General equilibrium effects of cash transfers: Experimental evidence from Kenya

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Intellectual context: macroeconomics

- Tracing out the pattern of transactions in an integrated economy and their contributions to aggregates such as overall output or well-being has long been a fundamental task of economic analysis
 - E.g. effects of fiscal stimulus, including Keynes (1936) and more recently Chodorow-Reich (2019), Nakamura and Steinsson (2014), Farhi and Werning (2016), Auerbach et al (2019), Corbi et al (2019)
- These issues generally have not, however, been subjected to experimental examination

Intellectual context: development

- There is also renewed interest in behavioral responses to cash transfers with the rise of large-scale government programs
 - Cash transfers make up the majority of social safety net spending (World Bank 2018)
 - A large literature documenting effects among recipients on a broad range of behavioral responses, including consumption, earnings, assets, food security, child growth and schooling, self-reported health, female empowerment, and psychological well-being
 - Generally no evidence of spending on "temptation goods", e.g., alcohol (Evans & Popova 2017) or reductions in work effort
- Yet we know much less about the aggregate consequences, even though cash transfers seem quite likely to have broader effects
 - Because cash functions as a medium of exchange, \$1 a recipient uses to transact will mechanically show up on someone else's balance sheet
 - In a few cases, experimentation at larger scales finds meaningful effects (Angelucci & di Giorgi, 2009; Cunha et al, 2018; Filmer et al, 2018)

This project

- We aim to unite these two literatures, bringing experimental methods to the study of aggregate economic issues
- In particular, we evaluate a large-scale cash transfer experiment in rural Kenya. Four methodological advances:
 - **1** A large influx of cash: \$11M, or 25% of annual GDP in treated areas delivered over 24 months, and 17% over the peak 12 months
 - 2 Randomization across large units generating spatial variation in the intensity of exposure both at and above the village level
 - 3 Unusually extensive measurement of outcomes for both recipients and non-recipients, nearby enterprises and markets, local government, etc., including high-frequency consumer goods prices. Census 65,385 households (with nearly 300,000 individuals), 12,095 non-farm enterprises
 - 4 A simple theoretical framework to organize results and interpret implications for welfare

Tracing out the flow of funds

- 1 Substantial expenditure increases for both recipient (+13%) and non-recipient (+13%) households
- 2 Quantitatively similar increases in sales at local enterprises
- 3 Increased earnings for non-recipients driven primarily by labor earnings, mirroring higher enterprise wage bills; no change in reported total hours worked
- 4 Small changes (+0.1-0.2%) in final goods prices, concentrated in more remote communities; some evidence of increased prices of non-tradeable inputs (labor, land) but not of capital

Aggregate implications

- 1 Estimate a local transfer multiplier of 2.5 using *either* expenditure or income data
 - Contrast to recent US local fiscal multiplier estimates (range 1.5-2.0)
 - Consistent with marginal propensity to spend locally of \approx 0.7 0.75
 - Increase in real output without substantial increase in employment of inputs suggest roles for local demand and factor under-utilization ("slack"), as opposed to constraints on investment
- 2 Interpreted through the lens of our framework, the results suggest welfare gains for non-recipients, driven by two forces
 - Expansions in household's real budget sets, not (or not solely) driven by increased labor supply
 - Non-market effects (externalities) are mostly null or positive, both between and within households (e.g., public goods, domestic violence)

Agenda

- 1 Context, design, and empirical specifications
- Empirical results Tracing out the flow of funds Transfer multiplier
- 3 Welfare framework, externalities & interpretation
- 4 Discussion: production capacity utilization
- 5 Conclusion

Setting: rural western Kenya

653 villages in Siaya County

- ~ 100 households per village
- 4.4 household members and 2.3 children on avg
- 97% of HH's in agriculture, 45% in self-employment, and 60% in wage work
- Survey respondent mean age is 48 years, 6 years of schooling
- Steady economic growth, no national elections during study period (2014-17)



The GiveDirectly (GD) Program

GD distributes unconditional cash transfers as follows:

- Enrolls roughly the poorest 1/3 of households in each village using a simple proxy means test (here, having a grass-thatched roof)
- Coaches recipients to register for mobile money system (M-Pesa)
- Distributes payments via M-Pesa in 3 tranches over 8 months: a test payment, then two larger payments
- Transfer are large: USD 1,000 nominal / USD 1,871 PPP
 - Equivalent to 75% of mean annual HH expenditure $\Rightarrow \sim\!\!17\%$ of annual GDP in treated areas during peak 12 months
 - · Recipients typically withdraw the full amount and spend in cash



Densely populated area, with many proximate markets Details Timing





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Original field data sources

- 1 Household surveys: at endline, 8,200 households across 653 villages, surveyed 9-31 months after first transfer. 90% survey rate, no difference by treatment Tracking Balance Timeline
- 2 Enterprise surveys: from both household surveys (ag and non-ag self-employment modules) a distinct census and survey of 5 enterprises per village, (mostly) matched to owning households Balance
- 3 Market price surveys: 61 markets × 72 major commodities × 3 vendors × 30 months
- 4 (Local government official surveys)

Effects of interest

- We are primarily interested in total effects, i.e., comparing observations to a counterfactual with no intervention, and estimate:
 - 1 The average total effect on outcomes for treated and untreated households and firms, including
 - Direct effects (for households) of own (village) treatment
 - Neighborhood effects (for households and firms) of treatment intensity, which we estimate within 2 km bands (selected to minimize a Bayesian Information Criterion)
 - 2 The reduced form (ITT) treatment effect on treated households, as a benchmark that assumes no neighborhood effects
 - 3 Neighborhood effects on monthly prices, including (i) average effects and (ii) average effect in the month of maximum local transfers
- Report monetary values in PPP USD, with flow outcomes annualized unless otherwise reported and with enterprise outcomes normalized per household in that village (for comparability)

Example spatial specification

For household i in village v, we estimate

$$y_{iv} = \alpha + \beta Amt_v + \sum_{r=2}^R \beta_r Amt_{v,r}^{\neg v} + \varepsilon_{iv}$$

- Use the (cumulative) amount per capita transferred over course of the study to own village (Amt_v) and other villages in the r to r-2 km buffer $(Amt_{v,r}^{\neg v})$
- Instrument respectively by $Treat_v$, and share $s^{e,t}_{\neg v,r}$ of eligible HH's in villages (other than v) assigned to treatment (by buffer)
- Report ATotE $(\hat{eta} \cdot \overline{X})$ using mean transfer amount per village/buffer
- Two modifications depending on sample:
 - (1) Untreated households: use $Amt_{v,r}$, so spillovers work entirely through β_r
 - 2 Market prices: use amount distributed last quarter, add in month and market fixed effects (instead of instrumenting)
- Conley SE's (1999, 2008); randomization inference very similar.

