Informal Taxation Responses to Cash Transfers: Experimental Evidence from Kenya

Michael Walker

UC Berkeley

Public Finance and Public Management in Africa Conference
October 23, 2018

Introduction

Common narrative: poor, rural households do not pay taxes

- May not pay income taxes
- Do make many tax-like payments – **informal taxes**

Informal taxation:

- Coordinated and collected by local leaders
- Enforcement via social sanctions
- Revenue collection often project-specific, public
- Important source of local public goods funding
- Tradeoffs in information, accountability and enforcement compared to formal tax system

Questions:

1. What is the magnitude of informal taxation in rural Kenya?
2. How do informal taxes and public goods respond to household income changes?

   Specifically, income changes from unconditional cash transfers?

My Approach

Household income change: randomized controlled trial (RCT) of NGO cash transfer program

- Large, one-time, unconditional cash transfer (UCT)
- Targeted to poorest households within villages (1/3 of households eligible)
- Villages randomly assigned to UCT program

UCTs growing in popularity for social protection, less evidence of how they interact with local institutions

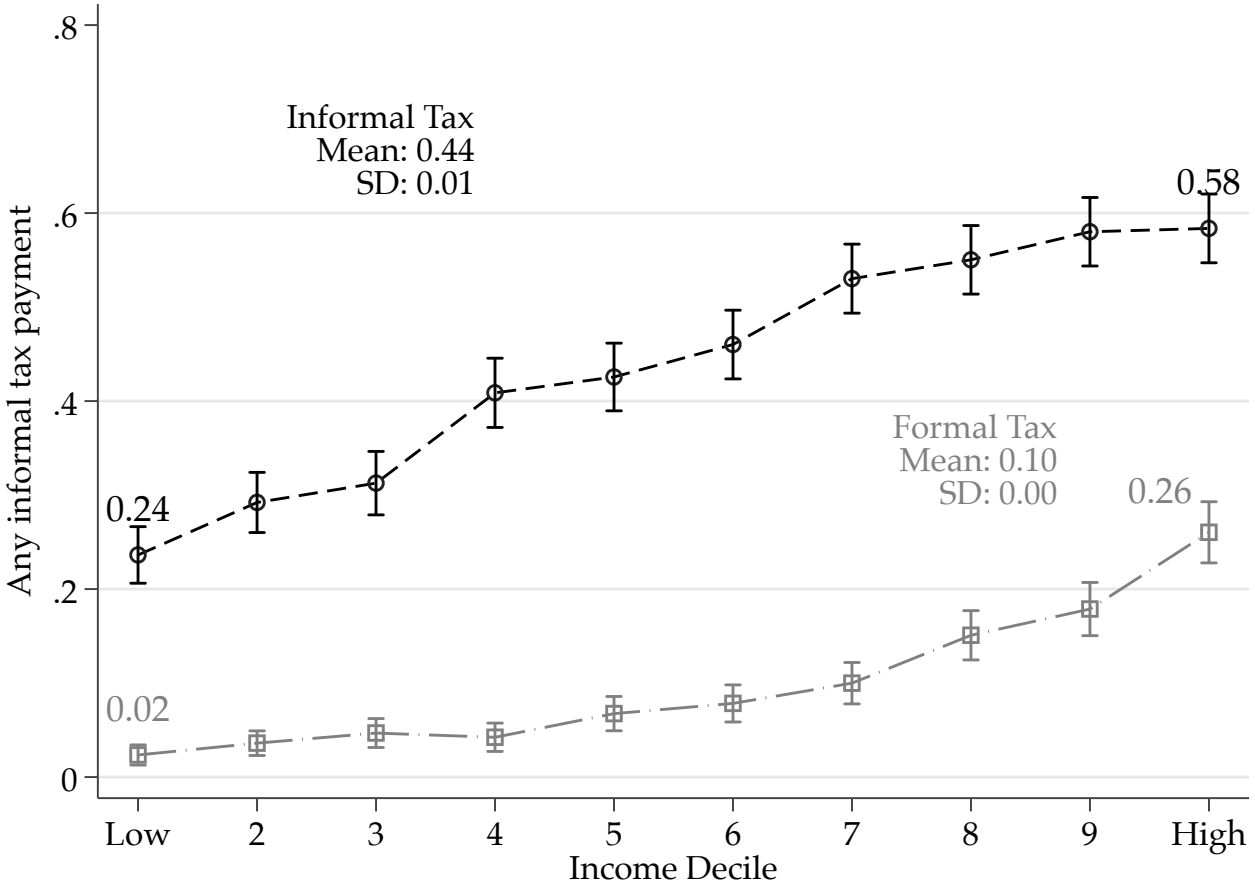
Data:

- 2 rounds of surveys of households (~8,000) and local leaders (~800)
- Spread across ~650 villages in rural western Kenya (Siaya County)

What is the magnitude of informal taxation in rural Kenya?

