how to better cultivate the Target Plot

- **Quantile treatment effects** are positive from 40th pctile, possibly negative below 10th pctile

Extra results on Target Plot outcomes

- **Value-added effects seem to grow over time**, consistent with renters gradually learning how to better cultivate the Target Plot

- **Quantile treatment effects** are positive from 40th pctile, possibly negative below 10th pctile

- **Robustness**: alternative specifications (IHST), alternative controls (e.g., PDS Lasso), attrition

  [Inputs, Harvest Value, Value Added, Attrition]

Value Added
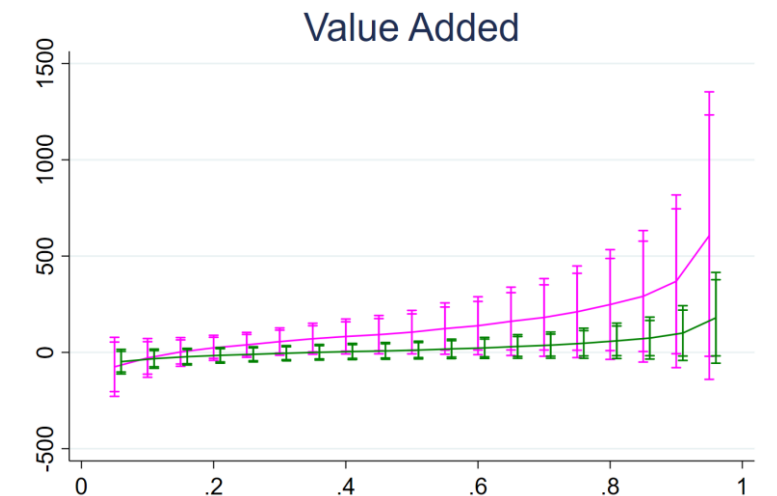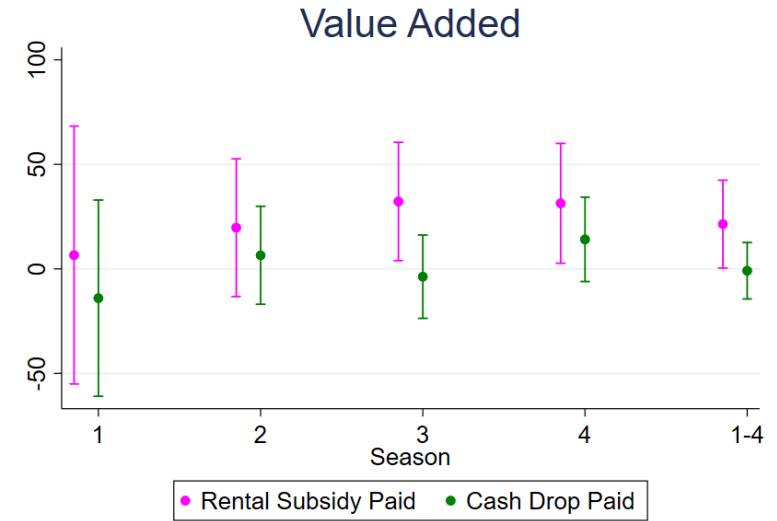
Value Added

No spillover effects on owners' other plots - *TOT*

	Rented Out	Cultivated	Maize	Commercial Crops	Inputs	HH labor	Hired labor	Harvest	Value Added
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rental Subsidy Paid	0.01	0.01	0.01	-0.01	2.08	-0.34	1.39	4.93	0.28
	[0.01]	[0.02]	[0.03]	[0.01]	[2.35]	[2.32]	[1.17]	[12.14]	[11.03]
Cash Drop Paid	0.00	-0.00	-0.00	0.01	3.58	0.16	1.11	-3.37	-9.40
	[0.01]	[0.02]	[0.02]	[0.01]	[1.91]	[1.82]	[0.82]	[9.18]	[8.19]
Rent - Cash	*0.01*	*0.01*	*0.02*	*-0.02*	*-1.50*	*-0.50*	*0.28*	*8.30*	*9.68*
	[0.01]	*[0.02]*	*[0.02]*	*[0.01]*	*[2.28]*	*[2.06]*	*[1.10]*	*[12.06]*	*[10.73]*
Mean Y in Control Group	0.05	0.75	0.47	0.09	24.22	31.81	9.51	109.10	38.96
Observations	5232	4958	4958	4958	4958	4955	4955	4955	4955

- Outcomes from follow-up surveys of owners, regardless of who is managing the Target Plot

- No evidence of spillovers of treatments onto owners' other plots

(ITT & TOT)

4. Effects on agricultural outcomes

Understanding sources of gains from rentals

Linking gains from rentals with land market frictions

Sources of gains from rentals

Technology?

- Renters' crop choice possibly better (Adamopolous and Restuccia, 2021)
- No gains from consolidation (Foster and Rosenzweig, 2022; Bryan et al., 2022)

Productivity?

- Rented plots have higher TFP. Renters are also younger, more educated and more likely to be male

Labor? (Benjamin 1992)

- Despite having higher labor-land ratios, renters do not use more labor

Capital?

- Owners appear to be capital-constrained (effect of cash drop on cultivation)
- Renters have better baseline access to capital, take more loans to cultivate the Target Plot, invest more in seeds & fertilizer, and plant crops that require more upfront investment, on top of paying the rent

Table 4: Manager characteristics

	(1)	(2)	(3)	(4)	(5)
(A) Demographics and Education	Age	High School	Male	Agri Training	Agri Experience
Rental Subsidy Paid	-5.46	0.10	0.18	-0.10	0.04
	[1.49]	[0.05]	[0.05]	[0.05]	[0.10]
Cash Drop Paid	-1.29	0.04	0.08	0.05	0.10
	[0.89]	[0.03]	[0.03]	[0.03]	[0.06]
Rent - Cash	*-4.17*	*0.06*	*0.09*	*-0.15*	*-0.07*
	[1.42]	*[0.04]*	*[0.05]*	*[0.05]*	*[0.10]*
Mean Y in Control Group	48.98	0.24	0.69	0.27	2.83
Observations	509	509	509	509	509
(B) Land and Household	N. Plots Owned	Acres Owned	Rent in Plot(s)	Household Size	Different Village
Rental Subsidy Paid	-1.29	-1.16	0.21	0.12	0.13
	[0.17]	[0.18]	[0.05]	[0.30]	[0.04]
Cash Drop Paid	-0.12	0.02	0.04	-0.27	0.03
	[0.12]	[0.13]	[0.03]	[0.16]	[0.02]
Rent - Cash	*-1.17*	*-1.18*	*0.17*	*0.39*	*0.11*
	[0.15]	*[0.16]*	*[0.04]*	*[0.27]*	*[0.04]*
Mean Y in Control Group	3.21	2.16	0.07	5.75	0.05
Observations	509	509	509	509	509
(C) Finance	Borrowed	Emergency Savings			
Rental Subsidy Paid	0.16	0.04			
	[0.05]	[0.03]			
Cash Drop Paid	0.02	-0.00			
	[0.03]	[0.02]			
Rent - Cash	*0.14*	*0.04*			
	[0.04]	*[0.03]*			
Mean Y in Control Group	0.62	0.85			
Observations	509	509			

Renter Characteristics

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

Household and hired labor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Total Labor		Household Labor					Hired Labor	
	Value of Household and Hired Labor		Value of Household Labor		Number of Tasks	Average Members	Average Days per Member	Value of Hired Labor	
(A) Full Sample									
Rental Subsidy Paid	0.44	0.14	-2.68	0.03	-0.01	-0.26	-0.18	3.09	0.09
	[3.66]	[0.15]	[2.98]	[0.16]	[0.22]	[0.15]	[0.12]	[2.19]	[0.24]
Cash Drop Paid	4.68	0.13	2.69	0.10	0.28	-0.09	-0.11	1.95	0.07
	[3.01]	[0.12]	[2.31]	[0.13]	[0.16]	[0.12]	[0.09]	[1.62]	[0.16]
Rent - Cash	*-4.25*	*0.00*	*-5.37*	*-0.08*	*-0.29*	*-0.17*	*-0.07*	*1.14*	*0.03*
	[3.43]	*[0.13]*	*[2.82]*	*[0.15]*	*[0.21]*	*[0.15]*	*[0.11]*	*[2.06]*	*[0.21]*
Mean Y in Control Group	59.40	IHS	40.33	IHS	5.27	2.97	2.65	18.58	IHS
Observations	1957	509	1957	509	1957	1680	1680	1957	509

4. Effects on agricultural outcomes

Understanding sources of gains from rentals

Linking gains from rentals with land market frictions

1. Size and incidence of rental frictions, by revealed preference

Most owners are not on the margin

- Only 16% are interested in a 30% subsidy - for many, the perceived frictions may be very large

For marginal trades:

- *Δ Value Added >0* ⇒ trades would be efficient in a frictionless market [(Model)](Model)

  - Also > *subsidy value (21 > 9)*. However, there may be more cost-effective ways to induce trades

- Back-of-the-envelope to bound the size of frictions: $\tau \in [\$45, \$54]$ per acre per season

- Rent similar to value added ($34 vs $40), suggesting owners bear large share of the frictions

2. Gains from marginal rentals vs. gains from full reallocation

- **Standard misallocation exercise using baseline data**: fit production function to estimate productivity dispersion, then simulate gains from full reallocation among owners' and renters' land **(CAVEATS & details)**

