



Food and Agriculture Organization
of the United Nations

Social Protection

From Protection to Production

Commercialization of smallholders and Cash Transfers: evidence from Zambia

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Agenda

- [Motivation]
- Zambia's unconditional cash transfer program
- Empirical strategy
- Results



Motivation

- **Commercialization** involves transition from traditional self-sufficiency goals towards income and profit-oriented decision making (increase in marketed surplus or purchased inputs)
- It plays an important role in reducing poverty and increasing living standards and the even spread of economic growth...



Motivation

Agriculture in Africa

Wake up and sell more coffee

Small farmers in Africa need to produce more. Happily that is easier than it sounds

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ON A hillside about an hour's drive north of Nairobi, Kenya's capital, is a visible demonstration of the difference between the miserable reality of smallholder farming in Africa and what it could be. On one side of the steep terraces stand verdant bushes, their stems heavy with plump coffee beans. A few feet away are sickly ones, their sparse



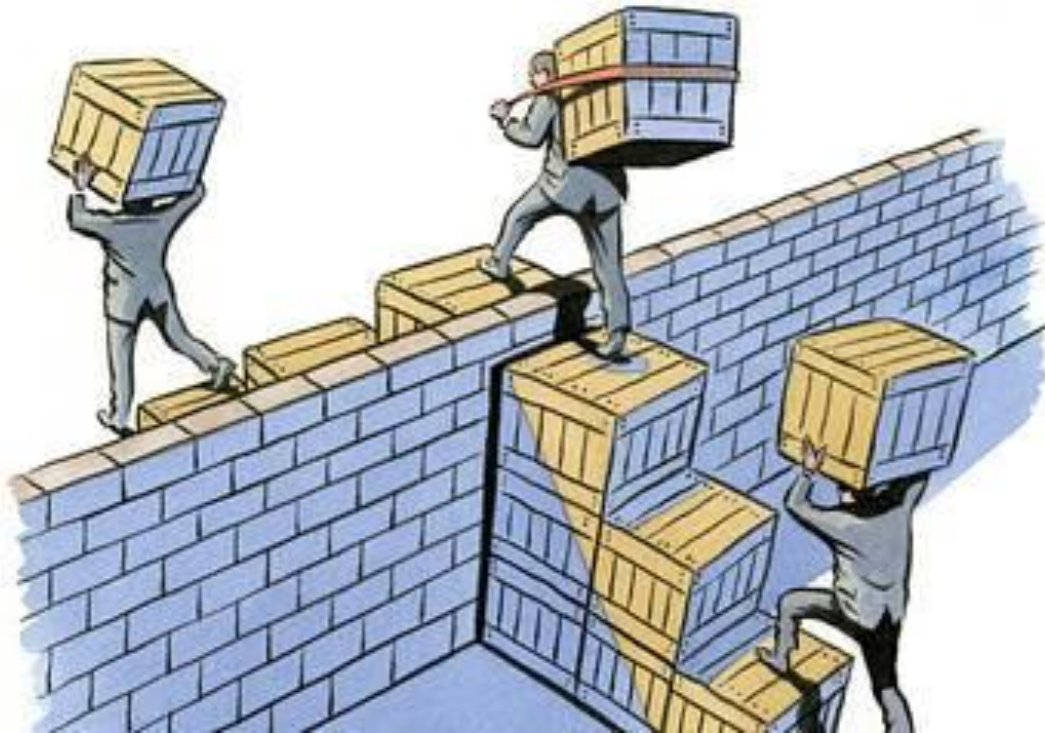
Motivation

- ...the majority of small farmers in Sub-Saharan Africa are engaged in subsistence farming
- Apparently **paradoxical** - autarky is associated with lower incomes than market participation
- What is holding them back from participating in market exchange?