Reduced form specification) (Testing for linearity

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Results Outline

- 1 Tracing out the flow of funds
 - Recipient households
 - Enterprises
 - Non-recipient households
 - Output & input prices
- 2 Transfer multiplier

Recipient HHs: expenditure, saving

	(1)	(2)	(3)	(4)
	Recipient Households		Non-recipient Households	-
	$1(Treat\ village)$	Total Effect	Total Effect	Control low saturation
	Reduced form	IV	IV	mean (SD)
Panel A: Expenditure				
Household expenditure, annualized	293 59***	338.57***		2.536.01
	(60.11)	(109.38)		(1,933.51)
Non-durable expenditure, annualized	187.65***	227.20**		2 470 69
	(58.59)	(99.63)		(1,877.23)
Food expenditure, annualized	72.04*	133.84**		1.578.05
	(36.96)	(63.99)		(1,072.00)
Temptation goods expenditure, annualized	6.55	5.91		37.07
	(5.79)	(8.82)		(123.54)
Durable expenditure, annualized	95.09***	109.01***		59.41
	(12.64)	(20.24)		(230.83)
Panel B: Assets				
Assets (non-land, non-house), net borrowing	178.78***	183.38***		1,131.66
· , _	(24.66)	(44.26)		(1,419.70)
Housing value	376.92***	477.29***		2,032.11
-	(26.37)	(38.80)		(5,028.27)
Land value	51.28	158.47		5,030.03
	(186.22)	(260.91)		(6,604.66)

Recipient HHs: income

	(1)	(2)	(3)	(4)
	Recipient Households		Non-recipient Households	
	1(Treat village) Total Effect		Total Effect	Control low saturation
	Reduced form	IV	IV	mean (SD)
Panel C: Household balance sheet				
Household income, annualized	79.43*	135.70		1.023.36
	(43.80)	(92.10)		(1,634.02)
Net value of household transfers received, annualized	-1.68	-7.43		130.08
	(6.81)	(13.06)		(263.65)
Tax paid, annualized	1.94	-0.09		16.92
	(1.28)	(2.02)		(36.50)
Profits (ag & non-ag), annualized	26.24	35.85		485.56
	(23.67)	(47.66)		(786.92)
Wage earnings, annualized	42.43	73.66		494.95
	(32.23)	(60.82)		(1,231.12)

Results Outline

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Enterprise outcomes

	(1)	(2)	(3)	(4)
	Treatment	Villages	Control Villages	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	weighted mean (SD)
Panel A: All enterprises				
Enterprise profits, annualized	-2.27	55.77	35.08	156.79
	(21.42)	(36.73)	(37.36)	(292.84)
Enterprise revenue, annualized	-29.61	322.16**	237.16**	494.45
	(102.74)	(138.17)	(112.72)	(1,223.07)
Enterprise costs, annualized	-13.32	89.35**	73.08	117.22
	(28.63)	(38.51)	(46.77)	(263.46)
Enterprise wagebill, annualized	-15.90	75.99**	66.57*	97.35
	(25.49)	(30.64)	(35.86)	(237.01)
Enterprise profit margin	0.01	-0.11*	-0.12**	0.33
	(0.02)	(0.06)	(0.05)	(0.30)
Panel B: Non-agricultural enterprises				
Enterprise inventory	11.02	34.69***	16.90	50.41
	(9.14)	(13.39)	(10.66)	(131.86)
Enterprise investment, annualized	4.00	13.58	6.82	46.57
	(7.05)	(13.10)	(7.96)	(167.44)
Panel C: Village-level	0.01	0.02	0.01	1.12
Number of enterprises	(0.01)	(0.01)	(0.01)	(0.14)

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Non-recipient HHs: income

	(1)	(2)	(3)	(4)
	Recipient Households		Non-recipient Households	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Panel C: Household balance sheet				
Household income, annualized	79.43*	135.70	224.96***	1,023.36
	(43.80)	(92.10)	(85.98)	(1,634.02)
Net value of household transfers received, annualized	-1.68	-7.43	8.85	130.08
	(6.81)	(13.06)	(19.11)	(263.65)
Tax paid, annualized	1.94	-0.09	1.68	16.92
	(1.28)	(2.02)	(2.02)	(36.50)
Profits (ag & non-ag), annualized	26.24	35.85	36.37	485.56
	(23.67)	(47.66)	(44.88)	(786.92)
Wage earnings, annualized	42.43	73.66	182.63***	494.95
	(32.23)	(60.82)	(65.53)	(1,231.12)

by eligibility

Non-recipient HHs: expenditure, saving

	(1)	(2)	(3)	(4)
	Recipient Households		Non-recipient Households	-
	$1(Treat\ village)$	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Panel A: Expenditure				
Household expenditure, annualized	293.59***	338.57***	334.77***	2,536.01
	(60.11)	(109.38)	(123.20)	(1,933.51)
Non-durable expenditure annualized	187 65***	227 20**	317 62***	2 470 60
Non-durable expenditure, annualized	(58.59)	(99.63)	(119.76)	(1.877.23)
	(*****)	(*****)	()	(-,)
Food expenditure, annualized	72.04*	133.84**	133.30**	1,578.05
	(36.96)	(63.99)	(58.56)	(1,072.00)
Temptation goods expenditure, annualized	6.55	5.91	-0.68	37.07
· · · · · · · · · · · · · · · · · · ·	(5.79)	(8.82)	(6.50)	(123.54)
Development in the second in the	05 00888	100 01888	0.44	50.41
Durable expenditure, annualized	95.09	(20.24)	8.44	(220.92)
	(12.04)	(20.24)	(12.50)	(230.03)
Panel B: Assets				
Assets (non-land, non-house), net borrowing	178.78***	183.38***	133.06*	1,131.66
	(24.66)	(44.26)	(78.33)	(1,419.70)
	376 92***	477 29***	80.65	2 032 11
Troubling value	(26.37)	(38.80)	(215.81)	(5.028.27)
	(/	()		(-,,
Land value	51.28	158.47	544.85	5,030.03
	(186.22)	(260.91)	(459.57)	(6,604.66)

ility potentially productive assets

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Consumer prices in markets (raw data by product

		(1)	(2)	(3)	(4)
	_	Overall Effects		ATE by market access	
		ATE	Average maximum effect (AME)	below median	above median
All goods		0.0010* (0.0006)	0.0042 (0.0031)	0.0017* (0.0009)	0.0007 (0.0007)
By tradability	More tradable	0.0014 (0.0015)	0.0062 (0.0082)	0.0023 (0.0023)	0.0021 (0.0018)
	Less tradable	0.0009 (0.0006)	0.0034 (0.0032)	0.0015 (0.0011)	0.0001 (0.0008)
By sector	Food items	0.0009 (0.0006)	0.0036 (0.0033)	0.0016 (0.0012)	0.0002 (0.0008)
	Non-durables	0.0014 (0.0017)	0.0061 (0.0089)	0.0026 (0.0026)	0.0019 (0.0019)
	Durables	0.0019* (0.0011)	0.0070 (0.0061)	-0.0009 (0.0011)	0.0034** (0.0016)
	Livestock	-0.0008 (0.0010)	-0.0027 (0.0052)	-0.0008* (0.0004)	-0.0017 (0.0020)
	Temptation goods	-0.0011 (0.0026)	-0.0112 (0.0143)	-0.0008 (0.0036)	-0.0003 (0.0035)