	No reallocation level (1)	Actual rentals treatment effect (2)	Full reallocation treatment effect (3)
Total revenue	66,800	1,950	85,400

2. Gains from marginal rentals vs. gains from full reallocation

- **Standard misallocation exercise using baseline data**: fit production function to estimate productivity dispersion, then simulate gains from full reallocation among owners' and renters' land (**CAVEATS** & details)

	No reallocation level (1)	Actual rentals treatment effect (2)	Full reallocation treatment effect (3)
Total revenue	66,800	1,950	85,400

- Experimentally induced rentals reallocate 9% of land but only generate 2% of predicted gains of full reallocation. Why? **Two potential reasons:**

    (1) For induced rentals, realized gains are much smaller than predicted gains

    (2) Induced rentals have much smaller predicted gains than "optimal" (frictionless) rentals

2. Gains from marginal rentals vs. gains from full reallocation

(1) Treatment effects of experimentally induced rentals on yield: predicted = $12-$20, actual =$20

	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	70.5	17.4	12.2	19.7	19.8

2. Gains from marginal rentals vs. gains from full reallocation

(1) Treatment effects of experimentally induced rentals on yield: predicted = $12-$20, actual =$20

	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	70.5	17.4	12.2	19.7	19.8

(2) Experimentally induced rentals were predicted to increase yields, but by much less than "optimal" rentals. Potential reasons:

- Restricted set of possible rentals due to experimental design

- Measurement error in baseline productivity estimation

- **Rentals with largest potential gains face largest frictions?**

38
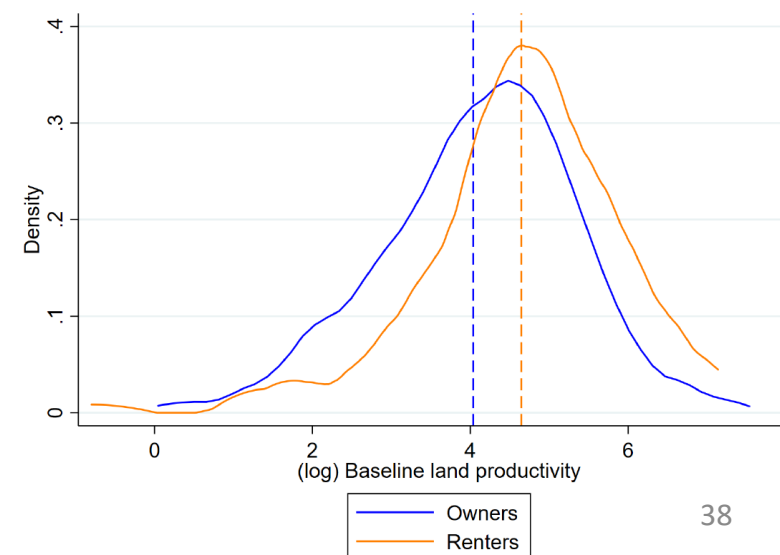
5. Owner outcomes

Main results on owner outcomes, for treatment effects of rental subsidy:

Food security

- Decrease in maize stocks, but no change in hunger

Labor supply

- Small *decrease* in non-agricultural labor supply (possibly due to income effect from renting out):

  - TOT -9.5 person-days on control mean of 38.7

- No effect on migration

Asset indices, household finances

- No meaningful effects

We experimentally induced marginal land rentals and studied their effects

- **Few owners are marginal.** Those who were owned more land and needed cash

- **Marginal rentals lead to efficiency gains.** Shift toward cash crops and ↑ in non-labor inputs, output, and value added, but not in labor

- **Sources of frictions, τ.** Rentals persisted beyond the subsidy. Search costs and learning

- **Sources of gains, Δ.** Differences in f, A, & possibly capital constraints, but not labor

- **Predicted gains from full reallocation are *much* larger.** Important to consider the joint distribution of potential gains Δ and frictions τ

- **Some open questions:** interventions targeting specific frictions; GE effects; large-scale leasing

Thanks!

	Season 1	Season 2	Season 3	Season 4
	2019 Short Rains (9/2019–1/2020)	**2020 Long Rains** (4/2020–8/2021)	**2020 Short Rains** (9/2020–1/2021)	**2021 Long Rains** (4/2021–8/2021)
Listing + Owner baseline survey + Randomization	X			
Rental subsidy offer + Rental verification + Subsidy disbursement	X	X	X	
Renter baseline survey	X			
Follow-up survey with owners & renters	X	X	X	X
Soil testing	X			X

Many leave plots uncultivated: baseline

- Both in the listing (N=5,500) and in the baseline (N=521), about 25% of farmers leave at least one plot uncultivated

WHY DID YOU NOT CULTIVATE THE PLOT?
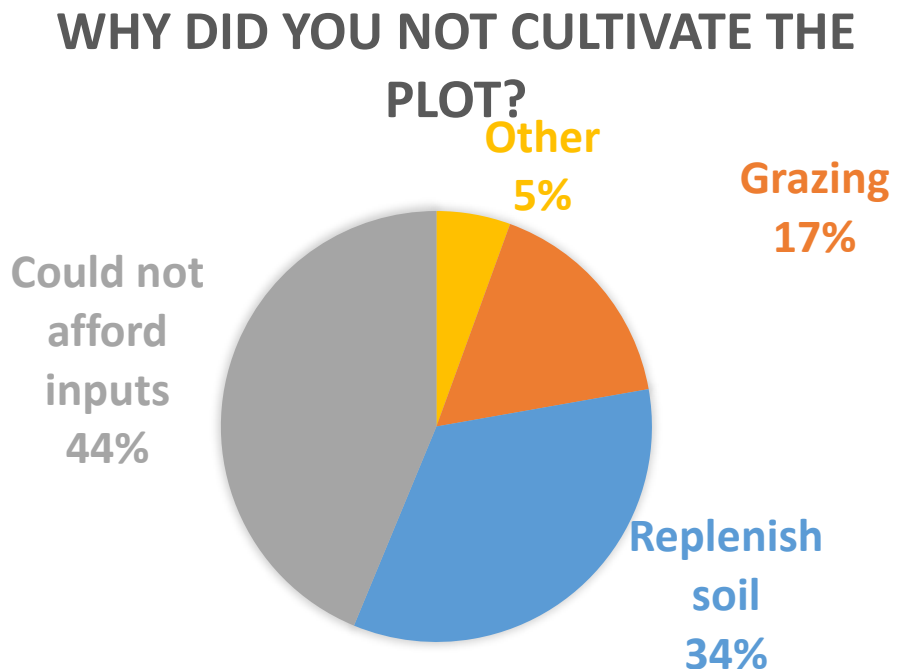
Extensive margin **gains** from increasing cultivation rates?

- **Caveat:** productive fallowing?

Other 5%

Grazing 17%

Could not afford inputs 44%

Replenish soil 34%

More on potential spillovers

- **Within owner's farm:** our design can look at this: no spillovers

- **Within renter's farm:** no counterfactual, but:

  - Most renters are first time renters so no displacement from other rentals

  - No spillovers across plots within owners suggest there may be little spillover within renters, too

  - Results not driven by labor, but by investment, productivity, and crop choice. Less obviously facing constraints on those margins, and renters often seem to have access to credit

- **GE effects**

  - Small experiment

  - To test these, we would need a completely different design with RCT at location level, identifying potential owners, potential renters ex ante

  - Also, if very segmented market, treatment on a small network does not affect the rest

Why do renters decide to rent in?

Why rented extra plot	%
Had spare cash	6
Had spare labor	9
Household needs more food	69
Plot very fertile	19
Rental price was low	10

Table B.1: Comparison Target Plots vs Non Target Plots

	Target Plot [T]	NON-Target Plots [NT]	[T-NT]	N
Plot Size	0.79	0.75	0.02	1,898
	(0.55)	(1.04)	(0.04)	
Respondent's homestead in different village than plot	0.01	0.03	-0.01	1,898
	(0.12)	(0.17)	(0.01)	
Sandy loam soil	0.54	0.53	0.01	1,898
	(0.50)	(0.50)	(0.01)	
Sandy clay soil	0.27	0.31	-0.03	1,898
	(0.44)	(0.46)	(0.01)***	
Irrigation dummy	0.06	0.05	0.01	1,898
	(0.23)	(0.22)	(0.01)	
Cultivated in 2019 long rains	0.60	0.79	-0.19	1,898
	(0.49)	(0.41)	(0.02)***	
Rented out in 2019 long rains	0.12	0.06	0.06	1,898
	(0.32)	(0.24)	(0.01)***	
Cultivated with maize in 2019 long rains	0.49	0.45	0.01	1,898
	(0.50)	(0.50)	(0.03)	
Cultivated with commercial crops in 2019 long rains	0.04	0.09	-0.04	1,898
	(0.20)	(0.29)	(0.01)***	
Value of agricultural inputs (excl. labor)	34.5	46.3	-9.4	1,883
	(71.7)	(284.9)	(7.4)	
Value of household labor	29.27	27.30	1.97	1,042
	(42.64)	(39.90)	(2.42)	
Value of hired labor	13.0	9.0	4.0	1,041
	(26.6)	(18.5)	(1.2)***	
Cultivated in 2018 short rains	0.54	0.69	-0.15	1,898
	(0.50)	(0.46)	(0.02)***	
Rented out in 2018 short rains	0.10	0.06	0.04	1,898
	(0.29)	(0.24)	(0.01)***	
Harvest value in in 2018 short rains	70.5	106.0	-22.8	1,898
	(185.2)	(743.3)	(16.1)	

