General Equilibrium Effects of Cash Transfers

Egger et al. (2022)

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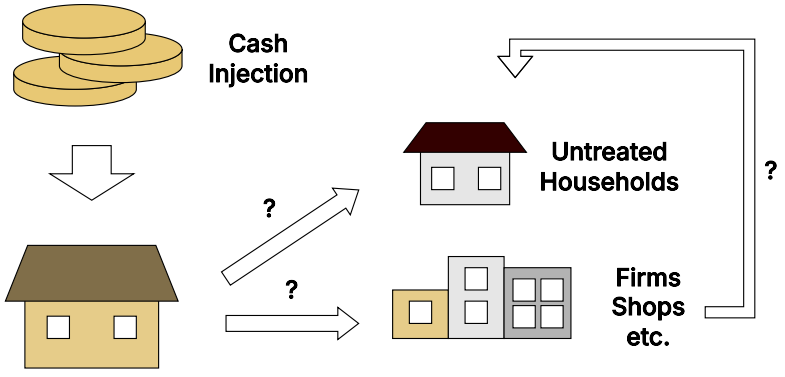
What Are We Going to Talk About?

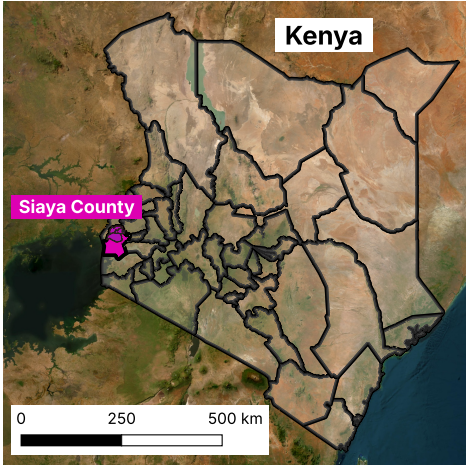
Paper Summary

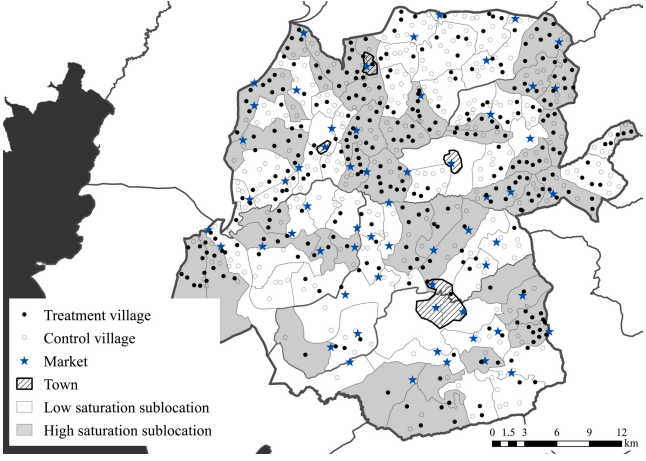
Discussion

Graphical Summary



Where Are We?


Kenya
Siaya County
0
250
500 km


Treatment village
Control village
Market
Town
Low saturation sublocation
High saturation sublocation
0 1.5 3 6 9 12
km

What Are We Going to Talk About?

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Setting: Rural Western Kenya

- **Siaya County**: rural, densely populated, high poverty
- **Sample**: 653 villages located in 84 sublocations across 3 subcounties of Siaya
- The mean village has 100 households
- **Mean household**: 4.3 members, 50-year-old respondent, 98% work in agriculture, 5 years of schooling
- **Control villages**: 46% wage workers, 49% self-employed
- **Context**: mid-2014 to 2017, steady economic growth, relative prosperity, political stability

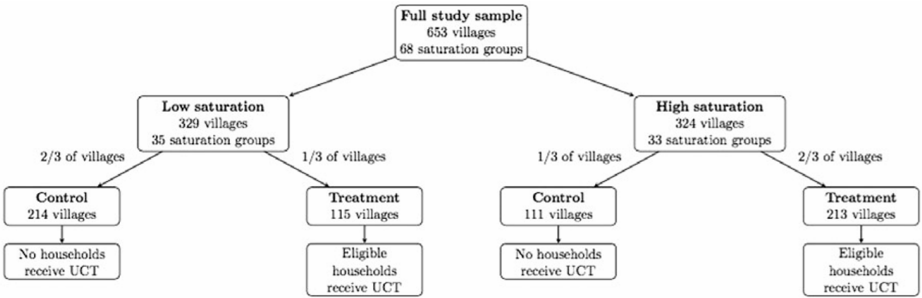
Intervention

- **Treatment**: Unconditional cash transfers to all poor (thatched-roof) households in the treated area
- **Transfer**: Three transfers made to eligible households in the treated area, totaling $1,000
  - 1st transfer: $80
  - 2nd transfer (2 months later): $460
  - 3rd transfer (6 months later): $460
- The total transfer amount corresponds to 75% of the mean annual household expenditure