1. Widespread
2. Increasing in income, but declining as a share of income $\Rightarrow$ regressive
3. More regressive than formal taxes
4. Change in response to household shifts in the income distribution (control villages)

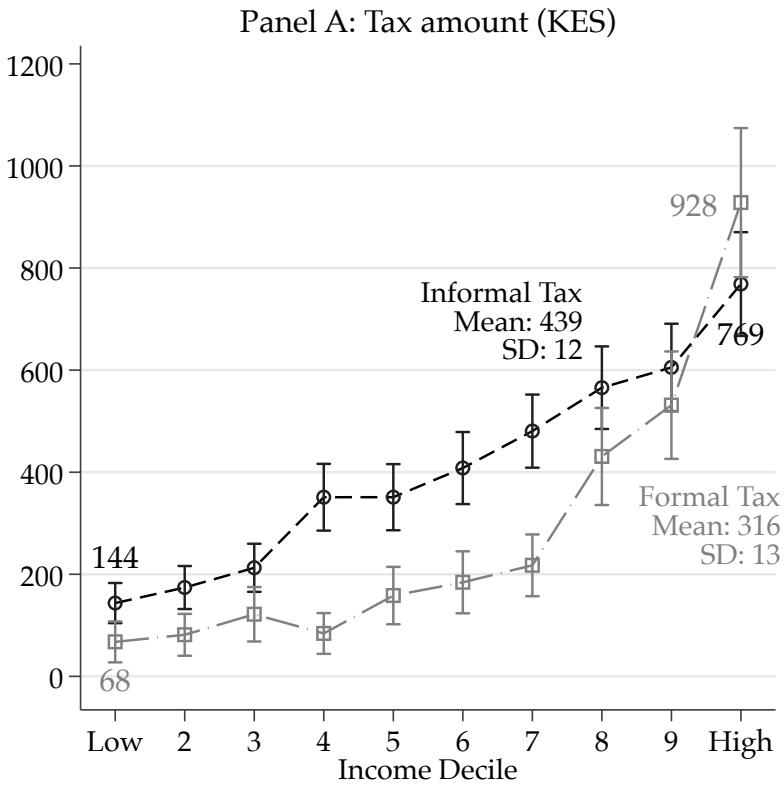
Informal taxation is widespread

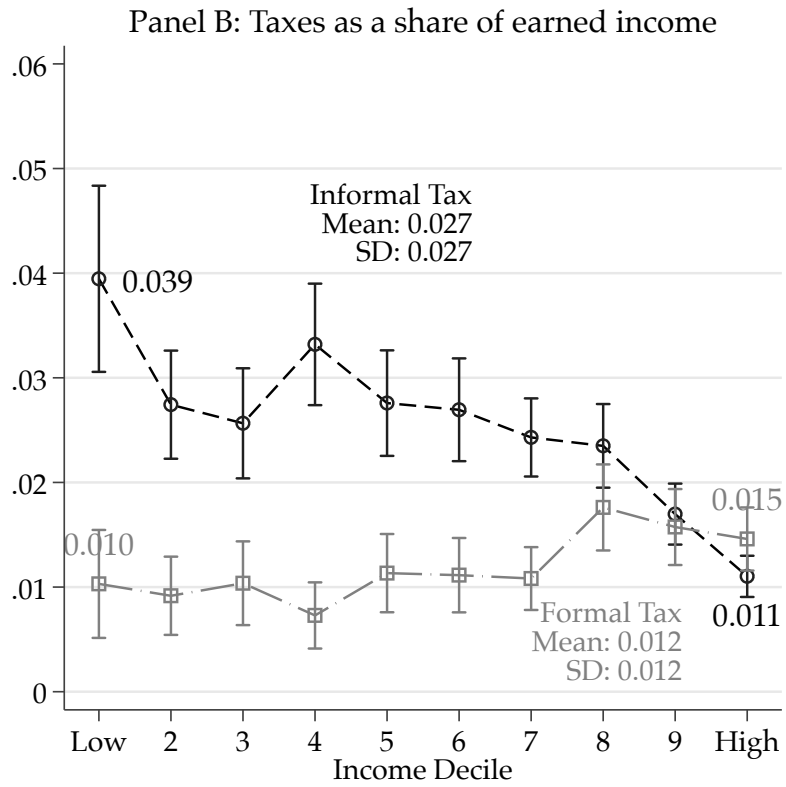


- Share of households paying any informal taxes increasing in income
- Much higher share making payments than formal taxes, particularly in lower income deciles

Source: Baseline household data

Informal taxes are increasing in income, declining as share of income





Informal taxes:

- more regressive than formal taxes
- change in response to household shifts in the income distribution Table

UCT Program

NGO GiveDirectly (GD) distributes one-time UCTs to poor households in rural Kenya meeting basic means test.

- Eligibility: grass-thatched roof (publicly observable)
- Distributed via mobile money at roughly same time to all eligible households within a village
- Villages randomly assigned to treatment

Large transfer & large scale: ~75% of annual expenditure, USD 11M across 650 villages

Sizable benefits for recipient households (Haushofer, Miguel, Niehaus and Walker (2018))