	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 plots: total acres owned in 2019 long rains	2.48	2.64	2.57	-0.17	-0.09	0.08	520
	(1.87)	(2.07)	(1.95)	(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)	
Number 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)	
Number 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)	

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
B. Target Plots							
Size (avg reported-GPS)	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=poor, 2=fair, 3=good)	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=swampy, 2=mix, 3=dry)	2.42	2.39	2.41	0.03	-0.02	0.01	521
	(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)	
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 (excl. labor)	41.1	39.2	23.1	2.6	19.1	19.6	517
	(84.5)	(75.9)	(48.8)	(8.1)	(7.5)**	(6.7)***	
Value of household labor	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	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 in 2018 short rains	72.5	86.4	52.8	-10.0	16.1	27.0	521
	(169.5)	(232.3)	(141.4)	(20.9)	(16.8)	(21.0)	

	Rental Subsidy [RS]	Cash Drop [CD]	Control [C]	[RS-CD]	[RS-C]	[CD-C]	N
C. Non-target 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	1.89	-0.12	-0.11	0.00	520
	(1.69)	(1.83)	(1.75)	(0.18)	(0.17)	(0.19)	
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 (excl. labor)	140.0	102.7	96.7	39.0	45.9	11.5	518
	(294.6)	(249.5)	(188.6)	(26.6)	(26.2)*	(23.3)	
Value of household labor	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	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 in 2018 short rains	231.9	295.7	281.3	-50.2	-32.3	3.2	521
	(603.1)	(842.8)	(825.8)	(83.4)	(70.6)	(89.8)	

	Complier	Non-Complier	Difference
A. Owner characteristics			
Age	48.91	50.85	-1.94
	(14.62)	(16.97)	(2.83)
Male	0.67	0.70	-0.03
	(0.47)	(0.47)	(.08)
Family Size	5.55	4.91	0.64
	(2.76)	(3.15)	(.53)
High School Educated	0.30	0.15	0.15**
	(0.46)	(0.36)	(.07)
Agricultural Training	0.40	0.13	0.27***
	(0.49)	(0.34)	(.07)
Compare agricultural experience to avg. farmer (1-5)	2.93	2.63	0.30**
	(0.91)	(0.77)	(.14)
No. plots owned in 2019 long rains	3.47	3.50	-0.03
	(1.23)	(1.39)	(.23)
Total plots: total acres owned in 2019 long rains	2.68	1.90	0.78***
	(1.99)	(1.36)	(.27)
Have maize stocks from own production, last 12 months	0.74	0.54	0.20**
	(0.44)	(0.50)	(.08)
Experienced a hunger period, last 12 months	0.32	0.41	-0.10
	(0.47)	(0.50)	(.08)
Own oxen or cow	0.73	0.54	0.19**
	(0.44)	(0.50)	(.08)
Number person-days spent working on other farms, last 7 months	24.01	10.02	13.99
	(81.15)	(32.61)	(8.83)
Number person-days spent on non-ag work, last 12 months	23.30	17.28	6.02
	(32.22)	(29.32)	(5.21)
Taken a loan in last 12 months	0.71	0.57	0.14*
	(0.46)	(0.50)	(.08)
Total borrowed, last 12 months	69.42	14.63	54.79***
	(144.27)	(22.42)	(13.6)
Participate in ROSCA	0.52	0.41	0.10
	(0.50)	(0.50)	(.09)
Have bank account	0.28	0.20	0.08
	(0.45)	(0.40)	(.07)
Total amount saved	69.91	50.01	19.90
	(161.78)	(141.11)	(25.45)
5k Ksh in emergency savings	0.42	0.28	0.13*
	(0.50)	(0.46)	(.08)
Wealth index, assets- and amenities-based PCA	0.40	-0.34	0.74**
	(2.25)	(1.53)	(.31)

Compliers:

- larger plot size

- more education

- more plots owned

- higher input intensity

51

	Complier	Non-Complier	Difference
B. Target plot characteristics			
Plot size	0.78	0.53	0.24***
	(0.48)	(0.29)	(.06)
Inherited	0.91	0.93	-0.03
	(0.29)	(0.25)	(.05)
Certificate of title/customary ownership	0.75	0.78	-0.03
	(0.43)	(0.42)	(.07)
Respondent's homestead in different village than plot	0.03	0.00	0.03*
	(0.16)	(0.00)	(.01)
Sandy loam soil	0.57	0.52	0.04
	(0.50)	(0.51)	(.09)
Sandy clay soil	0.26	0.26	-0.00
	(0.44)	(0.44)	(.08)
Soil quality index (1=poor, 2=fair, 3=good)	2.57	2.54	0.02
	(0.55)	(0.55)	(.09)
Swampy/dry index (1=swampy, 2=mix, 3=dry)	2.42	2.43	-0.01
	(0.62)	(0.54)	(.1)
Erosion dummy	0.23	0.20	0.03
	(0.42)	(0.40)	(.07)
Irrigation dummy	0.06	0.00	0.06***
	(0.24)	(0.00)	(.02)
Cultivated in 2019 long rains	0.62	0.67	-0.06
	(0.49)	(0.47)	(.08)
Rented out in 2019 long rains	0.16	0.07	0.09*
	(0.37)	(0.25)	(.05)
Cultivated with maize in 2019 long rains	0.53	0.52	0.01
	(0.50)	(0.51)	(.09)
Cultivated with commercial crops in 2019 long rains	0.04	0.04	-0.00
	(0.20)	(0.21)	(.04)
Value of agricultural inputs (excl. labor)	47.42	26.62	20.80*
	(93.37)	(59.72)	(12.23)
Value of household labor	35.90	21.62	14.28**
	(48.64)	(36.08)	(6.91)
Value of hired labor	15.91	17.67	-1.76
	(29.44)	(34.11)	(5.68)
Cultivated in 2018 short rains	0.53	0.52	0.01
	(0.50)	(0.51)	(.09)
Rented out in 2018 short rains	0.11	0.07	0.04
	(0.31)	(0.25)	(.05)
Plan cultivate in 2018 short rains (Listing)	0.66	0.67	-0.02
	(0.48)	(0.47)	(.08)
Harvest value in in 2018 short rains	74.18	67.94	6.25
	(163.81)	(189.34)	(31.56)

Renting out *non-Target plots*

	Rented out
	(1)
ITT	
Rental Subsidy	0.01
	[0.01]
Cash Drop	0.00
	[0.01]
p-value Rent = Cash	*0.63*
TOT	
Rental Subsidy Paid	0.01
	[0.01]
Cash Drop Paid	0.00
	[0.01]
p-value Rent = Cash	*0.51*
Mean Y in Control Group	0.05
Observations	5,229

Plot manager characteristics: results *(LATE)*

	(1)	(2)	(3)	(4)
Panel A: Demographics and Education	Household Size	Age	Gender	High School Educated
Plot Rented	0.21	-7.85***	0.25***	0.14**
	[0.43]	[2.14]	[0.07]	[0.07]
Mean Y in Control Group	5.75	48.98	0.69	0.24
Observations	508	508	508	508
Panel B: Agricultural Land and Practices	N. Plots Owned	Rent In Plot(s)	S. Plots Cash Crops	Target Plot in Diff. Village
Plot Rented	-1.89***	0.30***	0.05	0.19***
	[0.21]	[0.06]	[0.05]	[0.05]
Mean Y in Control Group	3.21	0.07	0.11	0.05
Observations	508	508	467	506
Panel C: Food Security, Wealth and Finance	Experienced Hunger	Non-Land Wealth	Borrowed	Emergency Savings
Plot Rented	-0.13**	-0.24	0.24***	0.09
	[0.06]	[0.17]	[0.07]	[0.07]
Mean Y in Control Group	0.33	-0.01	0.62	0.40
Observations	508	504	508	508

Nuanced distributional effects of rentals: Renters own fewer assets (land & non-land) despite similar household size, but are younger, more educated, and, possibly, more market-oriented (cash crops, loans). They are also more likely to be male

Table 1: Manager characteristics

	(1)	(2)	(3)	(4)
Panel A: Demographics and Education	Household Size	Age	Gender	High School Educated
ITT				
Rental Subsidy	0.10	-3.86***	0.12***	0.07*
	[0.25]	[1.24]	[0.04]	[0.04]
Cash Drop	-0.27	-1.42	0.09***	0.05
	[0.19]	[1.01]	[0.03]	[0.03]
p-value Rent = Cash	0.11	0.06	0.34	0.61
LATE				
Plot Rented	0.21	-7.85***	0.25***	0.14**
	[0.43]	[2.14]	[0.07]	[0.07]
Mean Y in Control Group	5.75	48.98	0.69	0.24
Observations	508	508	508	508

	N. Plots Owned	Rent In Plot(s)	S. Plots Cash Crops	Target Plot in Diff. Village
Panel B: Agricultural Land and Practices				
ITT				
Rental Subsidy	-0.92***	0.15***	0.02	0.09***
	[0.15]	[0.04]	[0.03]	[0.03]
Cash Drop	-0.17	0.04	-0.01	0.03
	[0.14]	[0.03]	[0.02]	[0.03]
p-value Rent = Cash	0.00	0.01	0.17	0.04
LATE				
Plot Rented	-1.89***	0.30***	0.05	0.19***
	[0.21]	[0.06]	[0.05]	[0.05]
Mean Y in Control Group	3.21	0.07	0.11	0.05
Observations	508	508	467	506