Experimental Design

Two levels: within and across village spillovers

(a) Randomization



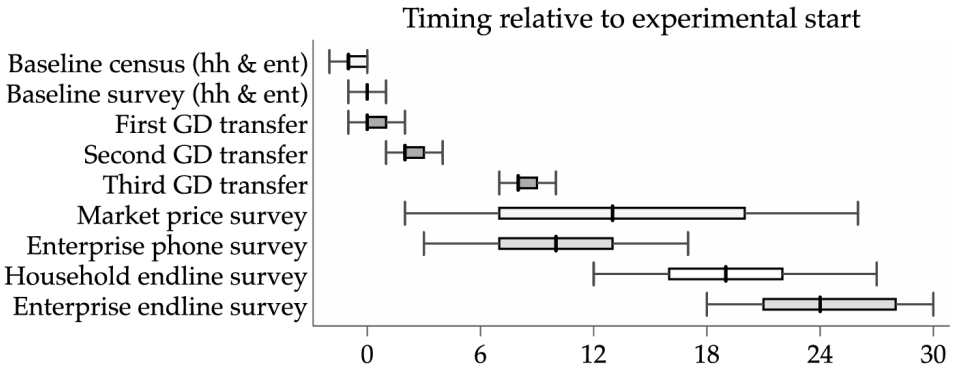
Household Data

- **Baseline Census**: Sampling frame and household eligibility; identified 65,383 households in a population of 280,000
- **Baseline Survey** — Sept. 2014 to Aug. 2015:
  - Conducted 1–2 months after the census
  - Randomly selected 8 eligible and 4 ineligible households per village, totaling 7,845 baseline surveys
  - Collected data on economic activity, asset ownership, psychological well-being, health, and nutrition
- **Endline Survey** — May 2016 to June 2017:
  - Conducted 9–31 months after the baseline survey
  - Followed households from the initial sample (8,239 surveys completed)
  - Added modules on expenditure, crop production, additional psychological scales, female empowerment, and gender-based violence

Enterprise and Price Data

- **Enterprise**:
  - **Household Survey**: Uses agricultural and self-employment modules
    - Revenue, profit, production, input costs, investment, hours worked, employment, etc.
  - **Non-farm Enterprise Census and Survey** — Nov. 2016 to Apr. 2017:
    - Randomly selected 5 firms per village
  - **Endline**: 1,673 firms within and 1,440 outside the homestead, plus 7,899 agricultural firms
  - Combining household and enterprise data allows matching firms to their owners
- **Price**:
  - Monthly survey of commodity prices in all 61 markets at baseline and up to 2.5 years after
  - Prices collected for 70 homogeneous goods
  - Household survey used to obtain prices of factors of production

Timeline


Timing relative to experimental start
Baseline census (hh & ent)
Baseline survey (hh & ent)
First GD transfer
Second GD transfer
Third GD transfer
Market price survey
Enterprise phone survey
Household endline survey
Enterprise endline survey
0
6
12
18
24
30

Empirical Specification: Recipient Households (1)

$$y_{ivs} = \alpha_1 \text{Treat}_v + \alpha_2 \text{HighSat}_s + \delta_1 y_{ivs,t=0} + \delta_2 M_{ivs} + \varepsilon_{ivs} \quad (1)$$

- y_{ivs}: outcome for HH i village v sublocation s
- Treat_v: village treatment indicator
- HighSat_s: high saturation sublocation
- $y_{ivs,t=0}$: outcome baseline
- M_{ivs}: missing baseline indicator

- α_1 captures HH **ATE**, α_2 yields a coarse **spillover** assessment.
- This specification would be sufficient if spillovers were fully **contained** within the **boundary** of an administrative subdivision.
- But **they are not**, and the region they investigate is densely populated, where administrative boundaries are often just that.