No clear predictions about direction of informal tax response

Results: Informal Taxes

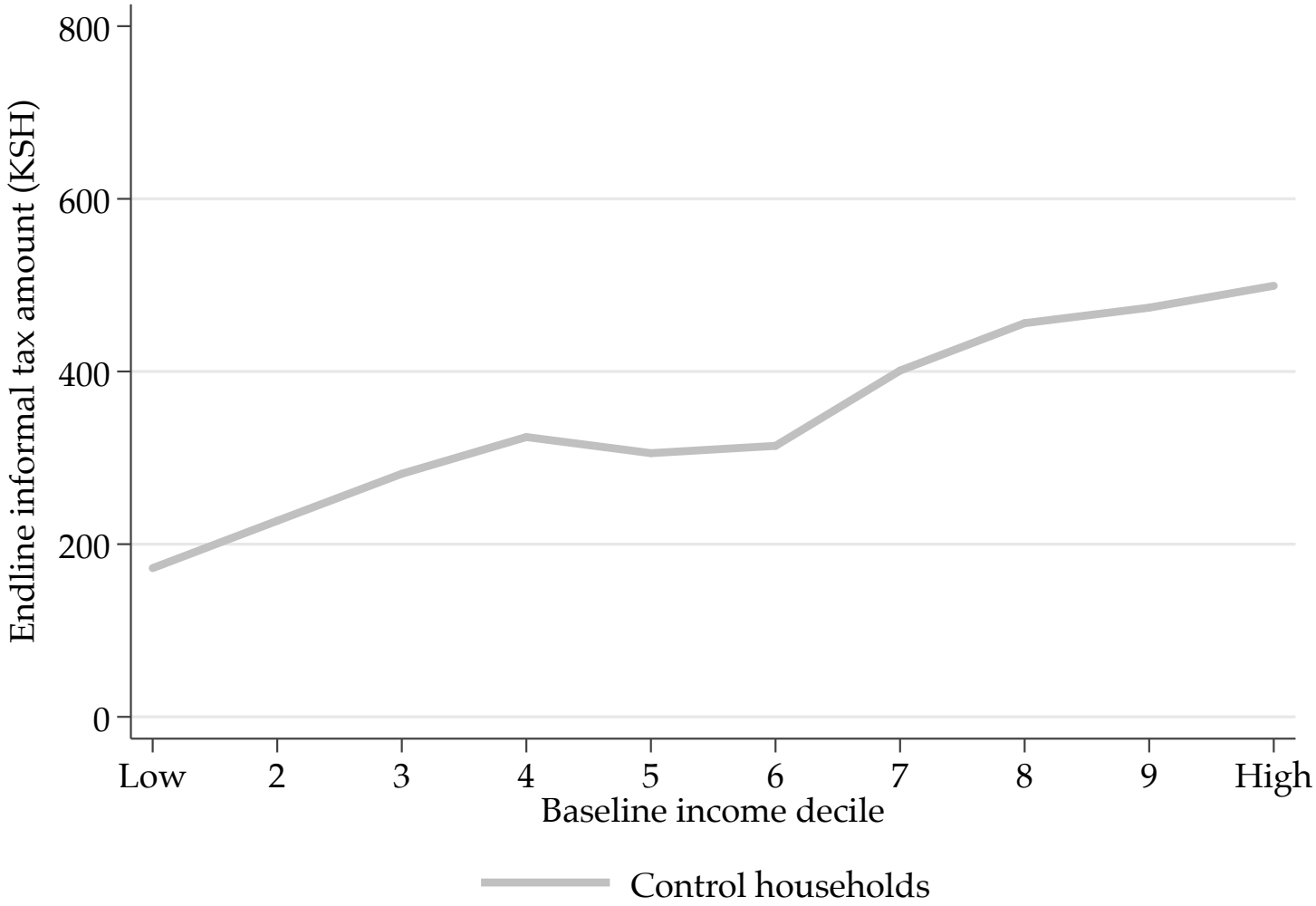
No effect on informal tax participation, amount paid

	(1) Tax Amount	(2) Tax Rate	(3) Any Tax Paid	(4) Tax Amount, cond > 0
Mean Effect, Treatment vs Control Villages				
Eligible Housheolds	15.267	−0.001	0.008	24.345
	(19.870)	(0.002)	(0.013)	(51.155)
Ineligible Households	41.156	0.001	0.014	108.446
	(29.531)	(0.002)	(0.017)	(75.865)
Control Low Sat Eligibles Mean (SD)	339.95	0.019	0.43	824.11
	(772.29)	(0.060)	(0.50)	(1208.00)
Observations	8,242	7,996	8,242	3,533