	Experienced Hunger	Non-Land Wealth	Borrowed	Emergency Savings
Panel C: Food Security, Wealth and Finance				
ITT				
Rental Subsidy	-0.06*	-0.12	0.12***	0.05
	[0.03]	[0.09]	[0.04]	[0.04]
Cash Drop	-0.03	0.08	0.03	0.06
	[0.03]	[0.09]	[0.04]	[0.04]
p-value Rent = Cash	0.34	0.04	0.03	0.85
LATE				
Plot Rented	-0.13**	-0.24	0.24***	0.09
	[0.06]	[0.17]	[0.07]	[0.07]
Mean Y in Control Group	0.33	-0.01	0.62	0.40
Observations	508	504	508	508

Plot manager characteristics: ITT & LATE

	Rental Subsidy [RS]	Cash Drop & Control [CD&C]	[RS-(CD&C)]
Target Plot characteristics			
Plot size (avg reported-GPS)	0.77	0.78	-0.01
	(0.48)	(0.54)	(0.07)
Sandy loam soil	0.57	0.59	-0.01
	(0.50)	(0.50)	(0.07)
Sandy clay soil	0.25	0.22	0.03
	(0.43)	(0.41)	(0.06)
Soil quality index (1=poor, 2=fair, 3=good)	2.56	2.59	-0.03
	(0.56)	(0.54)	(0.08)
Swampy/dry index (1=swampy, 2=mix, 3=dry)	2.42	2.52	-0.10
	(0.62)	(0.58)	(0.08)
Erosion dummy	0.23	0.28	-0.06
	(0.42)	(0.45)	(0.06)
Irrigation dummy	0.05	0.07	-0.02
	(0.22)	(0.25)	(0.03)
Formal certificate available	0.82	0.77	0.05
	(0.38)	(0.42)	(0.06)
Rented out at any point in 2019	0.22	0.33	-0.11
	(0.41)	(0.47)	(0.06)*
Renters and rental contracts			
Rental contract duration (months)	20.63	21.29	-0.66
	(16.42)	(16.08)	(2.32)
Cash amount agreed for rental contract	93.3	95.7	-2.4
	(87.1)	(111.4)	(14.5)
Taken a loan to rent in	0.08	0.05	0.03
	(0.27)	(0.21)	(0.03)
TPlot: respondent's homestead in different village than plot	0.21	0.21	0.00
	(0.41)	(0.41)	(0.06)
Renter is a family member	0.35	0.27	0.08
	(0.48)	(0.45)	(0.07)
Rented in before from same owner	0.19	0.27	-0.08
	(0.39)	(0.45)	(0.06)
Rented the Target Plot before	0.16	0.29	-0.13
	(0.37)	(0.46)	(0.06)**
Renting in other plots at baseline (2019 long rains)	0.29	0.34	-0.04
	(0.46)	(0.48)	(0.07)
Observations	120	92	212

Comparing rentals by treatment: plot characteristics & rental terms

Manager characteristics: descriptives

	Listing	All Owners	Owners Renting out	Renters
Household Size		5.69	5.83	5.61
		(2.72)	(2.78)	(2.35)
Age	49.60	50.51	50.72	42.89
	(16.12)	(14.93)	(14.84)	(13.17)
Male	0.59	0.70	0.67	0.81
	(0.49)	(0.46)	(0.47)	(0.39)
High School Educated		0.23	0.24	0.37
		(0.42)	(0.43)	(0.48)
N. Plots Owned	2.43	3.56	3.48	1.61
	(1.32)	(1.30)	(1.26)	(1.13)
Rent In Plot(s)	0.21	0.02	0.00	0.29
	(0.41)	(0.13)	(0.07)	(0.46)
Sh. Plots Cash Crops	0.20	0.10	0.11	0.14
	(0.29)	(0.20)	(0.22)	(0.29)
Plot in Diff. Village	0.03	0.01	0.02	0.21
	(0.00)	(0.12)	(0.14)	(0.41)
Experienced Hunger		0.36	0.32	0.14
		(0.48)	(0.47)	(0.35)
Non-Land Wealth		0.09	0.25	0.09
		(1.09)	(1.19)	(1.09)
Borrowed		0.62	0.68	0.77
		(0.49)	(0.47)	(0.42)
Emergency Savings		0.38	0.41	0.47
Observations	7,515	521	212	212

More on identification

- In the TOT, γ_1 vs γ_2 is a lower bound on the local effect of paying the rental subsidy *controlling for income effect,* if the income effect:

    - Is (weakly) stronger when the owner, who receives the payment, does not rent out the plot

    - Goes in the same direction for those who do not take up the rental subsidy as for those who do

More on identification

- In the TOT, γ_1 vs γ_2 is a lower bound on the local effect of paying the rental subsidy *controlling for income effect,* if the income effect:

  - Is (weakly) stronger when the owner, who receives the payment, does not rent out the plot

  - Goes in the same direction for those who do not take up the rental subsidy as for those who do

- A different question: **what is the effect of the induced rentals, absent any income effect of the subsidy?** Under the two assumptions states above, **we can bound the LATE of renting out** in an IV with renting out status as endogenous variable:

  - **Upper bound**: Rental Subsidy vs Control gives the effect of rentals on compliers, plus income effects on compliers and always takers

  - **Lower bound**: Rental Subsidy vs Cash Drop gives the effect of rentals on compliers, minus the income effect on never takers

Understanding the treatment effects: breaking down the ITT

1. Effect of rental subsidy on renting out
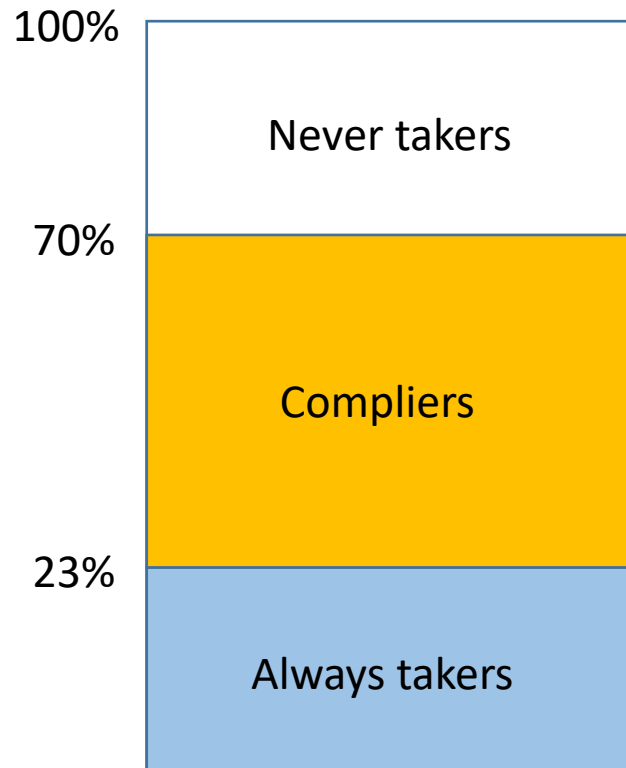
2. Treatment effects by group in 1., relative to control

Rental subsidy
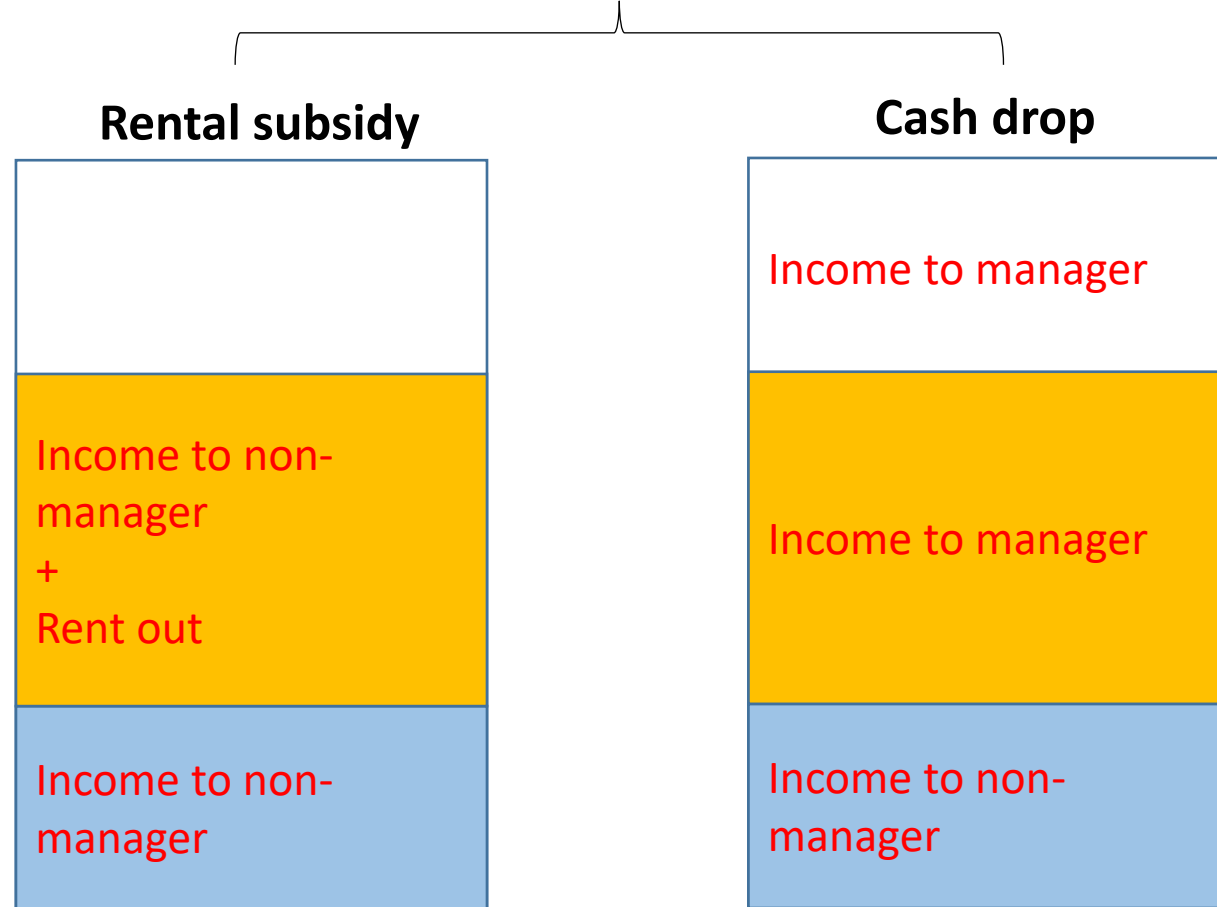
Cash drop

(Ignoring small effect on renting out of cash drop, and small number of renters who don't receive subsidy)