Empirical Specification: Recipient Households (2)

$$y_{iv} = \alpha + \beta\, \text{Amt}_v + \sum_{r=2}^{R} \beta_r\, \text{Amt}_{v,r}^{\neg v} + \delta_1\, y_{iv,t=0} + \delta_2\, M_{iv} + \varepsilon_{iv} \qquad (2)$$

- y_{iv}: outcome for HH i village v
- Amt_v: amount of money distr. in village
- $\text{Amt}_{v,r}^{\neg v}$: amount of money distr. in 2km bands around village
- $y_{iv,t=0}$: outcome baseline
- M_{iv}: missing baseline indicator

- This equation is an attempt to better capture **spillovers**.
- The Amt_v and $\text{Amt}_{v,r}^{\neg v}$ terms are cash per capita transferred to **village** v, and to all villages but v in donut-shaped 2km **bands**; all measured as a share of GDP/capita.
- Since only poor households are eligible, these are endogenous and **instrumented for** using the village treatment indicator and the share of eligible HH in the village.

Path of Spending: Recipient Households

- Recipient households increased **total expenditure** by **13.4%** for the total treatment effect and by **11.6%** in low-saturation areas
- The increase is driven by higher spending on **durable goods** (26% in low-saturation areas) and **non-durable goods** (mainly food)
- Although theoretically ambiguous, household earnings and hours worked did not decrease
- Little **heterogeneity** in treatment effects

Table 1 – Panel A

	Recipient Households	
	(1) 𝟙(Treat Village) Reduced Form	(2) Total Effect IV
Panel A: Expenditure		
Household expenditure, annualized	293.59	338.57
	(60.11)	(109.38)
Non-durable expenditure, annualized	187.65	227.20
	(58.59)	(99.63)
Food expenditure, annualized	72.04	133.84
	(36.96)	(63.99)
Temptation goods expenditure, annualized	6.55	5.91
	(5.79)	(8.82)
Durable expenditure, annualized	95.09	109.01
	(12.64)	(20.24)

Table 1 – Panel C

	Recipient Households	
	(1)	(2)
	𝟙(Treat Village) Reduced Form	Total Effect IV
Panel C: Household balance sheet		
Household income, annualized	79.43	135.70
	(43.80)	(92.10)
Net value of household transfers received, annualized	-1.68	-7.43
	(6.81)	(13.06)
Tax paid, annualized	1.94	-0.09
	(1.28)	(2.02)
Profits (ag & non-ag), annualized	26.24	35.85
	(23.67)	(47.66)
Wage earnings, annualized	42.43	73.66
	(32.23)	(60.82)

Empirical Specification: Enterprises

- The authors study **enterprise effects** using enterprise versions of the same specifications as they use for households.
- For the lagged outcome, they use village-level means because they only have repeated cross-sectional enterprise data.
- They interact all right-hand side variables with **enterprise type indicators** (agricultural, non-agricultural within the home, non-agricultural outside the home).

Path of Spending: Enterprise

- Large increases in **revenue** for firms in both treated (**+65%**) and control (**+48%**) areas

- Higher revenues led to increased **spending on labor** (higher wages)

Table 3 – Panel A

	Treatment Villages		Control Villages
	(1) 1(Treat Village) Reduced Form	(2) Total Effect IV	(3) Total Effect IV
Panel A: All enterprises			
Enterprise profits, annualized	−2.27 (21.42)	55.77 (36.73)	35.08 (37.36)
Enterprise revenue, annualized	−29.61 (102.74)	322.16 (138.17)	237.16 (112.72)
Enterprise costs, annualized	−13.32 (28.63)	89.35 (38.51)	73.08 (46.77)
Enterprise wage bill, annualized	−15.90 (25.49)	75.99 (30.64)	66.57 (35.86)
Enterprise profit margin	0.01 (0.02)	−0.11 (0.06)	−0.12 (0.05)

Empirical Specification: Non-Recipient Households

$$y_{iv} = \alpha + \sum_{r=2}^{\bar{R}} \beta_r^1 \, \text{Amt}_{v,r} + \sum_{r=2}^{\bar{R}} \beta_r^2 \left(\text{Amt}_{v,r} \cdot \text{Elig}_{iv} \right) + \gamma \, \text{Elig}_{iv} + y_{iv,t=0} \, \delta + \varepsilon_{iv} \qquad (3)$$

- y_{iv}: outcome for HH i village v
- $\text{Amt}_{v,r}$: amount of money distr. in 2km bands around village
- $\text{Amt}_{v,r} \cdot \text{Elig}_{iv}$: interaction
- Elig_{iv}: HH eligibility indicator
- $y_{iv,t=0}$: outcome baseline

- There are **two types** of non-recipient HH: ineligible HH in treated villages, and all HH in control villages.
- Own-village effects and cross-village effects are **no longer separated**.
- The authors report the results as a **weighted average** between the two types of non-recipient HH.