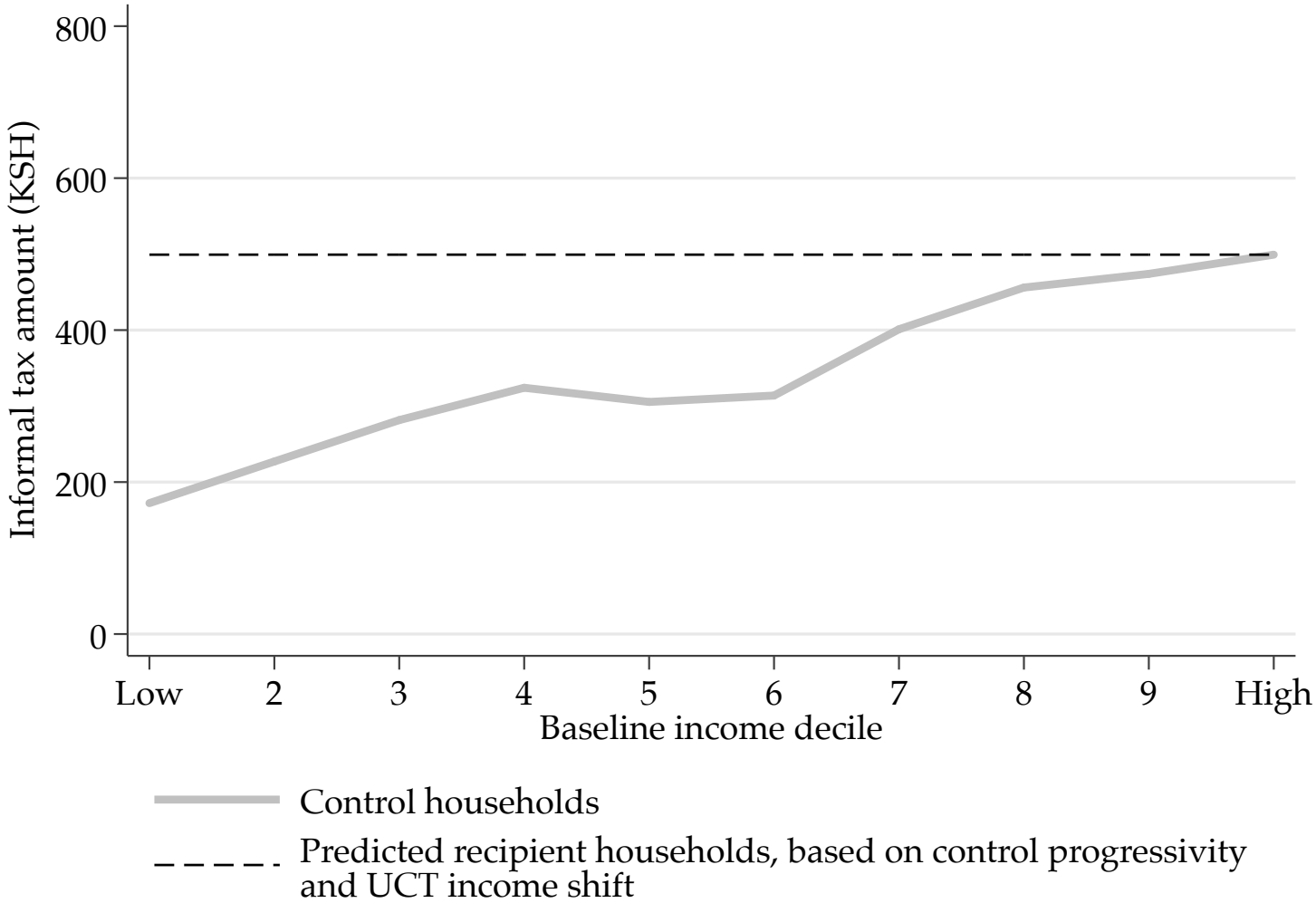
Notes: Rows report results from fully saturated regression model, and sum up coefficients accordingly. Standard errors clustered at the saturation group level, the highest level of randomization, and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

- Expected tax amount if UCT taxed like earned income: KES 165
- No effect on public good projects (but no negative effect either)

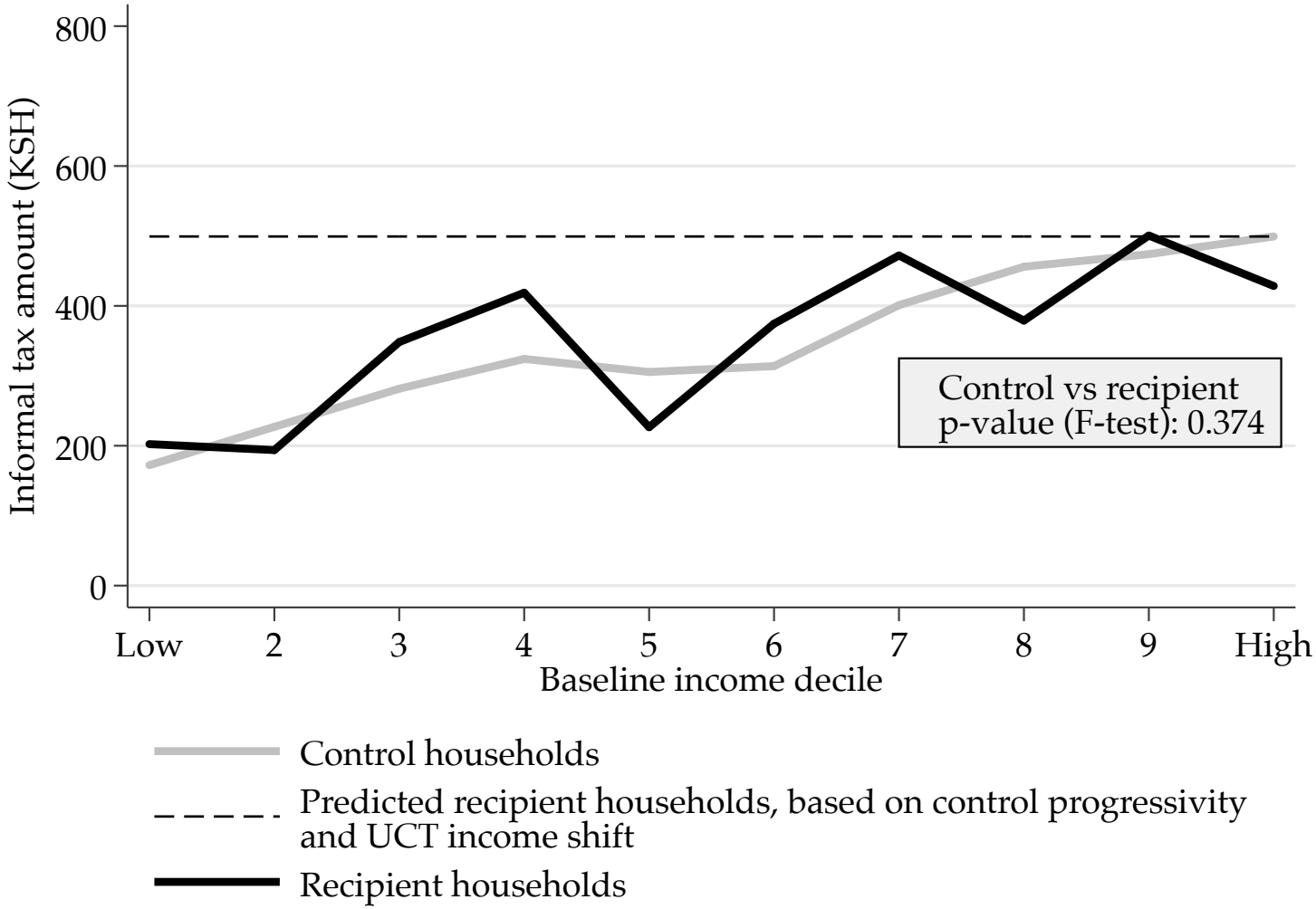
Endline informal taxes, by baseline income decile