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Input prices and quantities

	(1)	(2)	(3)	(4)
	Recipient Households		Non-recipient Households	
	$1(Treat\ village)$	Total Effect	Total Effect	Control low saturation
	Reduced form	IV	IV	mean (SD)
Papel A: Labor				
Hourly wage earned by employees	0.10***	0.04	0.19*	0.70
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Household total hours worked, last 7 days	2.44	1.41	-4.69	63.19
	(1.71)	(3.69)	(3.17)	(54.12)
Panel B: Land				
Land price per acre	168.02	366.46	557.44	3,952.48
	(201.18)	(290.85)	(412.34)	(3,147.29)
Acres of land owned	-0.19	-0.10	0.08	1.42
	(0.14)	(0.09)	(0.10)	(2.37)
Panel C: Capital				
Loan-weighted interest rate, monthly	-0.01	0.01	-0.01	0.06
	(0.01)	(0.01)	(0.01)	(0.07)
Total loan amount	5.53	3.12	6.12	80.57
	(4.95)	(8.34)	(13.23)	(204.28)

More labor supply results More land results

1 Tracing out the flow of funds

- Recipient household effects
- Enterprise outcomes
- Untreated household effects
- Output & input prices

2 Transfer multiplier

Transfer multiplier

Define the transfer multiplier as:

$$\mathbb{M} = \frac{1}{T} \left(\int_{t=0}^{\bar{t}} \Delta G D P_t \right)$$

Two approaches to estimating real GDP:

- Expenditure: $\mathbf{GDP_t} = \mathbf{C_t} + \mathbf{I_t} + \mathbf{G_t} + NX_t$
 - $C_t = Consumption (non-durables) + accumulated assets (durables)$
 - $I_t = \text{Enterprise investment} + \text{accumulated inventories}$
 - $G_t = Local$ government expenditure (effect ≈ 0 , Walker 2018)
 - $NX_t = Net exports$ (including intermediate goods)
- Income: $\mathbf{GDP_t} = \mathbf{W_t} + \mathbf{R_t} + \mathbf{\Pi_t} + \mathbf{Tax_t} NFI_t$
 - $\bullet \ \, {\bf W_t} = {\sf Household wage bill}$
 - $\mathbf{R_t} = \mathsf{Enterprise}$ rental income
 - $\Pi_t = \mathsf{Enterprise profits}$
 - **Tax**_t = Enterprise taxes
 - $NFI_t = Net income from abroad$
Transfer multiplier - dynamic estimation

Dynamic version of spatial regression for flow variable x:

$$x_{it,v} = \alpha_t + \sum_{s=0}^9 \beta_s \tilde{Amt}_{v(t-s)} + \sum_{s=0}^9 \gamma_s \tilde{Amt}_{v(t-s),0-2km}^{\neg v} + \varepsilon_{it,v}$$

- Instrument lagged treatment in quarter t s by share of eligibles assigned to treatment * share of transfers going out in t s (as order of both transfer and measurement rollout was randomized)
- Construct dynamic response to hypothetical treatment of everyone at time 0, using planned roll-out of transfers in months 0, 2 and 8. Integrate over time, and sum up across components using sampling weights from household and enterprises censuses
- Transfers and outcomes deflated to January 2015 USD PPP using the overall consumer price index in the nearest market
- Inference using wild bootstrap (with 2000 runs)

The marginal propensity to spend locally

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Transfer	Transfer	+ Income Gains		
	MPC		MPC MPC		MPC	MPC	MPC
	non-durables		durables total		local	total	local
	q1-q3	q4-q10					
Our data only	-0.21	0.29	0.30	0.38	0.30	0.34	0.27
	(0.22)	(0.12)	(0.05)	(0.21)	(0.17)	(0.17)	(0.14)
Rarieda data q1-3, our data q4-10	0.35	0.29	0.30	0.93	0.76	0.84	0.68
	(0.11)	(0.12)	(0.05)	(0.15)	(0.13)	(0.12)	(0.10)

- Static Keynesian benchmark: $\mathbb{M} = \frac{\text{MPC}}{1-\text{MPC}} \approx 2.3 3$
- Savings predominantly through asset purchases ⇒ what matters for aggregate output is spending on locally produced goods (MPC local)
- Recall window misses a lot of early spending ⇒ data from related study in neighboring Rarieda for the first 9 months after transfers (Haushofer & Shapiro (2016))

The real transfer multiplier



Transfer multiplier extensions

- Real multiplier of ≈ 2.5 using income and expenditure data, in line with a high MPC
- We refine the expenditure multiplier in two ways Details :
 - Improving noisy estimates for expenditure in the first 3 quarters after transfers using data from experiment in adjacent Rarieda county (Haushofer & Shapiro (2016))
 - 2 Accounting for imports: Conservative estimates imply *at most* 20% of expenditure and 59% of inventories reflect imported value added

	(1) ™ Estimate	(2) Share imported	(3) Import adjusted
Panel A: Expenditure multiplier	3.14	0.20	2.52
Household non-durable expenditure	1.76	0.18	1.44
Household durable expenditure	0.84	0.20	0.67
Enterprise investment	0.48	0.20	0.38
Enterprise inventory	0.07	0.59	0.03

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Objectives

- A transfer multiplier is not a welfare multiplier
 - Classic derivations (e.g. the "Keynesian cross") lack microfoundations
 - Recent studies have largely focused on estimation (Ramey, 2019)
 - Exceptions have pointed out that multipliers need not be sufficient statistics for welfare (Mankiw & Weinzerl 2011, Sims & Wolff 2018)
- We aim here to describe the broad channels through which transfer could affect welfare and how these relate to the multiplier

Household value function

- Let $v_i(T_i, T)$ be the indirect utility attained by a household that receives a (possibly zero) transfer T_i while other eligible households in the area receive T
- We want to know how changes in T affect i's equivalent variation (EV) T_i^* defined by

$$v_i(T_i^*, 0) = v_i(T_i, T)$$
 (1)

 If no general equilibrium effects, then T is irrelevant and we simply have T^{*}_i = T_i, i.e., the tautology that a dollar is worth a dollar.