Motivation

Transaction costs are one particular barrier to trade for smallholders





Motivation

- Zambian markets are riddled with transaction costs.
- This paper evaluates the impact of unconditional cash transfers in increasing smallholder commercialization by mitigating transaction costs.
- Cash transfers may be used by farmers to cover transaction costs and overcome entry barriers to goods markets.
 - Cover transportation costs
 - Purchase communication tools and services
 - Enhancing the social status of the beneficiary
 - Buying membership in formal farming organizations



Agenda

- Motivation
- [Program and data]
- Empirical strategy
- Results



The CGP program in Zambia

- **Child Grant Program** (2010): alleviating poverty among the poorest and block its intergenerational transmission
- **Pilot evaluation** implemented in 3 districts with highest rates of mortality and morbidity among children under 5
- Categorical **targeting mechanism**, reaching any household with a child under 5
- Impact evaluation designed as a **longitudinal RCT** with two levels of random selection of participants, at the Community (CWAC) and household level
- Randomization successful



Outcome variables

- Decision on whether to engage in market transactions
- Quantities traded
- Commercialization in both the output and input markets

	Controls	Treated	Diff
Crop sales (m^s)	270961.7	334245.6	63284.0
	(11.21)	(5.16)	(0.98)
Share of sellers (I^s)	0.239	0.198	-0.0416*
	(18.97)	(16.85)	(-2.41)
Seed purchases (m^b)	40622.4	44103.7	3481.2
	(11.58)	(11.64)	(0.67)
Share of buyers (I^b)	0.128	0.134	0.00605
	(12.98)	(13.38)	(0.43)

Note: *** significant at 1%; ** significant at 5%, *significant at 10%.



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- [Empirical strategy]
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Empirical strategy: overall effects

- Heckman selection model (for sellers)

$$m^{s*} = V'\Psi_s + \varepsilon_s$$

$$m^s = m^{s*} * I^s$$

- Two step estimation (for sellers)

$$P(I^s = 1) = \Phi(W'\Gamma_s)$$

$$m^s = V'\Psi_s + \lambda_s \sigma_{\varepsilon_s} v_s + \eta_s$$



Empirical strategy: heterogeneity of effects

- Are there groups of household definable by their observed characteristics that are affected more by cash transfers, in terms of commercialization?
 - Subgroup analysis by including interactions of D, T, DT with a subgroup of X in the Heckman model.
- Are there distributional impacts?
 - Quantile regression with sample selection correction (not yet a thing)



Empirical strategy: heterogeneity of effects

- Quantile regression (for sellers)

$$Q^q(m^s|V, I^s = 1) = V'\Psi_s^q + Q^q(\varepsilon_s|V, I^s = 1)$$

- Two step estimation (for sellers)

$$m^s = V'\Psi_s^q + P_k(\hat{g}_s)'\omega_s^q + \zeta_s$$



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- Motivation
- Program and data
- Empirical strategy
- [Results]



Results: overall results

- Revenues from crop sales

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
Time dummy (T)	0.496	(2.063)**	-1.80E+06	(-2.236)**
Treatment dummy (D)	-0.069	(-3.448)***	-4.62E+04	(-0.584)
D*T	0.127	(4.749)***	202000	(1.693)*

Note: significance levels: * $p < .1$, ** $p < .05$, *** $p < .01$. t-statistics in brackets.



Results: overall results

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
HH size	0.001	(0.136)	41297.151	(1.611)
Fem-headed HH	0.076	(0.376)	-319720.696	(-0.498)
Edu. Of HH head	0.021	(3.962)***	13270.271	(0.580)
Age head of HH	0.004	(2.264)**	3288.230	(0.506)
Dependency ratio	-0.040	(-2.482)***	-65056.128	(-1.058)
Operated land (ha)	0.131	(5.908)***	169047.688	(1.896)*
TLU owned	0.003	(0.346)	252303.627	(13.447)***
Time to main mkt.	0.074	(4.733)***	-22860.348	(-0.318)
Time to inp. mkt.	0.057	(1.827)*	-103963.481	(-0.903)
HH own motorcyc.	0.679	(2.381)**	1590179.471	(1.978)**
Price of maize	-0.000	(-1.080)	-0.139	(-0.134)
Price of casava	0.000	(0.015)	9.495	(1.189)
Price of rice	-0.000	(-1.238)	-1.960	(-0.118)
Price of potatoes	-0.000	(-1.172)	-0.736	(-0.048)
Price of beans	0.000	(0.245)	25.135	(1.281)
Price of maize seed	-0.000	(-0.554)	-0.112	(-0.353)
Lambda			-193236.072	(-0.738)
HH owns TV	-0.130	(-1.123)		
HH owns stereo	0.058	(1.064)		
HH owns cellphone	0.120	(1.872)*		



Results: overall results

- Expenditure for seeds purchases

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
Time dummy (T)	-0.088	(-0.397)	-5.16e+04	(-0.317)
Treatment dummy (D)	0.006	(0.347)	-158.107	(-0.011)
D*T	0.083	(3.407)***	25472.913	(1.084)

Note: significance levels: * p < .1, ** p < .05, *** p < .01. t-statistics in brackets.