Predicted informal tax payments for recipient households



Informal tax payments in line with pre-treatment income



Tradeoff: Households benefit from exemption, but missed opportunity for public goods improvements

No evidence that households overtaxed by local leaders $\Rightarrow$ transfer reaching intended beneficiary

- Benefits of informal institutions
- Not driven by households opting out

Forgo opportunity for substantial public goods investment

- Counterfactual shift would have raised 1/3 of annual expenditure on water points

Setting that reduced a number of potential frictions:

- Transfers large, public knowledge, coordinated timing, small villages & same ethnicity

Summary

Informal taxation in rural Kenya:

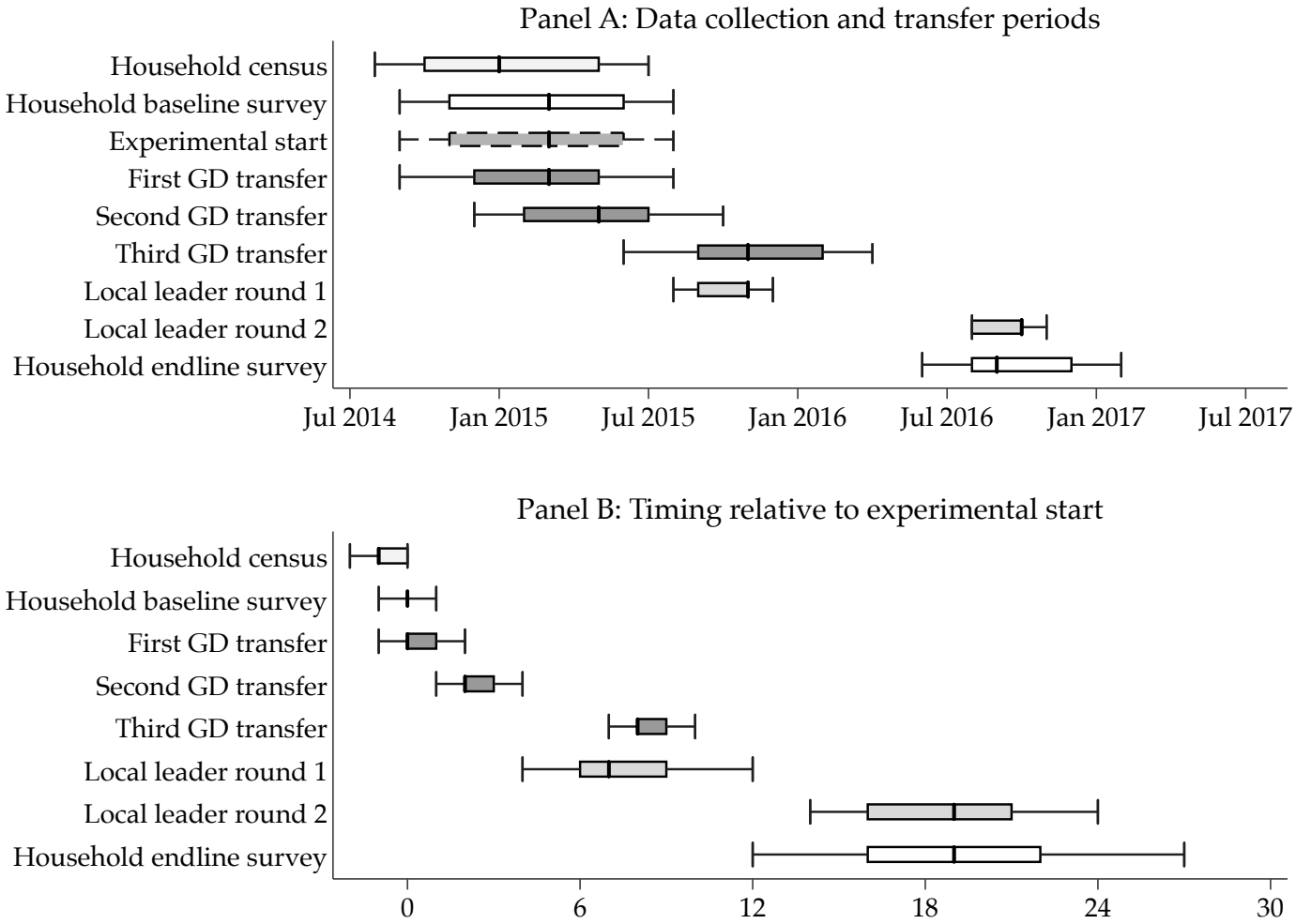
- Widespread, increasing in income but regressive $\Rightarrow$ looking only at formal taxes understates households' tax burden
- Local leaders are able and willing to change informal tax amounts in response to household earned income changes