Path of Spending: Non-Recipient Households

- Non-recipient households experienced a similar **expenditure increase** as recipient households
- Non-recipient households showed a larger increase in **income** than recipients

→ Recipient households spent the cash transfers, which increased firm revenues and, in turn, the incomes of non-recipient households, allowing them to also raise their expenditure.

Table 1 – Panels A & C

	(1) **Recipient Households** 𝟙(Treat Village) Reduced Form	(3) **Non-Recipient Households** Total Effect IV
Panel A: Expenditure		
Household expenditure, annualized	338.57	334.77
	(109.38)	(123.20)
Non-durable expenditure, annualized	227.20	317.62
	(99.63)	(119.76)
Food expenditure, annualized	133.84	133.30
	(63.99)	(58.56)
Temptation goods expenditure, annualized	5.91	−0.68
	(8.82)	(6.50)
Durable expenditure, annualized	109.01	8.44
	(20.24)	(12.50)
Panel C: Household balance sheet		
Household income, annualized	135.70	224.96
	(92.10)	(85.98)

Empirical Specification: Prices

- Using the prices collected across time and different markets, the authors can control for market FE when estimating **price effects**.
- They are unable to detect price increases that affect the entire study area, but such increases (at least large ones) are unlikely to result from localized cash injections.
- The authors investigate **heterogeneous price effects** along two dimensions: More and less tradable goods; and more and less accessible markets.

Path of Spending: Prices

- **Output Prices**
  - Price effects are **small**
  - Average maximum transfer effect across markets is about **1%**
  - The result holds across almost all product categories
  - Slightly larger price increases in **less integrated markets**
- **Input Prices**
  - Evidence of **higher wages**, more pronounced for non-recipient households
  - Results for other factors of production are either **insignificant** (land) or **null** (capital)

Empirical Specification: Dynamics

$$x_{it,v} = \alpha_t + \sum_{s=0}^{9} \beta_s \, \text{Amt}_{v(t-s)} + \sum_{s=0}^{9} \gamma_s \, \text{Amt}^{\neg v}_{v(t-s),0\text{–}2\text{km}} + \varepsilon_{it,v} \qquad (7)$$

$x_{it,v}$: some flow variable

$\text{Amt}_{v(t-s)}$: amount of money distr. to village v in quarter $(t-s)$

$\text{Amt}^{\neg v}_{v(t-s),0\text{–}2\text{km}}$: amount of money distr. in the 0–2km band around village v

- Using this **dynamic** version of the earlier **estimating equation**, the authors can estimate the multiplier associated with the cash injection.
- Lack of data immediately after the first transfer makes this approach somewhat imprecise.

The Transfer Multiplier (1)

- The **MPC** matters for the magnitude of the multiplier
- Estimated **MPC = 0.76**, implying a transfer multiplier of **3.2**
- The **multiplier** *M* measures the cumulative effect of transfers on local real GDP, relative to the total amount *T* transferred (in real terms) over a given time interval

$$M = \frac{1}{T} \int_{t=0}^{\bar{t}} \Delta GDP$$

- This specific context generates a **pure external transfer multiplier**
- Unlike the MPC, this approach accounts for **positive spillover effects** and **dynamic responses**

The Transfer Multiplier (2)

- Two distinct measures of the same concept (GDP) are used
- **Expenditure-based measure:**
  - $GDP_t = C_t + I_t + G_t + NX_t$
  - Estimated multiplier: **2.58**
- **Dual income-based measure:**
  - $GDP_t = W_t + R_t + \Pi_t + T_t - NFI_t$
  - Estimated multiplier: **2.47**

Welfare

- Different policies that yield positive output changes may entail different **welfare effects**.
- Any output increase must come from some mix of **two sources**:
  - Heavier **use** of **input factors**, and
  - those factors being **more productive**.
- Productivity gains are unambiguously welfare gains, while increased factor employment comes at a cost.
- The authors find **no change** in land, HH labor supply, or non-agricultural fixed capital investment. Inventories increase slightly, but less than sales.
- They conclude that output increases are **largely due to productivity gains** and should be interpreted as welfare gains of similar magnitude.