Back

Cultivation and crop choices: *ITT and TOT*

	Cultivated	Maize	Commercial
	(1)	(2)	(3)
ITT			
Rental Subsidy	0.06***	-0.01	0.07***
	[0.02]	[0.03]	[0.02]
Cash Drop	0.06***	0.05	0.02
	[0.02]	[0.03]	[0.02]
p-value Rent = Cash Paid	*0.90*	*0.05*	*0.02*
TOT			
Rental Subsidy Paid	0.08***	-0.01	0.10***
	[0.03]	[0.04]	[0.03]
Cash Drop Paid	0.06***	0.05	0.02
	[0.02]	[0.03]	[0.02]
p-value Rent = Cash Paid	*0.47*	*0.07*	*0.00*
Mean Y in Control Group	0.82	0.69	0.09
Observations	1,957	1,956	1,956

Cultivation and crop choices: *Stratum C vs NC*
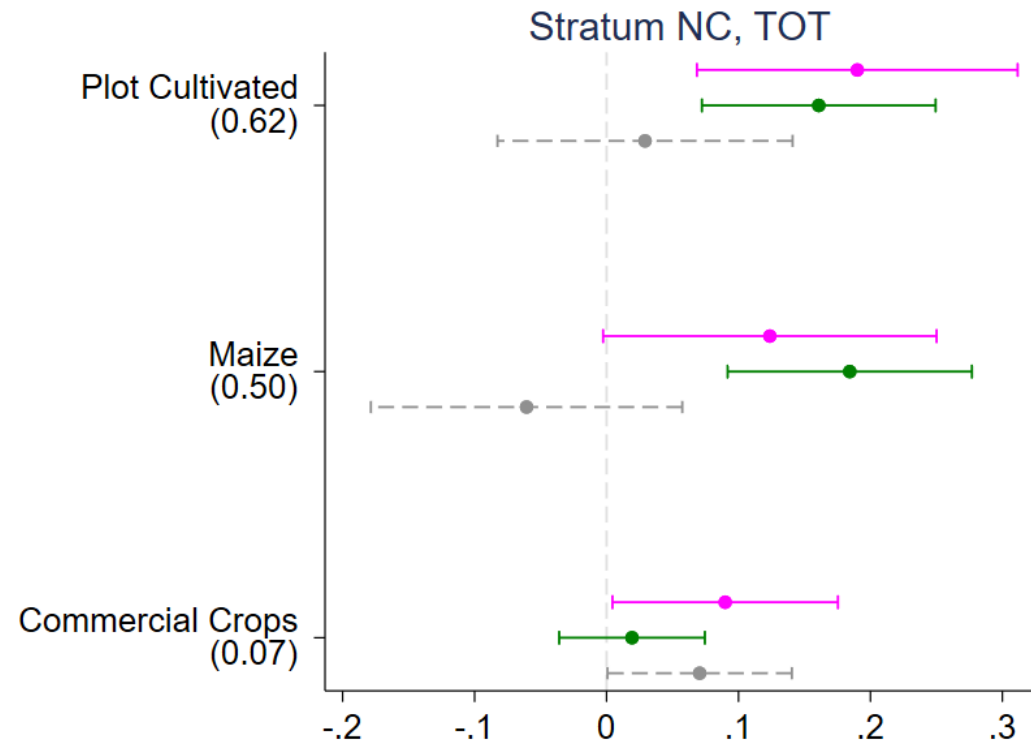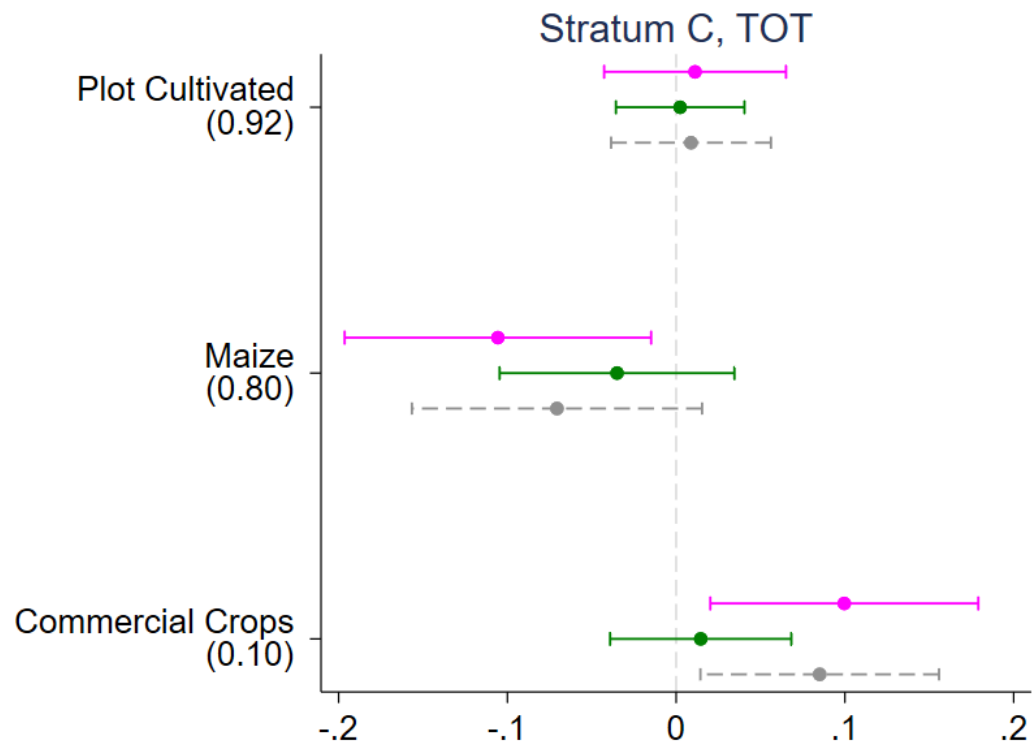
Inputs, output, value added, and soil quality: *ITT* and *TOT*

	Value of Inputs		Value of Household Labor		Value of Hired Labor		Harvest Value		Value Added	Soil Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ITT										
Rental Subsidy	10.1***	0.24**	-2.1	-0.02	3.0	0.08	32.4***	0.28**	15.6*	-0.02
	[3.4]	[0.11]	[2.5]	[0.11]	[2.1]	[0.16]	[10.4]	[0.12]	[8.1]	[0.06]
Cash Drop	3.5	0.14	3.2	0.07	1.8	0.06	12.7	0.10	-0.9	0.02
	[2.9]	[0.11]	[2.6]	[0.12]	[2.1]	[0.15]	[9.4]	[0.13]	[7.1]	[0.05]
p-value Rent = Cash Paid	*0.05*	*0.34*	*0.05*	*0.45*	*0.60*	*0.89*	*0.06*	*0.17*	*0.05*	*0.46*
TOT										
Rental Subsidy Paid	13.9***	0.34**	-2.9	-0.03	4.1	0.11	44.3***	0.39***	21.4**	-0.02
	[4.5]	[0.13]	[3.3]	[0.14]	[2.7]	[0.19]	[13.7]	[0.15]	[10.7]	[0.07]
Cash Drop Paid	3.6	0.14	3.2	0.07	1.8	0.06	12.7	0.10	-0.9	0.02
	[2.8]	[0.10]	[2.6]	[0.11]	[2.0]	[0.13]	[9.1]	[0.11]	[6.9]	[0.05]
p-value Rent = Cash Paid	*0.01*	*0.08*	*0.05*	*0.43*	*0.38*	*0.77*	*0.01*	*0.04*	*0.03*	*0.46*
Mean Y in Control Group	33.0	IHS	46.07	IHS	22.7	IHS	96.3	IHS	-6.4	-0.02
Observations	1,957	509	1,957	509	1,957	509	1,957	509	1,957	967