Response of informal taxes to UCT:

Positive finding that recipient households benefit and are not overtaxed, no negative effects on public good projects, social cohesion

Unlikely to see investment in public goods from one-time transfer, as this setting reduced many potential frictions

Study Timeline



Data

Experimental Design

Informal taxes change in response to household income changes

$$\Delta Tax_{hvs} = \alpha + \beta \Delta IncomeDecile_{hvs} + \varepsilon_{hvs}$$

	(1) Δ Informal Tax	(2) Δ Formal Tax
Δ Income Deciles	33.18**	148.5***
	(16.74)	(45.30)
Sample	Control HHs	Control HHs
Observations	3,593	3,594

Notes: Standard errors clustered at the village level and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

Mean shift up income distribution for recipient household: 5 income deciles ⇒ KES 165 increase in informal taxes

Back to magnitude figures

Regression Equations: Households

Fully saturated ANCOVA specification:

$$y_{hvs} = \beta_0 + \beta_1 T_{vs} + \beta_2 E_{hvs} + \beta_3 (T_{vs} \times E_{hvs}) + \beta_4 H_s + \beta_5 (T_{vs} \times H_s) + \beta_6 (E_{hvs} \times H_s) + \beta_7 (T_{vs} \times E_{hvs} \times H_s) + \delta_1 y_{hvst_0} + \delta_2 M_{hvst_0} + \varepsilon_{hvs}$$

- y_{hvs}: outcome for household h in village v in sublocation s at endline
- T_{vs}: treatment indicator
- E_{hvs}: indicator for eligibility
- H_s: high-saturation indicator
- $(T_{vs} \times E_{hvs})$: indicator for recipients
- Standard errors are clustered at the saturation group level

Mean Effect for Eligible Households

Regression Equation:

$$y_{hvs} = \beta_0 + \beta_1 T_{vs} + \beta_2 E_{hvs} + \beta_3 (T_{vs} \times E_{hvs}) + \beta_4 H_s + \beta_5 (T_{vs} \times H_s) + \beta_6 (E_{hvs} \times H_s) + \beta_7 (T_{vs} \times E_{hvs} \times H_s) + \delta_1 y_{hvst_0} + \delta_2 M_{hvst_0} + \varepsilon_{hvs}$$

Quantity of Interest:

$$E[y_{hvs} | T_{vs} = 1, E_{hvs} = 1] - E[y_{hvs} | T_{vs} = 0, E_{hvs} = 1]$$

Taking into account saturation design, mean effect for eligible households:

$$\beta_1 + \beta_3 + (1/3)\beta_4 + (2/3)\beta_5 + (1/3)\beta_6 + (2/3)\beta_7$$

Ineligible households:

$$\beta_1 + (1/3)\beta_4 + (2/3)\beta_5$$

◂ Informal Tax Results

Empirical Specifications: Village Public Goods

Panel specification:

$$y_{vst} = \gamma_1(T_{vs} \times Post_t) + \gamma_2(H_s \times Post_t) + \gamma_3(T_{vs} \times H_s \times Post_t) + \alpha_v + \lambda_t + \epsilon_{vst}$$

- y_{vst}: outcome for village v in sublocation s in year t
- T_{vs}: treatment indicator
- H_s: high-saturation indicator
- $Post_t$: post-treatment year indicator, based on rollout
- α_v, a village-level fixed effect, and λ_t, a year fixed effect.
- Standard errors are clustered at the saturation group level, the highest level of randomization.

◂ Public Goods Results

Local Leader Demographics

Assistant Chief (AC) - Sublocation

- 90% male
- Mean age of 47
- On average have served for 13 years
- 88% have some secondary schooling, 58% have completed secondary

Local Leader Job Description

Village Elder (VE) - Village

- 75% male
- Mean age of 58 (vs household mean of 44)
- On average have served as VE for 8 years
- 55% have completed primary school, only 17% with any secondary (vs 37% & 12% for household mean)

Testing for differences in tax rates: regression equation

Regress endline informal tax amount on various definitions of income deciles, including fixed effects for income deciles and interaction between treatment village and income deciles

$$Tax_{hvst} = \sum_{i=1}^{10} +\beta_i(INCDEC_i \times T_{vs} \times E_{hvs}) + \sum_{j=1}^{10} \gamma_j(INCDEC_j \times T_{vs}) + \sum_{k=1}^{10} \delta_k INCDEC_k + \varepsilon_{hvst}$$

- Tax_{hvst}: household informal tax amount
- $INCDEC$: income decile of interest (baseline, endline income with and without transfer wrt control)
- T_v: indicator for treatment village
- $T_v \times E_{hvs}$: indicator for recipient household (interaction between indicator for treatment village and indicator for eligible)