Distribution and Non-Market Welfare

- While transfers were targeted to poor **households**, sizable spillovers reached their **richer neighbors**.
- This is reflected by within-village **Gini coefficients** not changing.
- Changing **relative prices** of different goods could also have distributional effects.
- However, price changes for individual goods measured were all very similar, prompting the authors to deem this effect unlikely to have occurred.
- Psychological well-being, food security, education, health, female empowerment, and security are **non-market factors** that impact welfare.
- For **recipient** households, psychological well-being, food security, education, and security improved; for **non-recipients**, only education improved slightly.

Where Did the Additional Output Come From?

- The study exposed the local economy to a large, **sudden demand shock**.
- The retail and manufacturing sectors **responded elastically**, quickly increasing output.
- **No change** was observed in employment, or other **inputs**.
- The authors conclude, suggestively, that a lot of manufacturing is done **on-demand**; and retail typically has one employee minding the shop, waiting for the avg. 1.9 customers that come each hour.
- **Costs** of these businesses are largely **fixed** and cannot be reduced, while additional demand can readily be served.

Slack

- **Why** is there so much **underutilized capacity** in businesses?
- 69% of non-agricultural businesses had just one employee. You cannot have less than one person minding the shop.
- Local markets are extremely **small-scale** affairs. There is demand for a market to be present, but reducing locations is infeasible.
- Additionally, **market frictions** may prevent businesses from consolidating into larger, more centralized companies.

What Are We Going to Talk About?

Paper Summary

Discussion

Scope

- The **scale** of this paper is extremely large.
- Monetary payouts amount to roughly $ 10 million.
- This allows the authors to answer simple large-scale questions about spillovers, multiplier, etc. in a precise microeconometric setting.
- **Indicative results** about welfare effects, potential output expansion channels, etc. are interesting. It would probably not have been difficult to amend the survey in a way that allowed for more insights here.

Validity and Spillovers

- A usual cheap comment about experimental studies is to question **external validity**.
- However: This study surely is specific to a context of East African rural households in times of low economic uncertainty, but we find it plausible that the findings extend beyond the immediate study context.
- **Spillovers** are comprehensively studied, which is a selling point of this paper.
- Spillover effects within treated villages are on richer households, as all eligible households in treated villages were treated.

What More Would Be Interesting?

- Their **slack** argument is based on Bassi et al. (2022), who conducted a survey in Uganda.
- It might be that the extremely positive spillover effects plateau out once a certain amount of slack is eliminated.
- Repeating a study like this is hardly feasible since one would need to acquire substantial funding.
- That said, similar research in a **more uncertain** economic setting would be interesting.
- Also, **longer-term** follow-ups could have yielded additional insights on *how* permanent the improvement is.
- The measurement of **within-HH inequality** could be improved.

References (1)

Bassi, V., Muoio, R., Porzio, T., Sen, R., & Tugume, E. (2022).Achieving Scale Collectively. *Econometrica*, *90*(6), 2937–2978. https://doi.org/https://doi.org/10.3982/ECTA18773

Egger, D., Haushofer, J., Miguel, E., Niehaus, P., & Walker, M. (2022).General Equilibrium Effects of Cash Transfers: Experimental Evidence From Kenya. *Econometrica*, *90*(6), 2603–2643. https://doi.org/https://doi.org/10.3982/ECTA17945

Appendix

Table 1

TABLE I

EXPENDITURES, SAVINGS AND INCOME.