Household value function (2)

We think of v_i as the value of some underlying optimization problem

$$v_i(T_i, T) = \max_{x_i} u_i(x_i, x_{-i}(T)) \text{ s.t. } x_i \in X(T_i, T)$$
 (2)

- u_i captures preferences over own choices, which are constrained to lie in X, and choices x_{-i} of others (which may matter if there are externalities, public goods, preferences over inequality, etc.)
- Changes in T thus affect utility (and hence T_i^*) in two broad ways:
 - 1 Effects on market outcomes that alter the constraint set *X*, for example, by changing the prices facing *i*, or its income from various sources.
 - 2 Effects on non-market outcomes that directly affect i's well-being independent of its constraint set (or if we interpret i as an individual, changing intra-household externalities or allocation)

Mapping to the multiplier

- Increases in (real) output must show up as expansion of budget sets
 - If due to productivity gains, this is a pure welfare gain
 - If due to increased employment of factors of production, this comes at some opportunity cost (e.g. disutility of labor)
- The multiplier summarizes market activity and so does *not* capture effects on non-market outcomes

Interpreting the results

- Expansions in budget sets (whether measured by income or expenditure) do not seem to have been driven by factor employment
 - Land is in fixed supply (and households do not report owning or renting more of it)
 - No significant changes in overall labor supply, though some reallocation
 - Modest increases in capital (inventories), and output gains are if anything larger for enterprises owned by non-recipients Details
- 2 For (arguably) non-market outcomes we observe, effects are generally null or positive with the possible exception of inequality

Non-market outcomes and externalities

	(1) (2)		(3)	(4)	
	Recipient Ho	ouseholds	Non-recipient Households		
	1(Treat village)	Total Effect	Total Effect	Control, low saturation	
	Reduced form	IV	IV	mean (SD)	
Psychological well-being index	0.09***	0.12*	0.08	0.01	
	(0.03)	(0.07)	(0.06)	(1.01)	
Health index	0.03	0.06	0.01	0.03	
	(0.03)	(0.06)	(0.05)	(1.01)	
Food security index	0.10***	0.05	0.08	0.01	
	(0.03)	(0.07)	(0.06)	(1.00)	
Children food security	0.13***	0.17**	0.09	-0.04	
	(0.04)	(0.08)	(0.09)	(1.12)	
Education index	0.09**	0.09*	0.10*	0.01	
	(0.04)	(0.05)	(0.06)	(1.02)	
Female empowerment index	-0.01	0.08	0.09	0.05	
	(0.07)	(0.14)	(0.15)	(0.94)	
Security index	0.11****	-0.02	-0.02	0.03	
	(0.04)	(0.07)	(0.07)	(0.96)	

In more detail: Heterogeneity •

Security

Female Empowerment

Psychological well-being Health

Education

Inequality Details

	(1)	(2)	(3)	(4)	
	Treatment	Villages	Control Villages		
	$1(Treat\ village)$	Total Effect	Total Effect	Control low saturation	
	Reduced form	IV	IV	weighted mean (SD)	
Panel A: Expenditure					
Gini coefficient	0.7	0.8	0.2	32.3	
	(0.7)	(1.3)	(1.1)	(7.8)	
Counterfactual Gini coefficient	-1.1^{*}	-2.1	0	32.3	
	(0.7)	(1.3)		(7.8)	
P-value: effect = counterfactual effect	p=0.08	p=0.05	p=0.84		
Panel B: Assets					
Gini coefficient	-1.1	2.2	2.8**	45.4	
	(0.9)	(1.6)	(1.4)	(10.1)	
Counterfactual Gini coefficient	-7.6***	-6.7***	0	45.8	
	(0.8)	(0.5)		(10.7)	
P-value: effect = counterfactual effect	p=0.00	p=0.00	p=0.04		

Agenda

- 1 Context, design, and empirical specifications
- Empirical results Tracing out the flow of funds Transfer multiplier
- 3 Welfare framework, externalities & interpretation
- 4 Discussion: production capacity utilization
- 5 Conclusion

What drove increases in local output?

- Any explanation must apply to the retail and manufacturing sectors where gains are concentrated By sector
- In accounting terms, the value of increased real output must reflect some mix of
 - 1 Higher throughput of intermediates and finished goods produced elsewhere - seems likely given the large retail share though not directly measured
 - 2 Value added through increased use of factors of production little evidence of this for labor and capital, and land is in relatively fixed supply
 - 3 Value added through increased utilization of existing capacity some evidence of low baseline utilization in "steady-state"

Factor under-utilization

- A large share of the (non-ag) economy operates "on-demand"
 - Retail: e.g. a barbershop
 - Manufacturing: 60% of revenue to grain ("posho") mills and welding shops
 - In Uganda, Bassi et al (2019) find that employees in similar industries (welding, furniture-making) spend 25% of time "waiting for customers," "eating and resting"
- These examples suggest inputs whose costs are fixed over the relevant ranges a building, milling machinery, an employee to "mind the shop"
 - Non-ag enterprises have an average of just 1.7 customers per hour
 - A majority (72%) have one employee, suggesting that integer constraints often bind Data
- ⇒ Harkens back to classic theory in development economics on surplus labor (Lewis 1954), and may also be relevant for rich countries, esp. during recessions (e.g., Michaillat and Saez 2015; Murphy 2017).

Why might there be slack in steady-state? (speculative)

- The small scale of local market activity
 - It may be profitable to operate a standard grain milling machine with one employee, but capacity could be larger than local demand, and production easy to expand
 - Poor roads and high transport costs as an underlying cause
 - Slack may be lower in denser areas
- Frictions and institutions affecting local market structure
 - Bassi et al (2019) document multiple nearly identical manufacturing firms (e.g., carpenters) located on the same block, all with 1-2 workers and excess labor capacity
 - Consolidation into fewer, larger firms each with more machinery and workers – would presumably reduce "slack" in labor and capital utilization. The existence of too few large firms is a well-known empirical pattern in low income economies

Agenda

- 1 Context, design, and empirical specifications
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Closing thoughts

- We document meaningful increases in aggregate local economic activity in response to a large inflow of cash transfers
 - Increases in expenditure and assets of recipients, revenue for nearby enterprises, and earnings, expenditure and assets of non-recipients
 - · Minimal, precisely estimated consumer price inflation
 - A local transfer multiplier of 2.5
- A counter-example to the critique that experimental trials are not well suited to studying the "big questions" in economics (Bardhan 2005, Easterly 2006, Deaton 2010)
- Concerns about negative spillovers were not borne out in this setting; rather, unadjusted T-C estimates would doubly under-count welfare gains (as in Miguel & Kremer 2004)

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Details on study area

- **395 people/km**² (Kenyan average: 91)
- **8.5 other villages** on average **within 2km radius** of a given village (31 within 4km)
- **0.7 markets** on average **within 2km radius** of a given village (2.5 within 4km)
 - \Rightarrow Households report average commuting time to their preferred market of **33 minutes**. More than 3/4 walk this distance.

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Reduced form specification

Estimate the following with data from eligible households:

 $y_{ivs} = \alpha_1 Treat_v + \alpha_2 HighSat_s + \delta_1 y_{ivs,t=0} + \delta_2 M_{ivs} + \varepsilon_{ivs}$

- *α*₁: benchmark effect of being a T vs C village. Captures direct effects and within-village indirect effects
- Weighted by inverse sampling probabilities to be representative of the population of eligible HH's
- Include dep. variable $y_{ivs,t=0}$ when available
- SEs clustered at the village level