Robustness: Target Plot Value of Inputs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ITT								
Rental Subsidy	10.1***	0.24**	11.1***	0.29**	12.4***	0.32***	10.7***	0.21**
	[3.4]	[0.11]	[3.4]	[0.12]	[3.6]	[0.11]	[3.3]	[0.10]
Cash Drop	3.5	0.14	4.7	0.17	7.8**	0.23*	4.6	0.11
	[2.9]	[0.11]	[3.0]	[0.12]	[3.3]	[0.12]	[2.8]	[0.10]
p-value Rent = Cash Paid	*0.05*	*0.34*	*0.05*	*0.26*	*0.20*	*0.42*	*0.05*	*0.28*
TOT								
Rental Subsidy Paid	13.9***	0.34**	15.2***	0.41***	16.9***	0.45***	14.7***	0.30**
	[4.5]	[0.13]	[4.4]	[0.14]	[4.6]	[0.14]	[4.3]	[0.14]
Cash Drop Paid	3.6	0.14	4.7	0.17*	7.8**	0.23**	4.5	0.11
	[2.8]	[0.10]	[2.9]	[0.10]	[3.2]	[0.10]	[2.8]	[0.10]
p-value Rent = Cash Paid	*0.01*	*0.08*	*0.01*	*0.04*	*0.03*	*0.07*	*0.01*	*0.11*
Mean Y in Control Group	33.0	IHS	33.0	IHS	33.0	IHS	33.0	IHS
Controls	Main	Main	Only Size	Only Size	None	None	PDS	PDS
Observations	1,957	509	1,957	509	1,957	509	1,957	509

Robustness: Target Plot Harvest Value

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ITT										
Rental Subsidy	32.4***	0.28**	34.1***	0.29**	37.6***	0.32**	33.9***	0.24*	32.7***	0.25**
	[10.4]	[0.12]	[10.3]	[0.13]	[10.8]	[0.12]	[10.0]	[0.11]	[10.6]	[0.12]
Cash Drop	12.7	0.10	14.9	0.12	23.5**	0.18	15.13*	0.06	17.0*	0.07
	[9.4]	[0.13]	[9.4]	[0.13]	[10.2]	[0.13]	[9.0]	[0.11]	[9.9]	[0.13]
p-value Rent = Cash Paid	0.06	0.18	0.07	0.18	0.22	0.27	0.07	0.11	0.16	0.16
TOT										
Rental Subsidy Paid	44.3***	0.39***	46.6***	0.41***	51.3***	0.44***	44.5***	0.33**	44.7***	0.35**
	[13.7]	[0.15]	[13.6]	[0.15]	[14.0]	[0.15]	[13.7]	[0.15]	[13.9]	[0.15]
Cash Drop Paid	12.7	0.10	14.9	0.12	23.3**	0.17	13.2	0.06	17.0*	0.07
	[9.1]	[0.11]	[9.1]	[0.12]	[9.8]	[0.12]	[9.0]	[0.11]	[9.6]	[0.11]
p-value Rent = Cash Paid	0.01	0.04	0.01	0.04	0.04	0.05	0.01	0.05	0.04	0.04
Mean Y in Control Group	96.3	IHS	96.3	IHS	96.3	IHS	96.3	IHS	96.3	IHS
Controls	Main	Main	Only Size	Only Size	None	None	PDS	PDS	Unresolve	Unresolve
Observations	1,957	509	1,957	509	1,957	509	1,957	509	1,957	509

Robustness: Target Plot Value Added

	(1)	(2)	(3)	(4)	(5)
ITT					
Rental Subsidy	15.6**	16.2**	17.4**	17.4**	15.1*
	[8.1]	[7.8]	[7.9]	[7.7]	[7.8]
Cash Drop	-0.9	1.4	4.6	4.6	1.6
	[7.1]	[7.2]	[7.3]	[7.1]	[7.2]
p-value Rent = Cash Paid	0.05	0.08	0.13	0.12	0.11
TOT					
Rental Subsidy Paid	21.4**	22.1**	23.8**	11.2*	20.7**
	[10.7]	[10.3]	[10.5]	[10.4]	[10.4]
Cash Drop Paid	-0.9	1.3	4.5	0.3	1.5
	[6.9]	[7.0]	[7.1]	[7.0]	[7.0]
p-value Rent = Cash Paid	0.03	0.04	0.06	0.04	0.06
Mean Y in Control Group	-6.4	-6.4	-6.4	-6.4	-6.4
Controls	Main	Only Size	None	PDS	Unresolve
Observations	1,957	1,957	1,957	1,957	1,957

Inputs, output, and value added: Stratum *C* vs *NC*
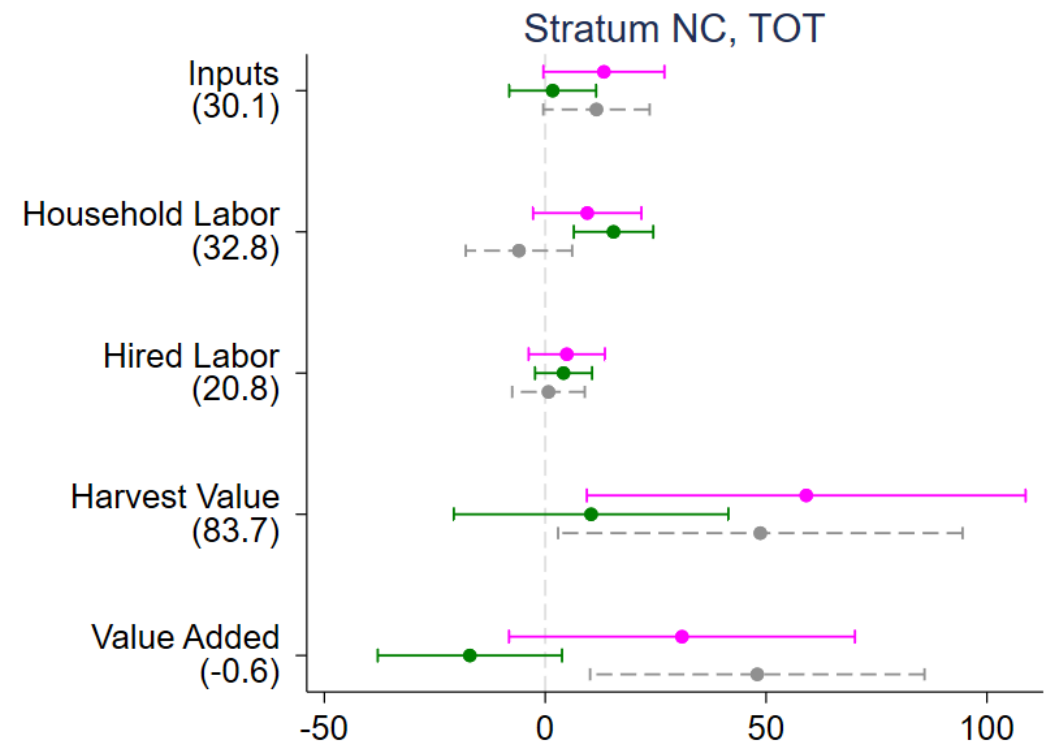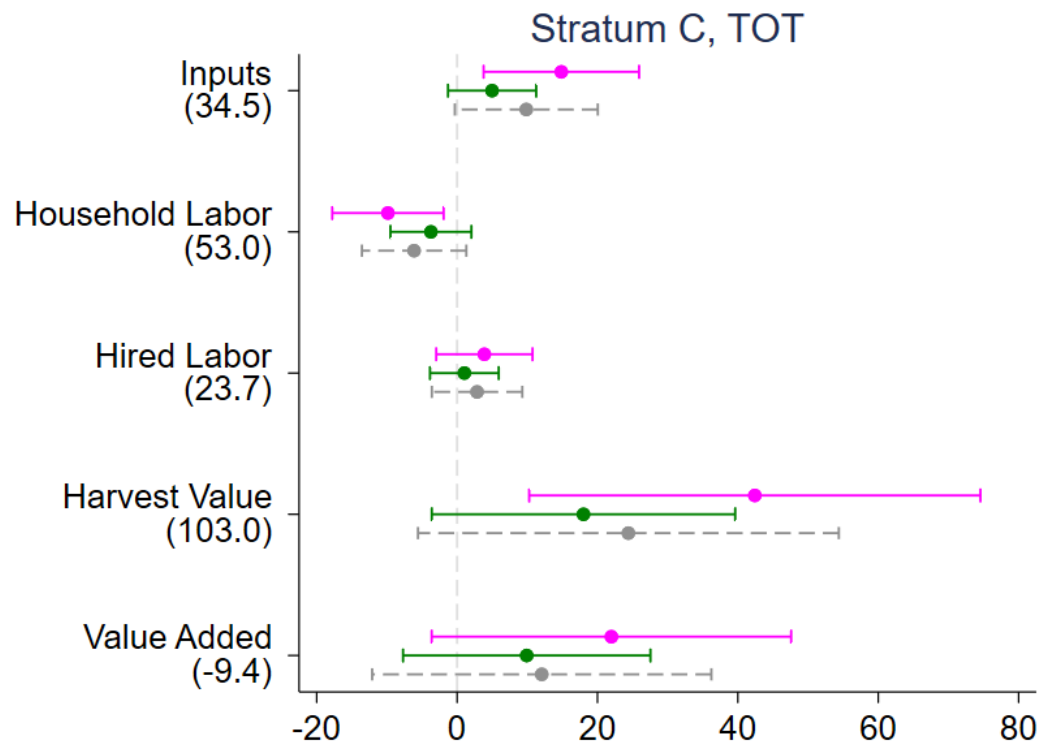
Breakdown by inputs