	(1)	(2)	(3)	(4)
	Recipient Households		Non-Recipient Households	
	𝟙(Treat Village) Reduced Form	Total Effect IV	Total Effect IV	Control, Low-Saturation Mean (SD)
Panel A: Expenditure				
Household expenditure, annualized	293.59	338.57	334.77	2536.01
	(60.11)	(109.38)	(123.20)	(1933.51)
Non-durable expenditure, annualized	187.65	227.20	317.62	2470.69
	(58.59)	(99.63)	(119.76)	(1877.23)
Food expenditure, annualized	72.04	133.84	133.30	1578.05
	(36.96)	(63.99)	(58.56)	(1072.00)
Temptation goods expenditure, annualized	6.55	5.91	−0.68	37.07
	(5.79)	(8.82)	(6.50)	(123.54)
Durable expenditure, annualized	95.09	109.01	8.44	59.41
	(12.64)	(20.24)	(12.50)	(230.83)
Panel B: Assets				
Assets (non-land, non-house), net borrowing	178.78	183.38	133.06	1131.66
	(24.66)	(44.26)	(78.33)	(1419.70)
Housing value	376.92	477.29	80.65	2032.11
	(26.37)	(38.80)	(215.81)	(5028.27)
Land value	51.28	158.47	544.85	5030.03
	(186.22)	(260.91)	(459.57)	(6604.66)
Panel C: Household balance sheet				
Household income, annualized	79.43	135.70	224.96	1023.36
	(43.80)	(92.10)	(85.98)	(1634.02)
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)	(1231.12)

Table 2

TABLE II

INPUT PRICES AND QUANTITIES.

	(1)	(2)	(3)	(4)
	Recipient Households		Non-Recipient Households	
	1(Treat Village) Reduced Form	Total Effect IV	Total Effect IV	Control, Low-Saturation Mean (SD)
Panel A: Labor				
Hourly wage earned by employees	0.10	0.04	0.19	0.70
	(0.03)	(0.04)	(0.10)	(0.89)
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	3952.48
	(201.18)	(290.85)	(412.34)	(3147.29)
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)

Table 3

TABLE III

ENTERPRISE OUTCOMES.

	(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)
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)	(1223.07)
Enterprise costs, annualized	−13.32	89.35	73.08	117.22
	(28.63)	(38.51)	(46.77)	(263.46)
Enterprise wage bill, 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				
Number of enterprises	0.01	0.02	0.01	1.12
	(0.01)	(0.01)	(0.01)	(0.14)

Table 4

TABLE IV

OUTPUT PRICES.

		(1)	(2)	(3)	(4)
		Overall Effects		ATE by Market Access	
		ATE	Average Maximum Effect (AME)	Below Median	Above Median
All goods		0.0010	0.0042	0.0017	0.0007
		(0.0006)	(0.0031)	(0.0009)	(0.0007)
By tradability	More tradable	0.0014	0.0062	0.0023	0.0021
		(0.0015)	(0.0082)	(0.0023)	(0.0018)
	Less tradable	0.0009	0.0034	0.0015	0.0001
		(0.0006)	(0.0032)	(0.0011)	(0.0008)
By sector	Food items	0.0009	0.0036	0.0016	0.0002
		(0.0006)	(0.0033)	(0.0012)	(0.0008)
	Non-durables	0.0014	0.0061	0.0026	0.0019
		(0.0017)	(0.0089)	(0.0026)	(0.0019)
	Durables	0.0019	0.0070	−0.0009	0.0034
		(0.0011)	(0.0061)	(0.0011)	(0.0016)
	Livestock	−0.0008	−0.0027	−0.0008	−0.0017
		(0.0010)	(0.0052)	(0.0004)	(0.0020)
	Temptation goods	−0.0011	−0.0112	−0.0008	−0.0003
		(0.0026)	(0.0143)	(0.0036)	(0.0035)

Table 5

TABLE V

TRANSFER MULTIPLIER ESTIMATES.

	(1) $\mathbb{M}$ Estimate	(2) $H_0: \mathbb{M} < 0$ p-Value	(3) $H_0: \mathbb{M} < 1$ p-Value
Panel A: Expenditure multiplier	2.58	0.03	0.14
	(1.44)		
Household non-durable expenditure	1.20	0.18	
	(1.31)		
Household durable expenditure	0.84	0.00	
	(0.05)		
Enterprise investment	0.48	0.14	
	(0.43)		
Enterprise inventory	0.07	0.02	
	(0.03)		
Panel B: Income multiplier	2.47	0.07	0.20
	(1.71)		
Enterprise profits	1.68	0.10	
	(1.27)		
Household wage bill	0.69	0.26	
	(1.09)		
Enterprise capital income	0.06	0.36	
	(0.17)		
Enterprise taxes paid	0.04	0.09	
	(0.03)		
Panel C: Expenditure and income multipliers			
Average of both multipliers	2.52	0.03	0.14
	(1.39)		
Joint test of both multipliers		0.01	0.07

Transfer Multiplier