▲ Back to spatial specification

Testing for linearity of effects



		Trackin	g and	attrition
	(1)	(2)	(3)	(4)
		Eligible		Ineligible
	Surveyed at	Surveyed at baseline	Surveyed at	Surveyed at baseline
	endline	and endline	endline	and endline
Panel A: All households target	ted at endline			
Treatment Village	0.004	0.000	0.011	0.013
	(0.008)	(0.013)	(0.011)	(0.015)
High Saturation Sublocation	0.002	-0.014	-0.014	-0.035**
	(0.008)	(0.012)	(0.011)	(0.016)
Control, Low Sat Mean (SD)	0.892	0.797	0.901	0.800
	(0.311)	(0.403)	(0.299)	(0.400)
Observations	6,039	6,039	3,111	3,111
Panel B: Among households s Treatment Village	urveyed at end	line —0.005 (0.011)		0.004 (0.014)
High Saturation Sublocation		-0.017 (0.011)		-0.025* (0.014)
Control, Low Sat Mean (SD)		0.894 (0.309)		0.889 (0.315)
Observations		5,423		2,816
Panel C: Among households s	urveyed at bas	eline		
Treatment Village	-0.005	-0.005	0.011	0.011
	(0.008)	(0.008)	(0.011)	(0.011)
High Saturation Sublocation	0.003	0.003	-0.019^{*}	-0.019*
	(0.008)	(0.008)	(0.011)	(0.011)
Control, Low Sat Mean (SD)	0.916	0.916	0.929	0.929
. ,	(0.278)	(0.278)	(0.256)	(0.256)
Observations	5,185	5,185	2,648	2,648



Household balance (1)

	(1)	(2)	(3)	(4)
	Recipient He	ouseholds	Non-recipient Households	
	1(Treat village) Reduced form	Total Effect	Total Effect IV	Control, low saturation mean (SD)
Panel A: Respondent demographics				
Female	0.02 (0.02)	0.02 (0.03)	-0.01 (0.02)	0.75 (0.43)
Respondent aged 25 or older	0.00	0.01	-0.01	0.92
	(0.01)	(0.02)	(0.01)	(0.28)
Is married	0.03	0.02	0.01	0.50
	(0.02)	(0.03)	(0.04)	(0.50)
Completed primary school	0.02	0.02	0.05*	0.33
	(0.02)	(0.03)	(0.03)	(0.47)
Has child	0.01	0.02	0.04*	0.73
	(0.01)	(0.02)	(0.02)	(0.44)
Self-employed	-0.01	-0.01	0.00	0.28
	(0.02)	(0.02)	(0.03)	(0.45)
Employed in wage work	-0.02	-0.01	0.01	0.25
	(0.02)	(0.05)	(0.03)	(0.43)
Panel B: Household assets				
Assets (non-land, non-house), net borrowi	3.27	-18.71	-40.78	1,017.56
	(23.06)	(36.20)	(100.37)	(1,391.49)
Housing value	2.20	-11.02	-9.72	1,584.08
	(7.64)	(13.52)	(343.42)	(4,219.37)
Land value	-223.06	-248.47	-132.20	4,375.59
	(163.25)	(347.45)	(435.13)	(5,865.04)



Household balance (2)

	(1) (2) Recipient Households		(3)	(4)	
			Non-recipient Households		
	1(Treat village)	Total Effect	Total Effect	Control, low saturation	
	Reduced form	IV	IV	mean (SD)	
Panel C: Household cash flow					
Household non-ag income, annualized	-4.73	29.60	-14.21	197.08	
	(15.83)	(32.74)	(29.23)	(461.58)	
Self-employment profits, annualized	2.09	9.84	-3.28	88.81	
	(7.43)	(13.62)	(18.94)	(286.98)	
Wage earnings, annualized	-10.40	8.44	-4.76	96.63	
	(12.68)	(26.08)	(13.51)	(306.96)	
Tax paid, annualized	1.98	3.40**	3.28	16.34	
	(1.20)	(1.71)	(2.44)	(44.71)	
Panel C: Input Prices					
Land price per acre	-55.87	194.77	268.61	3,302.21	
	(94.85)	(168.99)	(262.53)	(2,984.12)	
Acres of land owned	35.60	71.95	-0.32**	1.36	
	(35.64)	(72.81)	(0.15)	(2.39)	
Total loan amount	1.65	6.44	-3.20	54.09	
	(3.17)	(4.79)	(12.16)	(162.35)	

■ Back

Study timeline



Plots the 5th, 25th, 50th, 75th and 95th percentiles of study activities relative to the anticipated start of activities in each village. As markets were not assigned to treatment, we use the first date transfers were distributed within the subcounty in which the market is located. Surveys were conducted from August 2014 to June 2017.



Calendar timeline



Plots the 5th, 25th, 50th, 75th and 95th percentiles of study activities.

back to timing since transfers 🔪 🖣 back to household data

Enterprise balance

	(1) (2)		(3)	(4)
	Treatment	Villages	Control Villages	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	weighted mean (SD)
Panel A: Non-agricultural enterprises				
Enterprise profits, annualize	-10.31	8.21	13.74	238.33
	(15.92)	(21.85)	(21.55)	(393.18)
Enterprise revenue, annualized	-93.00	85.33	130.63	1,010.90
	(84.39)	(103.82)	(109.89)	(2,370.59)
Panel B: All enterprises				
Enterprise costs, annualized	2.73	11.36	4.76	37.72
	(5.14)	(8.64)	(7.79)	(107.56)
Enterprise wagebill, annualized	2.11	8.54	5.29	36.10
	(5.03)	(7.33)	(5.79)	(106.31)
Panel C: Village-level				
Number of enterprises	0.00	0.00	-0.01	1.07
	(0.01)	(0.02)	(0.02)	(0.14)

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Potentially Productive Assets

	(1)	(2)	(3)	(4)
	Recipient He	ouseholds	Non-recipient Households	
	$\mathbb{1}(Treat \ village)$	Total Effect	Total Effect	Control. low saturation
	Reduced form	IV	IV	mean (SD)
Assets (non-land, non-house)	174.49***	175.62***	151.53*	1,205.22
	(25.51)	(46.95)	(82.92)	(1,459.67)
Productive Agricultural Assets	4.26***	4.16**	-0.37	32.50
	(0.93)	(1.96)	(2.47)	(38.93)
Potentially Productive Assets	90.03***	52.80	36.46	700.16
	(25.85)	(49.31)	(65.84)	(1,025.10)
Livestock Assets	50.60***	44.81	-6.88	461.88
	(17.03)	(27.90)	(35.77)	(723.23)
Non-Ag Assets	37.10***	24.64	25.71	218.90
	(10.43)	(22.85)	(23.15)	(423.88)
Non-Productive Assets	79.00***	92.71***	52.49*	449.32
	(9.32)	(14.28)	(29.60)	(468.53)