Table E.11: Target plot outcomes: inputs

	Inputs		Seeds			Compost		Inorganic			Pesticide		Ox-Plough	Tractor
	Value (1)	IHS (2)	Use (3)	Value (4)	IHS (5)	Use (6)	Value (7)	Use (8)	Value (9)	IHS (10)	Use (11)	Value (12)	Use (13)	Use (14)
ITT														
Rental Subsidy	10.11***	0.24**	0.05**	7.63***	0.34***	-0.04**	-0.43	0.07**	2.07	0.12	0.02*	0.20	0.03	0.00
	[3.43]	[0.11]	[0.02]	[2.27]	[0.11]	[0.02]	[0.35]	[0.03]	[1.48]	[0.13]	[0.01]	[0.19]	[0.03]	[0.01]
Cash Drop	3.53	0.14	0.06**	3.59*	0.27**	0.00	0.29	0.02	0.29	0.02	0.01	-0.01	0.05*	-0.01
	[2.89]	[0.11]	[0.02]	[1.91]	[0.11]	[0.02]	[0.37]	[0.03]	[1.40]	[0.12]	[0.01]	[0.17]	[0.02]	[0.01]
p-value Rent = Cash Paid	*0.05*	*0.33*	*0.68*	*0.07*	*0.52*	*0.02*	*0.06*	*0.06*	*0.21*	*0.40*	*0.23*	*0.24*	*0.61*	*0.61*
TOT														
Rental Subsidy Paid	13.93***	0.34**	0.06**	10.45***	0.47***	-0.05**	-0.59	0.10***	2.84	0.17	0.03*	0.27	0.04	0.00
	[4.48]	[0.13]	[0.03]	[2.97]	[0.13]	[0.02]	[0.47]	[0.04]	[1.94]	[0.15]	[0.02]	[0.25]	[0.03]	[0.02]
Cash Drop Paid	3.57	0.14	0.06**	3.59*	0.27***	0.00	0.29	0.02	0.29	0.02	0.01	-0.01	0.05*	-0.01
	[2.80]	[0.10]	[0.02]	[1.84]	[0.10]	[0.02]	[0.36]	[0.03]	[1.36]	[0.11]	[0.01]	[0.16]	[0.02]	[0.01]
p-value Rent = Cash Paid	*0.01*	*0.08*	*0.79*	*0.01*	*0.08*	*0.01*	*0.05*	*0.01*	*0.13*	*0.26*	*0.12*	*0.19*	*0.96*	*0.65*
Mean Y in Control Group	33.02	IHS	0.81	13.07	IHS	0.14	2.18	0.63	16.06	IHS	0.06	0.59	0.45	0.05
Observations	1,957	509	1,957	1,957	509	1,957	1,957	1,957	1,957	509	1,957	1,957	1,957	1,957

Value Added under different valuations of household labor

Control mean of value added

Point estimate

95% Confidence interval
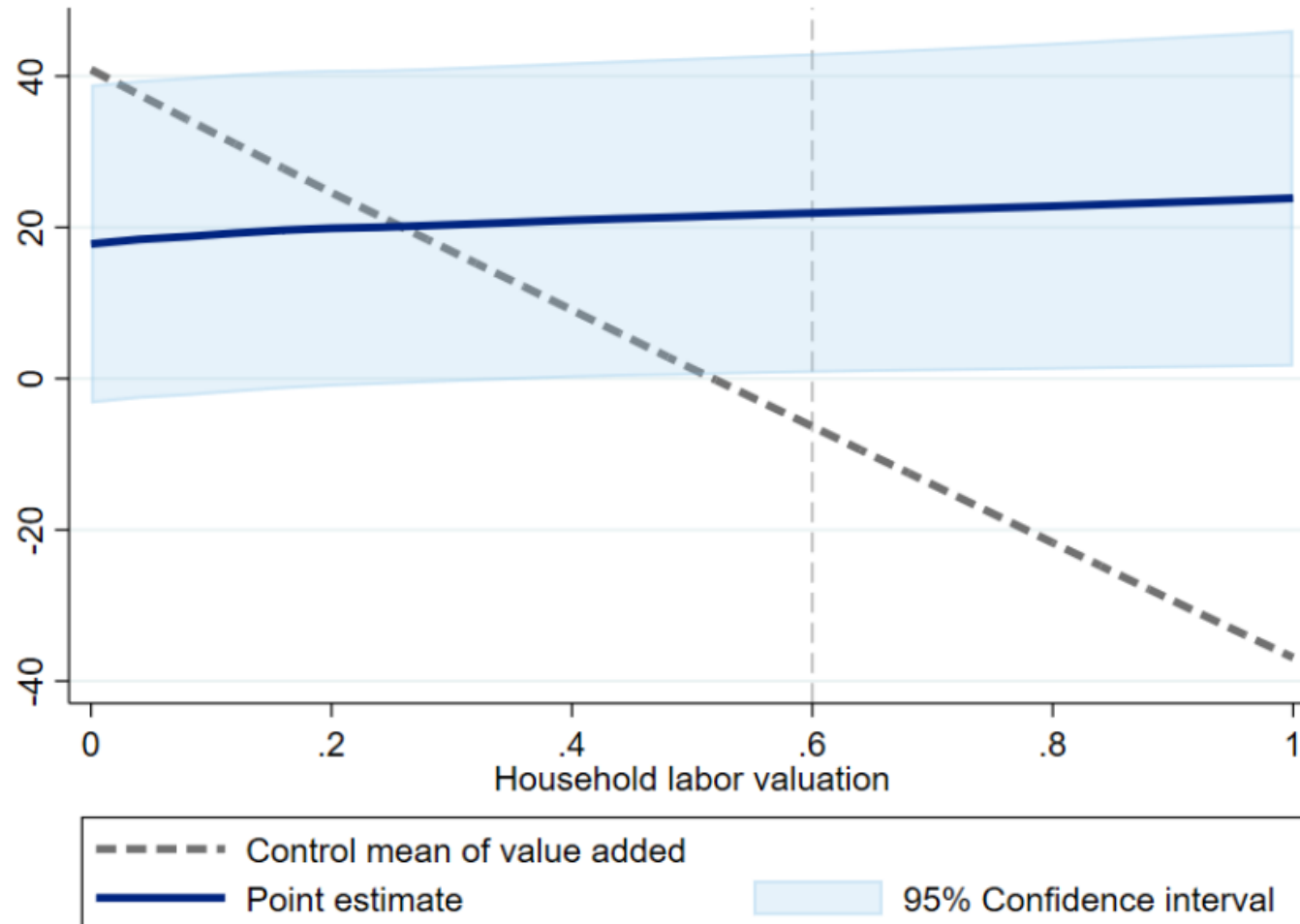
- Net revenues (harvest value minus non-labor inputs) follow a Cobb-Douglas production function in land and labor
  - *Common* prod fn (regardless of crops!)
- TFP is only defined if Target Plot cultivated
- No instrument for input use. Calibrate using factor shares from Gollin and Udry (2021) estimated in Uganda (col 1, 2)
  - Robustness: Shares from Gollin and Udry (2021) in Malawi (col 3), Restuccia and Santaeulalia-Llopis (2017) in Tanzania (col 4), and Valentinyi and Herrendorf (2008) in the U.S. (col 5)

Table E.14: TFP results & robustness tests

	Core	Strata C	Alternative Calibrations		
	(1)	(2)	(3)	(4)	(5)
ITT					
Rental Subsidy	4.69**	5.02*	7.59*	4.62**	4.19**
	[2.23]	[2.58]	[4.08]	[2.11]	[1.73]
Cash Drop	0.89	1.40	0.59	1.09	1.49
	[1.99]	[2.42]	[3.67]	[1.89]	[1.53]
p-value Rent = Cash Paid	*0.10*	*0.18*	*0.10*	*0.11*	*0.14*
TOT					
Rental Subsidy Paid	6.08**	6.59**	9.83*	5.98**	5.43**
	[2.79]	[3.28]	[5.09]	[2.64]	[2.16]
Cash Drop Paid	0.91	1.44	0.62	1.11	1.51
	[1.93]	[2.37]	[3.56]	[1.83]	[1.48]
p-value Rent = Cash Paid	*0.05*	*0.10*	*0.06*	*0.05*	*0.06*
Mean Y in Control Group	16.89	16.92	34.52	16.47	12.80
Land Share	.53	.53	.61	.391	.18
Labor Share	.43	.43	.26	.419	.46
Observations	1,621	1,142	1,621	1,621	1,621

Back

69

Measurement

- Classic measurement error only reduces precision in our experiment

  - Bigger problem for studies that quantify misallocation through productivity dispersion (Aragon *et al.,* 2022),

- Main measurement concern is if renters over-report outcomes more than owners, but:

  - No financial incentives to misreport

  - Effects on cultivation choices and crop portfolio unlikely to suffer from this concern

  - In rented plots, more non-labor inputs, but less labor: hard to explain with misreporting

  - *Concern:* farmers with many plots may underreport quantities on marginal plots.