Results: overall results

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
HH size	0.002	(0.234)	1995.051	(0.341)
Fem-headed HH	0.126	(0.676)	326.865	(0.002)
Edu. Of HH head	0.014	(2.905)***	1922.060	(0.399)
Age head of HH	0.003	(1.894)*	862.969	(0.616)
Dependency ratio	-0.028	(-1.917)*	1049.057	(0.087)
Operated land (ha)	0.071	(3.795)***	9189.432	(0.476)
TLU owned	-0.014	(-1.526)	-2618.796	(-0.373)
Time to main mkt.	0.048	(3.245)***	9176.942	(0.651)
Time to inp. mkt.	-0.064	(-2.246)**	11012.742	(0.435)
HH own motorcyc.	0.338	(1.322)	130641.981	(0.677)
Price of maize	-0.000	(-0.106)	-0.067	(-0.280)
Price of casava	-0.000	(-1.198)	0.963	(0.628)
Price of rice	0.000	(0.945)	-0.502	(-0.122)
Price of potatoes	-0.000	(-1.602)*	0.558	(0.180)
Price of beans	0.000	(2.120)**	1.134	(0.222)
Price of maize seed	-0.000	(-0.332)	0.093	(1.627)*
Lambda			-134866.266	(-2.323)**
HH owns TV	0.165	(1.641)*		
HH owns stereo	0.042	(0.855)		
HH owns cellphone	0.046	(0.790)		



Results: subgroup effects

- Revenues from crop sales

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
D*T*Dep. Ratio	0.006	(0.194)	-191000	(-1.417)
D*T*Operated land	-0.003	(-0.067)	-64900	(-0.394)
D*T*Dist. main mkt.	0.003	(0.099)	50071	(0.409)
D*T*Dist. inp. mkt.	0.008	(0.227)	-15100	(-0.105)
D*T*HH owns motorcycle	-0.176	(-65.407)***	502000	(0.245)
D*T*HH owns TV	0.006	(0.050)		
D*T*HH owns stereo	-0.044	(-0.764)		
D*T*HH owns cellphone	-0.121	(-1.728)*		

Note: significance levels: * p < .1, ** p < .05, *** p < .01. t-statistics in brackets.