Testing for differences in tax rates

	(1) Baseline Income Decile	(2) Endline Income Decile, w/o UCT transfer	(3) Endline Income decile, w/ UCT transfer
Income Decile 1 × Recipient	94.44*	-187.1**	-236.4***
	(55.40)	(84.32)	(90.99)
Income Decile 2 × Recipient	-7.857	-64.04	53.03
	(60.89)	(84.50)	(162.8)
Income Decile 3 × Recipient	5.157	-13.64	-119.8*
	(87.65)	(63.19)	(63.25)
Income Decile 4 × Recipient	92.80	168.0*	-30.15
	(103.0)	(100.0)	(112.9)
Income Decile 5 × Recipient	-32.99	-136.9	-300.1***
	(54.31)	(85.28)	(78.03)
Income Decile 6 × Recipient	-63.97	-80.33	-124.2
	(108.5)	(86.61)	(124.1)
Income Decile 7 × Recipient	16.66	-71.22	-263.2***
	(95.18)	(91.52)	(77.69)
Income Decile 8 × Recipient	-93.00	81.79	-34.50
	(92.05)	(91.24)	(86.34)
Income Decile 9 × Recipient	-56.18	-180.8	-98.71
	(109.9)	(123.4)	(116.1)
Income Decile 10 × Recipient	-444.8***	-404.3***	-387.9***
	(143.2)	(135.5)	(131.1)
Income Decile FEs	Yes	Yes	Yes
Treat × Income Decile FEs	Yes	Yes	Yes
Observations	7226	7226	7226
Mean of Dep Var	355.5	355.5	355.5
Joint test of significance (p-value)	0.120	0.001	0.000
Adjusted R^2	0.185	0.179	0.179

Notes: Standard errors clustered at the village level. * significance at 10%, ** significance at 5%, and *** significance at 1%. Dependent variable topcoded at the 99th percentile. Endline income deciles calculated on control households only. HHousehold income defined as the sum of agricultural profits, self-employment profits and after-tax wage earnings.

Summary

Results: Public Good Quality

No statistically significant increase in reported quality for treatment villages.

	(1) VE PG Quality	(2) VE Water Quality	(3) Eligible HH Index	(4) Ineligible HH Index
treat	−0.00508	0.0724	0.00375	0.0246
	(0.0957)	(0.103)	(0.0323)	(0.0397)
hi_sat	0.137	0.259**	0.0148	−0.0360
	(0.0833)	(0.0967)	(0.0365)	(0.0485)
Treat × HiSat	−0.0142	−0.130	−0.00406	0.0369
	(0.117)	(0.123)	(0.0431)	(0.0564)
Constant	$-9.77e-09$	$-5.31e-09$	−0.00580	0.00108
	(0.0531)	(0.0727)	(0.0233)	(0.0290)
Observations	640	640	640	640
Control & Low Sat (pre-treatment) mean (SD)	−0.00	−0.00	−0.01	0.00
	(0.80)	(1.00)	(0.28)	(0.38)

Notes: Standard errors clustered at the saturation group level, the highest level of randomization, and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

Public Goods Projects Results

Results: Public Good Expenditure (per-capita)

No increase in expenditure for treatment villages

	(1) Total Expenditure	(2) Water Expenditure	(3) Road Expenditure
Treat × Post	−148.870*	−10.876	−118.945
	(79.307)	(9.779)	(72.253)
High Sat × Post	32.306	3.258	6.937
	(87.086)	(14.203)	(76.524)
Treat × High Sat × Post	35.128	5.689	38.005
	(128.684)	(14.362)	(109.316)
Observations	3,616	4,130	3,882
Control & Low Sat pre-treatment mean (SD)	93.19	23.37	49.75
	(518.61)	(83.32)	(401.92)
Mean effect, treatment village (SE)	−114.59*	−6.03	−92.00
	(63.26)	(6.93)	(58.24)

Notes: Standard errors clustered at the saturation group level, the highest level of randomization. * significance at 10%, ** significance at 5%, and *** significance at 1%.

Results: Assistant Chief Public Good Projects

	Number of Sublocation Projects			Public Good Quality	
	(1) Total Projects	(2) Health Clinic Projects	(3) Market Center Projects	(4) AC Health Center Quality	(5) AC Market Center Quality
High Sat (× Post)	−0.392*	0.142	−0.469**	−0.443*	−0.100
	(0.226)	(0.255)	(0.180)	(0.241)	(0.217)
Panel Specification	Yes	Yes	Yes	No	No
Observations	549	321	510	46	72
Low Sat (pre-treatment) mean (SD)	1.06	0.68	0.67	−0.00	0.00
	(1.47)	(1.02)	(1.03)	(1.00)	(1.00)

Notes: This table presents results on the number of sublocation public good projects and reported public good quality, using data from assistant chiefs. *Total Projects* measures the total number of sublocation projects (repairs, improvements, new constructions) for health clinics, market centers and other sublocation-level projects reported by assistant chiefs within their sublocation. *Health Center Quality* and *Market Center Quality* are standardized variables of the assistant chief-reported quality of facilities within the sublocation, and are conditional on a sublocation having a health or market center, respectively. Standard errors clustered at the saturation group level, the highest level of randomization, and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