▲ Back

Expenditure, saving: extended

	Recipient households		No	n-recipient househo		
	(1)	(2)	(3)	(4)	(5)	(6)
	1(Treat village) Reduced form	Total Effect IV	Total Effect IV	Control Eligibles	Ineligibles	Control, low-saturation mean (SD)
Panel A: Expenditure						
Household expenditure, annualized	293.59***	338.57***	334.77***	21.03	411.55***	2,536.01
	(60.11)	(109.38)	(123.20)	(83.76)	(147.81)	(1,933.51)
Non-durable expenditure, annualized	187.65***	227.20**	317.62***	24.68	389.31***	2,470.69
	(58.59)	(99.63)	(119.76)	(79.05)	(144.86)	(1,877.23)
Food expenditure, annualized	72.04*	133.84**	133.30**	10.59	163.33**	1,578.05
	(36.96)	(63.99)	(58.56)	(50.09)	(71.26)	(1,072.00)
Temptation goods expenditure, annualized	6.55	5.91	-0.68	10.65	-3.46	37.07
	(5.79)	(8.82)	(6.50)	(8.02)	(7.80)	(123.54)
Durable expenditure, annualized	95.09***	109.01***	8.44	5.69	9.12	59.41
	(12.64)	(20.24)	(12.50)	(16.83)	(15.00)	(230.83)
Panel B: Assets	178.78***	183.38***	133.06*	-12.25	168.63*	1,131.66
Assets (non-land, non-house), net borrowing	(24.66)	(44.26)	(78.33)	(39.93)	(98.04)	(1,419.70)
Housing value	376.92***	477.29***	80.65	26.90	93.80	2,032.11
	(26.37)	(38.80)	(215.81)	(37.33)	(268.31)	(5,028.27)
Land value	51.28	158.47	544.85	192.35	631.12	5,030.03
	(186.22)	(260.91)	(459.57)	(291.51)	(545.93)	(6,604.66)



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Income: extended

	Recipient households		Non-recipient households			
	(1)	(2)	(3)	(4)	(5)	(6)
	1(Treat village)	Total Effect	Total Effect			Control, low-saturation
	Reduced form	IV	IV	Control Eligibles	Ineligibles	mean (SD)
Panel C: Household balance sheet						
Household income, annualized	79.43*	135.70	224.96***	83.37	259.61**	1,023.36
	(43.80)	(92.10)	(85.98)	(58.32)	(105.27)	(1,634.02)
Net value of household transfers received, annualized	-1.68	-7.43	8.85	-6.84	12.69	130.08
	(6.81)	(13.06)	(19.11)	(10.27)	(23.18)	(263.65)
Tax paid, annualized	1.94	-0.09	1.68	-0.92	2.31	16.92
	(1.28)	(2.02)	(2.02)	(1.65)	(2.39)	(36.50)
Profits (ag & non-ag), annualized	26.24	35.85	36.37	-1.74	45.70	485.56
	(23.67)	(47.66)	(44.88)	(36.54)	(55.63)	(786.92)
Wage earnings, annualized	42.43	73.66	182.63***	90.01**	205.30**	494.95
	(32.23)	(60.82)	(65.53)	(39.13)	(80.22)	(1,231.12)

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Output price effects by product



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Input prices and quantities: more labor results

	(1)	(2)	(3)	(4)
	Recipient Ho	ouseholds	Non-recipient Households	
	1(Treat village)	Total Effect	Total Effect	Control low coturation
	Reduced form	IV	IV	mean (SD)
Household hours worked on own farm	2.07*	0.97	-6.26**	35.32
Household hours worked on own farm	(1.15)	(2.30)	(2.61)	(38.79)
Individual hours worked in self-employment	1.80	4 23**	-1.38	26.82
	(1.14)	(1.96)	(1.76)	(23.53)
Individual hours employed last week	0.52	-1.37	2.51	23.60
	(0.98)	(2.32)	(2.67)	(25.95)
Individual hours employed last week in agriculture	-1.53***	-2.28***	0.33	6.00
	(0.56)	(0.75)	(1.11)	(12.78)
Individual hours employed last week not in agriculture	1.67	0.62	1.93	17.08
	(1.03)	(2.31)	(2.65)	(26.40)
Hourly wage earned by employees	0.10***	0.04	0.19*	0.70
	(0.03)	(0.04)	(0.10)	(0.89)
Hourly wage earned by employees in agriculture	0.15**	0.21**	-0.06	0.67
	(0.06)	(0.08)	(0.13)	(0.67)
Hourly wage earned by employees not in agriculture	0.04	0.08	0.20	1.09
	(0.08)	(0.10)	(0.23)	(1.45)

▲ Back
Input prices and quantities: more land results

	(1)	(2)	(3)	(4)
	Recipient He	ouseholds	Non-recipient Households	-
	$\mathbb{1}(Treat \ village)$	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Acres of land owned	-0.19	-0.10	0.08	1.42
	(0.14)	(0.09)	(0.10)	(2.37)
Acres of land rented out	-0.04	-0.05	0.06	0.93
	(0.11)	(0.21)	(0.18)	(0.91)
Acres of land rented in	0.03	0.04	0.08	0.70
	(0.03)	(0.06)	(0.07)	(0.64)
Acres of land used for crops	0.03	-0.03	0.09	0.96
	(0.02)	(0.04)	(0.06)	(1.18)
Land price per acre	168.02	366.46	557.44	3,952.48
	(201.18)	(290.85)	(412.34)	(3,147.29)
Monthly land rental price per acre	-0.05	-0.02	1.80	9.71
	(0.56)	(0.96)	(1.41)	(8.33)
Total ag land rental costs	6.97***	8.99*	10.14	51.76
	(2.47)	(5.21)	(9.39)	(39.67)

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Transfer multiplier: robustness

	(1)	(2)	(3)	(4)	(5) Alter	(6) native Specifi	(7) cation II
	Main estimate	Alternative Specification I: Setting initial 3 quarters = 0			Initial 3 quarters from Haushofer & Shapiro (2016)		
		M Estimate	$H_0: \mathbb{M} < 0$ <i>p</i> -value	$H_0: \mathbb{M} < 1$ <i>p</i> -value	M Estimate	$H_0: \mathbb{M} < 0$ <i>p</i> -value	$\begin{array}{l} H_0: \ \mathbb{M} < 1 \\ p ext{-value} \end{array}$
Panel A: Expenditure multiplier	2.58 (1.44)	2.07 (0.67)	0.00***	0.05*	3.14 (1.41)	0.01***	0.06*
Household non-durable expenditure	1.20 (1.31)	1.00 (0.64)	0.06*		1.76 (1.28)	0.08*	
Household durable expenditure	0.84 (0.05)	0.84 (0.05)	0.00***		0.84 (0.05)	0.00***	
Enterprise investment	0.48 (0.43)	0.17 (0.11)	0.08*		0.48 (0.42)	0.14	
Enterprise inventory	0.07 (0.03)	0.07 (0.03)	0.02**		0.07 (0.03)	0.02**	
Panel B: Income multiplier	2.47 (1.71)	1.44 (0.61)	0.01***	0.25	2.47 (1.80)	0.08*	0.20
Enterprise profits	1.68 (1.27)	0.01 (0.32)	0.49		1.68 (1.32)	0.10	
Household wage bill	0.69 (1.09)	1.34 (0.51)	0.00***		0.69 (1.12)	0.28	
Enterprise capital income	0.06 (0.17)	0.08 (0.06)	0.09*		0.06 (0.18)	0.36	
Enterprise taxes paid	0.04 (0.03)	0.01 (0.01)	0.04**		0.04 (0.03)	0.09*	
Panel C: Expenditure and income multipliers							
Average of both multipliers	2.52 (1.39)	1.75 (0.56)	0.00***	0.09*	2.80 (1.43)	0.02**	0.10*
Joint test of both multipliers			0.00***	0.03**		0.01***	0.04**