Results: subgroup effects

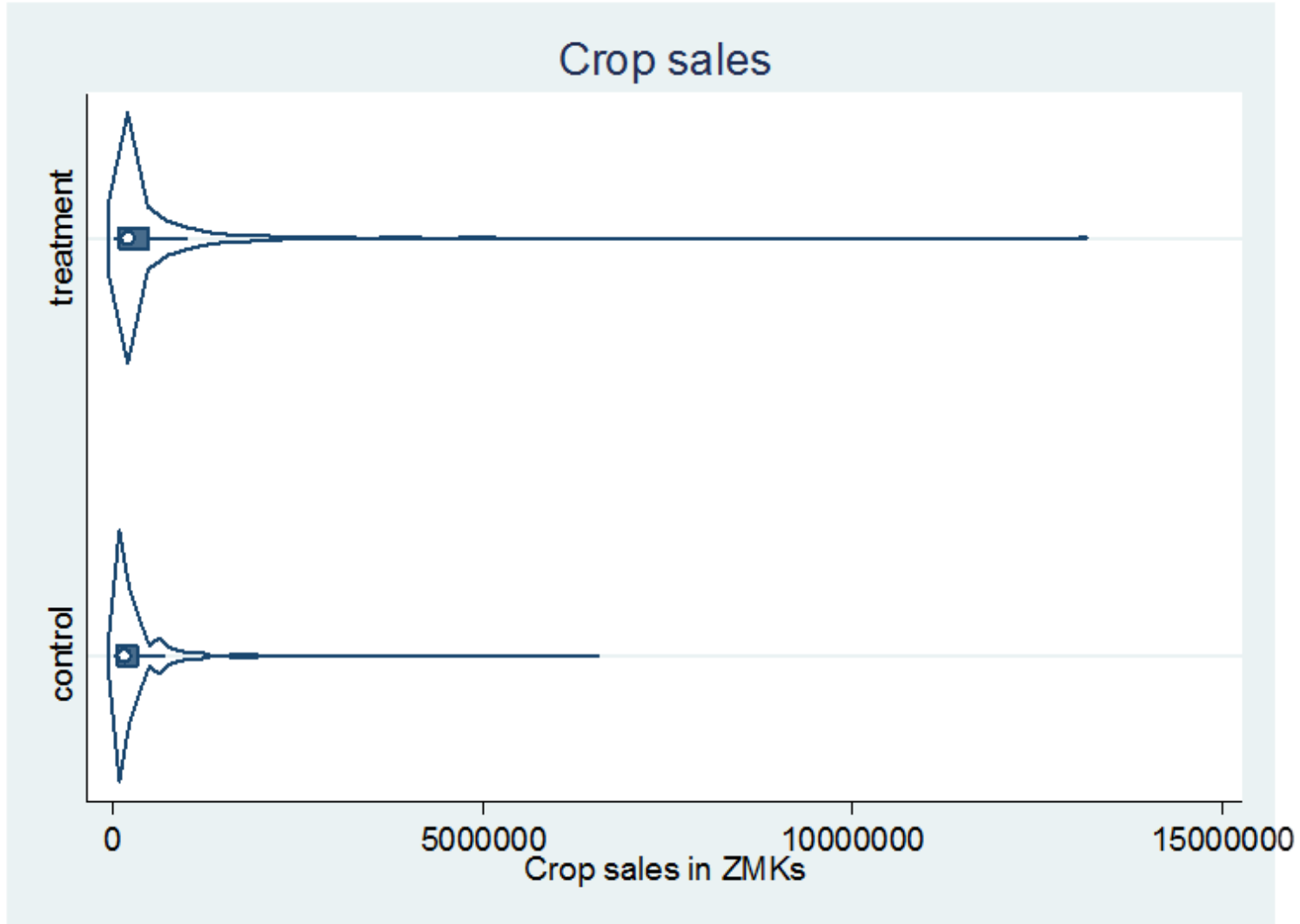
- Expenditure for seeds purchases

	Participation		Quantity	
	Coefficient	t-statistics	Coefficient	t-statistics
D*T*Dep. Ratio	-0.017	(-0.611)	9094	(0.597)
D*T*Operated land	0.074	(1.986)**	-26000	(-1.173)
D*T*Dist. main mkt.	-0.043	(-1.569)	4365	(0.278)
D*T*Dist. inp. mkt.	0.066	(2.118)**	-14300	(-0.783)
D*T*HH owns motorcycle	-2.917	(-50.100)***	-1130000	(-4.449)***
D*T*HH owns TV	0.025	(0.249)		
D*T*HH owns stereo	-0.02	(-0.399)		
D*T*HH owns cellphone	0.053	(0.860)		

Note: significance levels: * p < .1, ** p < .05, *** p < .01. t-statistics in brackets.