Support for Redistribution Coefficient Estimates

	(1) Mean Effects Index	(2) Gov't reduce inc diff	(3) Local leaders reduce inc diff	(4) Ability to pay	(5) Preferred tax weakly progressive
Treat Village (β_1)	0.005	0.042*	0.032	−0.044	−0.013
	(0.024)	(0.024)	(0.029)	(0.027)	(0.029)
Eligible Household (β_2)	−0.013	0.009	−0.002	0.014	−0.027*
	(0.017)	(0.012)	(0.018)	(0.018)	(0.016)
Treat Vill × Eligible (β_3)	−0.029	−0.063*	−0.041	0.011	0.001
	(0.030)	(0.034)	(0.033)	(0.033)	(0.035)
Hi Sat Sublocation (β_4)	0.007	0.015	−0.008	−0.021	0.037
	(0.023)	(0.022)	(0.031)	(0.029)	(0.023)
Treat Vill × Hi Sat (β_5)	−0.013	−0.035	−0.014	0.040	−0.037
	(0.035)	(0.033)	(0.044)	(0.037)	(0.038)
Eligible × Hi Sat (β_6)	0.002	−0.040	−0.005	0.009	−0.005
	(0.031)	(0.028)	(0.031)	(0.038)	(0.031)
Treat Vill × Eligible × Hi Sat (β_7)	0.028	0.090**	0.045	0.001	−0.008
	(0.044)	(0.043)	(0.045)	(0.048)	(0.048)
Control Eligibles Mean (SD)	0.003	0.821	0.645	0.519	0.283
	(0.448)	(0.384)	(0.479)	(0.500)	(0.451)
Observations	8,242	8,221	8,220	8,224	8,242

Notes: The support for redistribution index is a mean effects index of 7 questions, covering whether the government should reduce income differences, local leaders should reduce income differences, households able to pay more should pay more, incomes should be made more equal, government should take more responsibility for to ensure everyone is provided for, communities should take more responsibility to ensure everyone is provided for, and household's preferred tax rate is weakly progressive. Standard errors clustered at the saturation group level, the highest level of randomization, and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

◂ ATE Estimates

Social Cohesion Coefficient Estimates

	(1) Social Trust Index	(2) Trust Own Village	(3) Comm Involvement Index	(4) Member of comm group
Treat Village (β_1)	0.051	0.047	−0.064	−0.051**
	(0.042)	(0.032)	(0.067)	(0.022)
Eligible Household (β_2)	−0.065***	−0.013	−0.146***	−0.066***
	(0.024)	(0.022)	(0.044)	(0.019)
Treat Vill × Eligible (β_3)	−0.002	−0.016	0.128*	0.075***
	(0.036)	(0.035)	(0.072)	(0.026)
Hi Sat Sublocation (β_4)	−0.039	−0.003	0.066	0.009
	(0.045)	(0.031)	(0.069)	(0.025)
Treat Vill × Hi Sat (β_5)	−0.007	−0.056	0.095	0.046
	(0.064)	(0.045)	(0.098)	(0.033)
Eligible × Hi Sat (β_6)	0.064	0.008	−0.016	−0.009
	(0.048)	(0.039)	(0.078)	(0.034)
Treat Vill × Eligible × Hi Sat (β_7)	−0.048	0.006	−0.058	−0.024
	(0.060)	(0.049)	(0.111)	(0.043)
Control Eligibles Mean (SD)	0.008	0.525	1.252	0.723
	(0.673)	(0.499)	(1.127)	(0.447)
Observations	8,226	8,225	8,230	8,230

Notes: Social cohesion variables were not collected at baseline. The Social Trust Index is a mean effects index of general trust, trust in one's own (and other) tribes, religious groups and village. The Community Involvement Index is a count of the number of types of community groups in which a household has memberships, while the Member of a community group is an indicator that a household is in at least one community group. Standard errors clustered at the saturation group level, the highest level of randomization, and reported in parentheses. * significance at 10%, ** significance at 5%, and *** significance at 1%.

◂ ATE Estimates

Interhousehold transfers / kin tax Coefficients

Recipient households increase community group membership, not opting out

	(1) Transfers sent to family	(2) Transfers sent within village	(3) Any loans given	(4) Amount of loans given
Treatment Village	168.477	106.920	0.009	58.226
	(208.795)	(84.374)	(0.022)	(56.101)
Eligible HH	133.830	144.041***	0.052***	−10.503
	(124.654)	(47.514)	(0.018)	(37.272)
Treat Village × Eligible HH	207.980	−39.362	0.027	105.391
	(233.632)	(103.306)	(0.030)	(67.314)
High Saturation Sublocation	426.803	−4.295	−0.006	26.474
	(269.714)	(57.859)	(0.022)	(48.708)
Treat Village × High Sat	−88.366	−46.604	0.042	−30.330
	(329.294)	(99.326)	(0.033)	(79.745)
Eligible HH × High Sat	−680.739**	−42.557	0.017	17.201
	(317.138)	(78.867)	(0.031)	(72.568)
Treat Village × Eligible HH × High Sat	357.657	119.860	−0.073	−29.708
	(385.597)	(135.155)	(0.047)	(111.139)
Control Eligibles Mean (SD)	1530.25	407.14	0.31	381.22
	(3257.82)	(1342.50)	(0.46)	(1031.95)