Enterprise outcomes by owner eligibility

	(1)	(2)	(3)	(4)
	Recipient	Owners	Non-Recipient Owners	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	weighted mean (SD)
Panel A: All enterprises				
Enterprise profits, annualized	6.78	18.51*	43.55***	156.79
	(7.39)	(11.08)	(14.44)	(292.84)
Enterprise revenue, annualized	51.79**	100.98	171.83***	494.45
	(22.82)	(86.46)	(42.78)	(1,223.07)
Enterprise costs, annualized	24.04**	28.11	37.27**	117.22
	(9.41)	(17.39)	(17.18)	(263.46)
Enterprise wagebill, annualized	21.13**	27.71	36.93**	97.35
	(8.69)	(17.48)	(17.10)	(237.01)
Enterprise profit margin	-0.05**	-0.05	-0.01	0.33
	(0.02)	(0.05)	(0.04)	(0.30)
Panel B: Non-agricultural enterprises				
Enterprise inventory	2.88	7.74	5.58	50.41
	(2.79)	(7.47)	(3.91)	(131.86)
Enterprise investment, annualized	-5.15	-15.61	5.49	46.57
	(5.34)	(15.75)	(8.36)	(167.44)

Psychological well-being index

	(1) (2)		(3)	(4)
	Treated Ho	useholds	Untreated Households	
	1(Treat village) Reduced form	Total Effect IV	Total Effect IV	Control, low saturation mean (SD)
Psychological well-being index	0.09***	0.12*	0.08	0.01
	(0.03)	(0.07)	(0.06)	(1.01)
Depression	-0.03	0.04	-0.04	-0.03
	(0.03)	(0.07)	(0.06)	(0.99)
Happiness	0.01	0.15**	0.05	0.00
	(0.04)	(0.07)	(0.06)	(1.01)
Life satisfaction	0.14***	0.07	0.04	0.02
	(0.03)	(0.08)	(0.07)	(1.00)
Perceived stress	-0.02	-0.04	-0.09	0.01
	(0.03)	(0.06)	(0.05)	(1.00)
Aspirations	-0.01	0.04	4.17	0.00
	(0.03)	(0.03)	(5.75)	(0.95)
Self-efficacy	0.07**	0.03	0.02	0.01
	(0.04)	(0.06)	(0.07)	(1.00)
Locus of control	0.00	-0.02	-0.10*	-0.02
	(0.03)	(0.06)	(0.05)	(1.01)
Норе	0.07**	0.07	0.02	0.01
	(0.03)	(0.05)	(0.06)	(0.98)

Child-related outcomes

	(1)	(2)	(3)	(4)
	Treated Ho	useholds	Untreated Households	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Total education expenditure (annualised)	27.20**	45.31***	55.20	277.70
	(10.65)	(17.02)	(35.00)	(587.12)
Proportion of school-aged children in school	0.01	0.00	0.02*	0.96
	(0.01)	(0.01)	(0.01)	(0.18)
Days attended school (in last five days)	0.04	0.04	0.20**	4.33
	(0.05)	(0.10)	(0.09)	(1.29)
Per-child school expenditures (last 3 terms)	8.29***	17.14***	18.53*	78.04
	(3.01)	(5.71)	(9.69)	(109.87)
Days children skipped meals (last week)	-0.13***	-0.13	-0.11	0.60
	(0.05)	(0.11)	(0.08)	(1.29)
Days children went without food (last week)	-0.03	-0.04	-0.04	0.08
	(0.02)	(0.03)	(0.03)	(0.46)
Days children went to bed hungry (last week)	-0.08***	-0.13***	0.00	0.20
	(0.02)	(0.05)	(0.05)	(0.62)
Hours spent playing with children (last 24h)	-0.01	-0.01	-0.01	0.04
	(0.01)	(0.01)	(0.02)	(0.23)

Crime and safety outcomes

	(1)	(2)	(3)	(4)
	Treated Ho	useholds	Untreated Households	
	$1\!\!1(Treat village)$	Total Effect	Total Effect	Control low saturation
	Reduced form	IV	IV	mean (SD)
Committee in days	0.11444	0.00	0.02	0.03
Security index	(0.04)	-0.02	-0.02	(0.05
	(0.01)	(0.07)	(0.07)	(0.50)
No. times victimized by theft, last 12 months	0.00	0.09**	0.02	0.29
	(0.02)	(0.04)	(0.05)	(0.85)
	0.15**		0.05	0.00
No. times victimized by assault/arson/witchcraft, last 12 months	-0.15**	-0.13	-0.05	0.32
	(0.06)	(0.11)	(0.06)	(1.20)
Has experienced a crime but did not report it, last 12 months	-0.03**	-0.02	-0.02	0.17
	(0.01)	(0.02)	(0.02)	(0.37)
Is worried about crime or safety in neighborhood	-0.05***	-0.01	0.05	0.40
	(0.02)	(0.03)	(0.03)	(0.49)
Has been victimized by any theft, last 12 months	0.00	0.03	0.05**	0.16
has been vicennized by any chere, last 12 months	(0.01)	(0.02)	(0.02)	(0.37)
	()	(0.02)	()	(0.01)
Has been victimized by any assault/arson/witchcraft, last 12 months	-0.03***	-0.01	0.00	0.14
	(0.01)	(0.02)	(0.02)	(0.34)

Health outcomes

	(1)	(2)	(3)	(4)
	Treated Ho	useholds	Untreated Households	-
	$1(Treat\ village)$	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Health Index	0.04	0.06	0.01	0.03
react mex	(0.03)	(0.06)	(0.05)	(1.01)
Self-reported health	0.05	0.02	0.02	3.33
	(0.04)	(0.08)	(0.06)	(1.05)
Index of recent health symptoms	-0.01	0.00	-0.04	-0.03
	(0.03)	(0.06)	(0.06)	(0.99)
Has experienced a major health problem since baseline	0.00	-0.04**	0.02	0.17
	(0.01)	(0.02)	(0.02)	(0.38)
Days school / work missed due to poor health	-0.18	-0.24	-0.25	3.09
	(0.14)	(0.26)	(0.38)	(5.66)
Has had a major health problem resolved since baseline	-0.01	0.00	0.03	0.18
	(0.04)	(0.07)	(0.05)	(0.38)
No. of visits to hospital (last 4 weeks)	-0.01	-0.04	0.02	0.57
/	(0.03)	(0.08)	(0.06)	(1.23)
Medical expenditure (last 4 weeks)	0.13	-1.28*	1.73	8.15
,	(0.49)	(0.78)	(1.30)	(21.56)