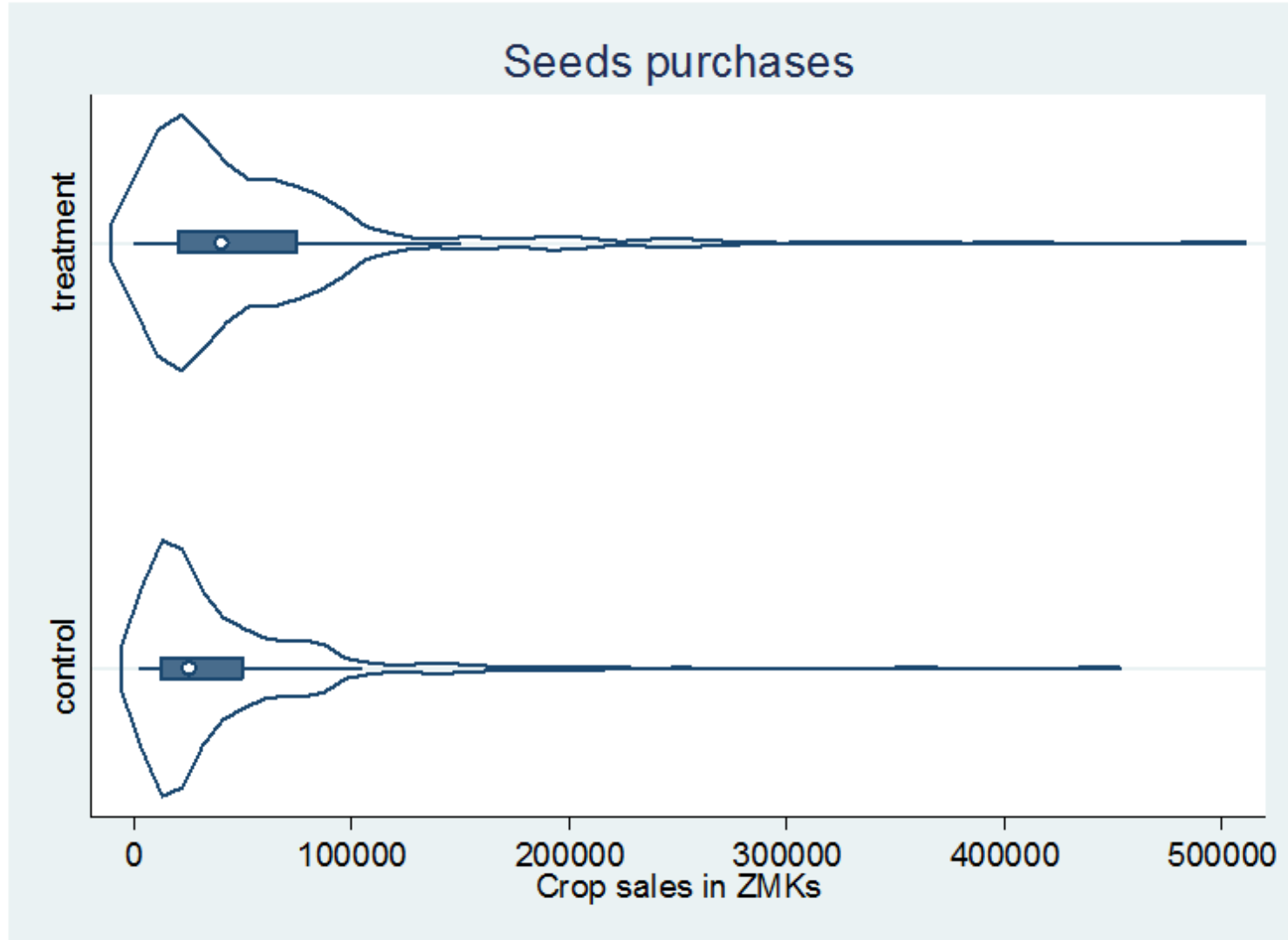


Results: distributional impacts





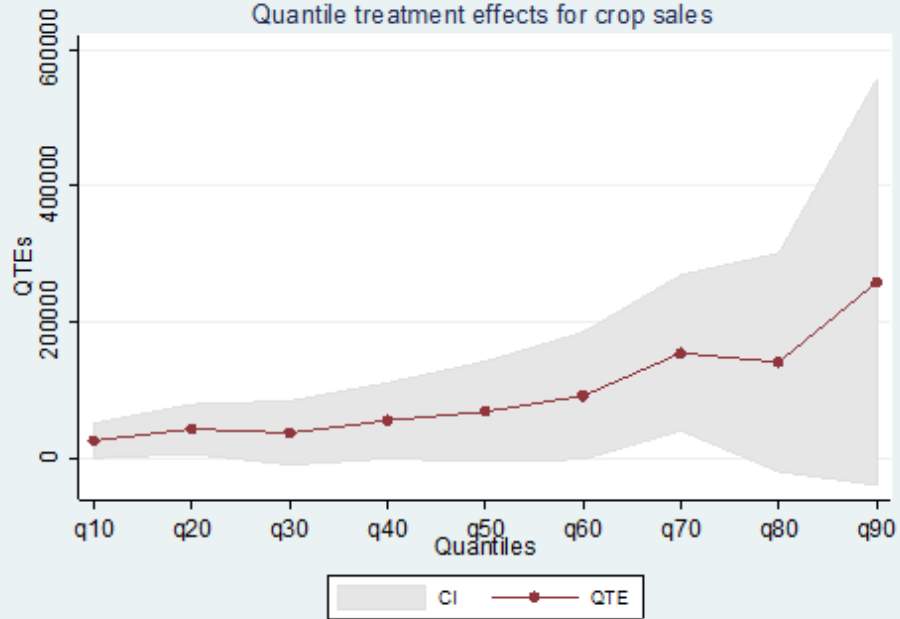
Results: distributional impacts



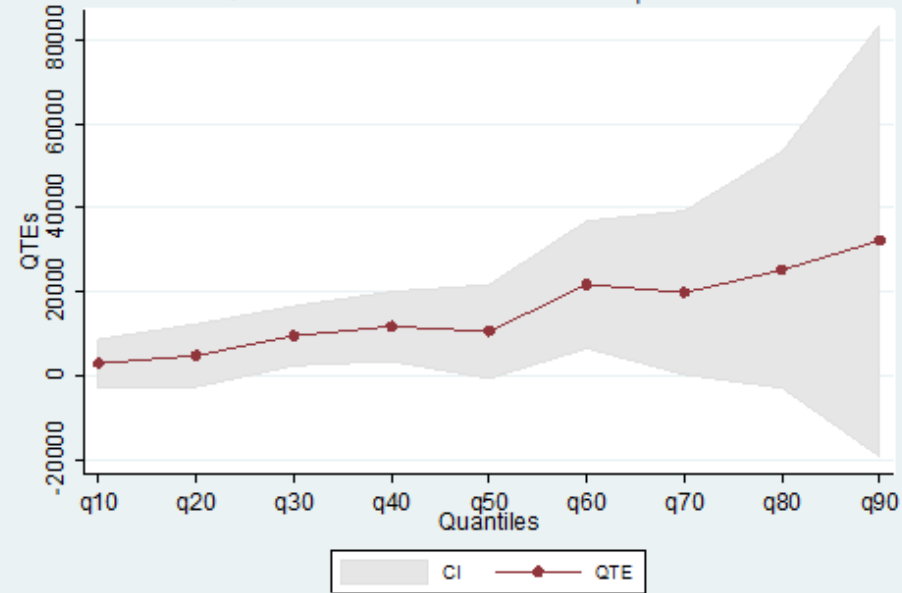


Results: distributional impacts

Quantile treatment effects for crop sales



Quantile treatment effects for seeds purchases





Results: distributional impacts

	Sellers		Buyers	
	Coefficient (β_s^q)	t-statistics	Coefficient(β_b^q)	t-statistics
$\beta_j^{0.1}$	25766	(1.981)**	2795	(0.945)
$\beta_j^{0.2}$	42874	(2.293)**	4660	(1.213)
$\beta_j^{0.3}$	37173	(1.550)	9377	(2.597)***
$\beta_j^{0.4}$	54940	(1.932)*	11650	(2.748)***
$\beta_j^{0.5}$	68498	(1.819)*	10418	(1.820)*
$\beta_j^{0.6}$	91556	(1.918)*	21636	(2.776)***
$\beta_j^{0.7}$	154000	(2.634)***	19692	(1.971)**
$\beta_j^{0.8}$	141000	(1.712)*	25231	(1.741)*
$\beta_j^{0.9}$	258000	(1.693)*	32160	(1.216)

Note: significance levels: * $p < .1$, ** $p < .05$, *** $p < .01$. t-statistics in brackets.



Results: headline effects

- **Output markets:** cash transfers lead to increased commercialization both on the *extensive* and *intensive margin*
- **Input markets:** cash transfers act mainly on the extensive margin by inducing more farmers to participate. Decisions regarding the quantities of seeds bought in the market are unaffected.



Results: heterogeneity of effects

- The **interaction coefficients** that relate to fixed and variable transaction costs show that cash transfers produce higher impacts, both in terms of participation and volume of revenues and expenditure for households that face more binding costs.
- CTs act as a mitigating factor and help program beneficiaries **overcome this particular barriers to trade** by allowing them to either cover part of the transaction costs or to invest in technologies that reduce these costs.



Results: heterogeneity of effects

- An increasing trend in **QTEs for crop sales** implies that the program benefitted more bigger farmers who were already selling larger quantities of crop
- For **seeds purchases** the bulk of the program impacts are concentrated at the off-median QTEs near the center of the distribution. **Limited distributional impacts** of the program



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Thank you