    *Test: a*t baseline, farmers with more plots (for given total land) report *higher* values of inputs and output on the Target Plot (possibly suggesting a *downward* bias in our treatment effect)

Robustness: Target Plot Lee Bounds

	Value of Inputs		Value of Household Labor		Value of Hired Labor		Harvest Value		Value Added	Soil Index
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ITT										
Rental Subsidy	10.1*** [3.4]	0.24** [0.11]	-2.1 [2.5]	-0.02 [0.11]	3.0 [2.1]	0.08 [0.16]	32.4*** [10.4]	0.28** [0.12]	15.6* [8.1]	-0.02 [0.06]
	9.2*** [3.4]	0.20** [0.11]	-2.8 [2.5]	-0.08 [0.11]	2.8 [2.1]	0.03 [0.16]	31.0*** [10.5]	0.21* [0.12]	11.8 [7.7]	-0.03 [0.06]
	10.9*** [2.8]	0.27** [0.11]	-0.6 [2.3]	0.00 [0.11]	4.4** [1.8]	0.10 [0.16]	34.4*** [8.2]	0.30** [0.13]	17.8*** [6.5]	0.01 [0.06]
Cash Drop	3.5 [2.9]	0.14 [0.11]	3.2 [2.6]	0.07 [0.12]	1.8 [2.1]	0.06 [0.15]	12.7 [9.4]	0.10 [0.13]	-0.9 [7.1]	0.02 [0.05]
	4.2 [2.9]	0.24** [0.10]	4.7* [2.7]	0.19* [0.10]	2.9 [2.1]	0.16 [0.14]	15.7 [9.6]	0.24** [0.11]	7.7 [6.8]	0.05 [0.06]
	-0.0 [2.1]	0.11 [0.11]	-0.3 [2.3]	0.04 [0.12]	-0.9 [1.6]	-0.01 [0.15]	-0.9 [5.9]	0.06 [0.13]	-11.8** [4.9]	-0.00 [0.05]
p-value Rent = Cash	0.05	0.34	0.05	0.45	0.60	0.89	0.06	0.17	0.05	0.46
	0.13	0.70	0.00	0.01	0.97	0.38	0.15	0.80	0.61	0.17
	0.00	0.12	0.93	0.73	0.00	0.46	0.00	0.07	0.00	0.74
TOT										
Rental Subsidy Paid	13.9*** [4.5]	0.34** [0.13]	-2.9 [3.3]	-0.03 [0.14]	4.1 [2.7]	0.11 [0.19]	44.3*** [13.7]	0.39*** [0.15]	21.4** [10.7]	-0.02 [0.07]
	13.5*** [4.5]	0.26** [0.12]	-3.6 [3.3]	-0.10 [0.13]	3.4 [2.7]	-0.02 [0.19]	42.3*** [13.6]	0.31** [0.14]	16.2 [10.3]	-0.04 [0.07]
	15.1*** [3.7]	0.38*** [0.13]	-0.8 [3.1]	0.00 [0.14]	6.0*** [2.3]	0.14 [0.19]	47.2*** [10.7]	0.41*** [0.15]	24.5*** [8.6]	0.02 [0.07]
Cash Drop Paid	3.6 [2.8]	0.14 [0.10]	3.2 [2.6]	0.07 [0.11]	1.8 [2.0]	0.06 [0.13]	12.7 [9.1]	0.10 [0.11]	-0.9 [6.9]	0.02 [0.05]
	4.1 [2.9]	0.23*** [0.08]	4.9* [2.6]	0.21** [0.09]	2.5 [2.0]	0.12 [0.12]	15.8* [9.3]	0.25*** [0.09]	7.7 [6.6]	0.05 [0.05]
	0.0 [2.1]	0.11 [0.10]	-0.3 [2.2]	0.04 [0.11]	-0.9 [1.5]	-0.02 [0.13]	-1.0 [5.7]	0.06 [0.11]	-11.8* [4.8]	-0.00 [0.05]
p-value Rent = Cash	0.01	0.08	0.05	0.43	0.38	0.77	0.01	0.04	0.03	0.46
	0.02	0.79	0.01	0.01	0.72	0.40	0.04	0.66	0.39	0.18
	0.00	0.01	0.88	0.75	0.00	0.36	0.00	0.01	0.00	0.72
Mean Y in Control Group	33.0		46.1		22.7		96.3		-6.4	-0.02
	33.6	IHS	46.9	IHS	23.1	IHS	98.0	IHS	-1.2	0.00
	29.4		43.5		20.0		83.7		-16.5	-0.07
Observations	1,957	509	1,957	509	1,957	509	1,957	509	1,957	967
	1,914	498	1,914	498	1,914	498	1,914	498	1,914	946
	1,914	498	1,914	498	1,914	498	1,914	498	1,914	946

Renter experimentation and asymmetric information about plot quality

	Continued Rentals [CR]	Terminated Rentals [TR]	[TR-CR]	N
Baseline soil quality	1.47	1.39	-0.08	163
	(0.59)	(0.52)	(.08)	
Baseline Revenue	101.94	80.74	-21.20	163
	(283.62)	(191.88)	(37.80)	
Rental rate (per acre, per season)	45.95	42.40	-3.56	163
	(40.67)	(36.32)	(6.03)	
Revenue (Season 1)	196.19	108.04	-88.15	163
	(288.17)	(192.57)	(38.26)**	
Revenue (Seasons 1-3)	178.13	123.00	-55.13	486
	(252.32)	(181.92)	(24.09)**	
Value Added (Season 1)	42.60	-1.89	-44.49	163
	(245.09)	(154.76)	(31.98)	
Value Added (Seasons 1-3)	28.33	-2.03	-30.36	486
	(200.32)	(141.66)	(16.74)*	
Target Plot cultivated (Seasons 1-3)	0.96	0.94	-0.02	486
	(0.20)	(0.24)	(.02)	

Details of misallocation exercise, predicting gains from full reallocation

1. Fit production function, at farm level, to baseline data: $Y_i = A_i \, L_i^{\alpha}$

   - Y revenue, L land, A TFP residual.

   - $\alpha \sim 0.6$, either calibrated or estimated

2. Predict gains from full reallocation of L among farmers (until $\frac{dY_i}{dL_i}$ equalized), based on the $\hat{A}_i$

   - Sample of farmers comprises all owners and all renters, in rental subsidy group

3. Net out predicted gains from rentals in control group from predicted gains from full reallocation

   - Makes predicted treatment effect of full reallocation comparable to true treatment effect of induced rentals

Caveats: one season of baseline data (noise biases upwards gains from reallocation), limited sample

	Rented out	Cultivated	Maize	Commercial crops	Inputs	HH labor	Hired labor	Harvest	Value added
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ITT									
Rental Subsidy	0.01	0.01	0.02	-0.01	1.02	-0.17	1.69	1.21	-2.71
	[0.01]	[0.02]	[0.02]	[0.01]	[1.77]	[1.92]	[1.19]	[8.94]	[9.07]
Cash Drop	0.00	-0.00	-0.00	0.00	3.33*	0.38	1.15	0.08	-6.14
	[0.01]	[0.02]	[0.02]	[0.01]	[1.93]	[2.00]	[1.10]	[9.17]	[9.26]
p-value Rent = Cash	*0.63*	*0.60*	*0.34*	*0.23*	*0.24*	*0.78*	*0.66*	*0.91*	*0.70*
TOT									
Rental Subsidy Paid	0.01	0.01	0.02	-0.01	1.36	-0.22	2.25	1.62	-3.62
	[0.01]	[0.02]	[0.03]	[0.01]	[2.32]	[2.53]	[1.55]	[11.94]	[10.91]
Cash Drop Paid	0.00	-0.00	-0.00	0.00	3.33*	0.38	1.14	0.07	-6.14
	[0.01]	[0.02]	[0.02]	[0.01]	[1.90]	[1.98]	[1.09]	[9.13]	[8.28]
p-value Rent = Cash	*0.51*	*0.59*	*0.29*	*0.20*	*0.39*	*0.79*	*0.45*	*0.89*	*0.81*
Mean Y in Control Group	0.05	0.75	0.47	0.09	25.06	36.21	12.04	102.14	27.07
Observations	5,229	4,955	4,955	4,955	4,955	4,955	4,955	4,955	4,955

Owner outcomes: labor supply, migration, wealth

	Labor Supply			Assets		Food Security			Finance	
	Other Farms	Non - Agricultural	Worked Outside Village	Owns Livestock	Wealth Index	Maize (S1)	Maize (S2 - S4)	Experienced Hunger	Emergency Liquidity	Borrowed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ITT										
Rental Subsidy	-0.54	-7.00*	-0.02	-0.04	0.04	0.10**	-0.06***	0.02	-0.02	-0.02
	[1.58]	[3.83]	[0.02]	[0.03]	[0.08]	[0.05]	[0.02]	[0.02]	[0.03]	[0.03]
Cash Drop	0.84	-4.66	-0.03	-0.02	0.07	0.05	-0.03*	0.02	-0.01	-0.05*
	[1.44]	[3.73]	[0.02]	[0.03]	[0.08]	[0.05]	[0.02]	[0.02]	[0.03]	[0.03]
p-value Rent = Cash	0.37	0.52	0.45	0.40	0.74	0.34	0.23	0.87	0.82	0.37
TOT										
Rental Subsidy Paid	-0.74	-9.52*	-0.02	-0.06	0.05	0.13**	-0.08***	0.03	-0.03	-0.03
	[2.08]	[5.07]	[0.03]	[0.04]	[0.11]	[0.06]	[0.03]	[0.03]	[0.04]	[0.04]
Cash Drop Paid	0.84	-4.66	-0.03	-0.02	0.07	0.05	-0.03*	0.02	-0.01	-0.05*
	[1.40]	[3.63]	[0.02]	[0.03]	[0.08]	[0.04]	[0.02]	[0.02]	[0.03]	[0.03]
p-value Rent = Cash	0.40	0.27	0.67	0.26	0.88	0.11	0.07	0.90	0.70	0.60
Mean Y in Control Group	9.16	38.71	0.18	0.64	-0.00	0.71	0.91	0.16	0.31	0.61
Observations	1,985	1,965	1,967	1,985	1,979	503	1,482	1,984	1,985	1,985