Female empowerment outcomes

	(1)	(2)	(3)	(4)
	Treated Households		Untreated Households	
	1(Treat village)	Total Effect	Total Effect	Control, low saturation
	Reduced form	IV	IV	mean (SD)
Female Empowerment Index	-0.01	-0.13	0.09	0.05
	(0.07)	(0.15)	(0.15)	(0.94)
Violence Index	-0.03	0.08	-0.04	-0.03
	(0.07)	(0.15)	(0.17)	(0.93)
Frequency of physical violence (last 6 months)	-0.21	1.01	0.21	0.89
	(0.53)	(1.52)	(0.30)	(5.85)
Frequency of emotional violence (last 6 months)	-0.08	1.26	-0.01	1.22
	(0.46)	(1.24)	(1.10)	(5.45)
Frequency of sexual violence (last 6 months)	-0.10	-0.43	-0.49	0.72
	(0.19)	(0.40)	(0.35)	(3.66)
Attitudes Index	0.04	0.02	-0.09	-0.04
	(0.07)	(0.15)	(0.12)	(0.98)
Male-oriented attitudes	-0.08	-0.24	0.12	1.65
	(0.09)	(0.18)	(0.35)	(1.24)
Justifiability of domestic violence	0.24*	0.43	0.18	2.16
	(0.13)	(0.28)	(0.26)	(1.92)
Marital control	0.75	1.12	0.61	1.57
	(0.54)	(1.26)	(1.12)	(5.16)

Education outcomes

	(1) (2) (3)		(4)	
	Treated Ho	useholds	Untreated Households	
	1(Treat village) Total Ef		Total Effect	Control low saturation
	Reduced form	IV	IV	mean (SD)
Education Index	0.09**	0.10*	0.10*	0.01
	(0.04)	(0.05)	(0.06)	(1.02)
Total education expenditure (annualized)	27.20**	45.31***	55.20	277.70
	(10.65)	(17.02)	(35.00)	(587.12)
Proportion of school aged children in school	0.01	0.00	0.02*	0.96
	(0.01)	(0.01)	(0.01)	(0.18)
Has undertaken a new form of education or training	0.01	0.00	-0.01	0.02
	(0.00)	(0.01)	(0.01)	(0.13)
Days attended school (last 5 days)	0.04	0.04	0.20**	4.33
	(0.05)	(0.10)	(0.09)	(1.29)
Per-child school expenditures (last 3 terms)	8.29***	17.14***	18.53*	78.04
	(3.01)	(5.71)	(9.69)	(109.87)
Times sent home because of missing school fees (last term) $% \left($	-0.16	0.00	-0.11	3.69
	(0.22)	(0.43)	(0.32)	(5.90)

Public goods (Walker 2018)

	(1)	(2)	(3)
	Treatment	Villages	
	1(Treat village)	Total Effect	Control, low saturation
	Reduced form	IV	mean (SD)
Total public good expenditure per-capita, annualized $\left(\text{USD}\right)$	-7.76	8.61	30.92
	(8.80)	(13.11)	(76.19)
Expenditure raised from own village (USD)	0.06	-0.68	5.11
	(0.60)	(1.20)	(7.87)
Expenditure raised from community fundraisers (USD)	0.45	-0.18	0.52
	(0.30)	(0.46)	(2.49)
Expenditure from external sources (USD)	-9.90	-4.09	19.99
	(8.64)	(10.51)	(75.19)



Inequality Counterfactual: Details

- Goal: identify what village-level inequality would have looked at if there were no spillovers from transfers
- Assume an MPC of 0.4 for expenditure, MPS of 0.6 for asset ownership (savings). These are based on relative shares for treatment effects
- For asset ownership: Apply transfer * MPS to recipient household baseline asset ownership, assume asset ownership unchanged for non-recipient households
- For expenditure: Apply transfer * MPC to (randomly-selected) control, low saturation eligible households; follow same procedure (by eligibility, without adding in transfer) for non-recipients.
- Re-calculate village-level Gini coefficients, re-estimate same model as for actual data

Enterprise revenue effects by sector

	(1)	(2)	(3)	(4)
	Treatment	Villages	Control Villages	
	1(Treat village) Reduced form	Total Effect IV	Total Effect IV	Control, low saturation weighted mean (SD)
Retail revenue	65.46	160.21**	81.50*	235.98
	(41.84)	(68.09)	(43.38)	(414.95)
Manufacturing revenue	-49.59	92.74**	108.51	81.19
	(73.46)	(46.42)	(70.22)	(177.10)
Services revenue	-77.25*	7.20	43.37	115.09
	(40.75)	(46.57)	(31.35)	(175.76)
Agriculture revenue	3.11**	5.51***	2.15*	37.91
	(1.27)	(1.43)	(1.29)	(46.39)

◀ back

Heterogeneous household effects (Back)

	200 -	•***			1	4			Å	1
Assets 724 (863)	- 0 - - 200 -		— — ф. — —			Y	—		¥	Ŷ
Expenditure 2491 (1726)	500 - 0 - -500 -	•***	¢	¢	¢		—		- +	
Income 1051 (1313)	500 - 0 - -500 -	•*	— —¢— —	¢	— _¢— -		0		¢ –	¢*
Revenue 820 (1395)	- 500 - 0 - -500 -				¢	\$	— -¢ — -			¢
Psych Well-Being Index -0.00 (0.98)	- 2 - - 0 - - 2 -	•**_	— — — — —							
Health Index 0.02 (0.99)	.2 - 0 - 2 -	•			—				- 4	
Education Index 0.01 (1.04)	.2 - 0 - 2 -	•**	¢	¢	— _ ф— _	\$	—			
Female Empowerm Index 0.04 (0.96)	ent .5 - - 0 - 5 -	•			— — ф— —					
Food Security Index 0.03 (1.00)	.2 - 0 - 2 -	•***	— — ф— —		—				- +	¢
Hours Worked 36.1 (27.8)	- 10 - 0 - 10 -		\$		—				\$	¢
		Treatment Village	Female Respondent	Age >=25	Married	Completed Primary	Child in HH	High Psych	Self Employed	Wage Employment
		(0.50)	(0.69)	(0.83)	(0.64)	(0.40)	(0.81)	(0.50)	(0.27)	(0.33)

Treatment Interaction with Baseline Covariate

Number of employees: non-ag enterprises



A dual, expenditure-based approach

We also show that, assuming differentiability, the *marginal* equivalent variation is:

$$\frac{dEV_i}{dT} = \frac{de_i}{dT} - \sum_{t=0}^{\infty} (\delta_i)^t \left(\frac{\partial p_t}{\partial T} \cdot c_{it} + \frac{t}{\delta_i} \frac{\partial \delta_i}{\partial T} p_t \cdot c_{it} - p_t \cdot \frac{\partial l_{it}}{\partial T} \right)$$
(3)

Beyond ignoring externalities, the usual measure of living standards in development economics, consumption expenditures (here e_i), differs from welfare in this framework. Three (correctable) biases:

- 1 Counts appreciation of the price of consumption goods $\left(\frac{\partial p_t}{dT} \cdot c_{it}\right)$ or the time path of consumption $\left(\frac{\partial \delta_i}{\partial T} p_t \cdot c_{it}\right)$ as a welfare gain
- 2 Counts income gains due to behavioral responses such as increased labor supply $(p_t \cdot \frac{\partial l_{it}}{\partial T})$ as a welfare gain
- 3 (Over any finite time interval, e_i mistakenly counts as a welfare gain increases in spending financed by dis-saving.)