Altruism, Insurance, and Costly Solidarity Commitments

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Motivation

- VERY big picture: understanding human nature
- Inter-hh transfers in village economies as our lens.
- Dominant econ model: self-enforcing informal insurance among self-interested agents. (Coate and Ravallion, 1993; Townsend, 1994; etc.)
- More recently: social taxation, a self-interested norm, increases incentive to hide income. (Jakiela and Ozier, 2016; Squires, 2017)

- **Key Common, Testable Public Observability Assumption:** Inter-hh transfers increase with public income shocks but are invariant wrt private ones. If false, then need to adapt canonical self-interested model of inter-hh transfers.

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In This Paper

- Study patterns of inter-hh transfers in 4 Ghana villages
  - Experiment w/repeated public and private iid cash prizes
- First, test 2-part public observability hypothesis implied by models based on self-interested mechanisms alone:
  1. Reject null that publicly observable income shocks have no impact on interhh transfers?
  2. Fail to reject null that private (unobservable) income shocks have no impact on interhh transfers?

In This Paper

- Empirical evidence inconsistent w/public observability hypotheses that follow from dominant framework:
    1. No signif. response of (number, avg or total value of) interhh transfers to publicly observable income shocks
    2. Signif. positive impact of private shocks on (number, avg and total value of) interhh transfers

    Implication: purely self-interested model insufficient.

- Further:
    3. Only transfers from private income shocks get directed towards neediest hhs.
    4. Giving shuts down when network gets too large.
    5. Significant but incomplete risk pooling overall, but effectively complete in special cases.

In This Paper

- Second, since a purely self-interested model won't suffice, we update canonical model of dynamic self-enforcing insurance contracts to allow for:
  - (Impurely) altruistic preferences w/diminishing returns to giving and costly gift giving.
  - Social tax demands endog to income observability

- This model more realistically allows multi-functional social solidarity networks in which people:

  1. use networks to smooth consumption against shocks.
  2. face social pressures to surrender scarce resources.
  3. act on altruistic preferences.
  4. retain agency to renege on agreements and to resist social pressures

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Key implications of multi-functional network model:

- Avg gift size bigger after private than public shocks
- Private income used more progressively b/c social taxation of public income can crowd out altruistic motives
- Public income shocks only shared if hh network is small: "shutdown hypothesis"
- Limited risk pooling holds overall, but full risk pooling model holds in special case of median network size
- Shutdown has dynamic consequences on future receipts
- Policies that aim to make transfers transparent may unintentionally erode local moral codes

Empirical tests w/RCT data support these more refined hypotheses, w/standard model as a special case.

Empirical Setting (Data)

- Head and Spouse of 320 HHs surveyed bimonthly in 4 villages:

Feb '09 — Apr '09 — June '09 — Aug '09 — Oct '09 — Dec '09

- Baseline mapping of gift-giving networks
- Experimental Variation: idiosyncratic lottery winnings
    - Publicly revealed winners (20 per round)
    - Privately revealed winners (20 per round)
- Self-reported transfers and hh consumption

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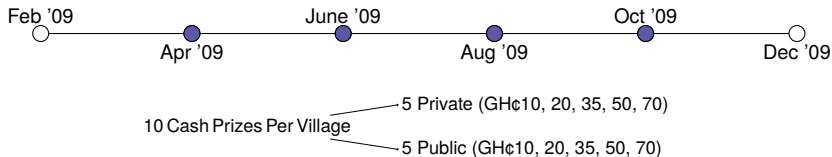
Public Lotteries

Private Lotteries

Lotteries

Private and Public

Feb '09   Apr '09   June '09   Aug '09   Oct '09   Dec '09

5 Private (GH¢10, 20, 35, 50, 70)

10 Cash Prizes Per Village

5 Public (GH¢10, 20, 35, 50, 70)

	N	Mean	Sd
Own Lottery Winnings (GH¢):			
Won in Private	1,251	0.06	0.24
Won in Public	1,251	0.06	0.25
Value of Private Cash Prize	1,251	2.35	10.52
Value of Public Cash Prize	1,251	2.29	10.45

Over year 23% hhs won a private cash prize, also 23% for a public cash prize. Only 4% won more than once.

Gift Giving

	N	Mean	Sd	5 p-tile	95 p-tile
Fixed Over Time:					
HH size	315	6.66	2.64	3	11
Cash Gifts Given (last 2 months, GH¢):					
Number	1,561	0.74	1.22	0	3
Value (Total)	1,561	9.77	62.73	0	35
Value (Conditional on Giving)	615	24.79	98.11	1	80

Gift-giving Behavior

estimation strategy

$$y_{itk} = \alpha + \beta_v \text{Private}_{it} + \beta_b \text{Public}_{it} + \text{hh}_i + r_{tk} + \epsilon_{it}$$

- Household i, Round t, Village k

- $Private_{it} = \begin{cases} 1 \text{ if won lottery} \\ 0 \text{ otherwise.} \end{cases}$

- $\mathbf{y_{itk}}$: Value (Total), Value (Average), N Gifts Given
    - Log transformation
    - Bounded below by zero $\Rightarrow$ Tobit estimator
    - robustness check with Poisson estimator on N

Giving Grows w/Private (not Public) Income

experimental results

		Gift Giving		
Dependent Variable:		Value (Total) (1)	Value (Average) (2)	Number (3)
Randomized Explanatory Variables				
Value of Private Cash Prize	β_v	0.149**	0.129**	0.166***
		(0.069)	(0.055)	(0.057)
Value of Public Cash Prize	β_b	0.00789	-0.0265	0.0639
		(0.071)	(0.057)	(0.058)
Household FE		Yes	Yes	Yes
Round × Village FE		Yes	Yes	Yes
P-value: $\beta_v = \beta_b$		0.15	0.05	0.21
P-value: $\beta_v <= \beta_b$		0.08	0.02	0.10
Left-censored Obs.		946	946	946
Observations		1,561	1,561	1,561

Note: $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. The dependent variable equals log total value of cash gifts given in household in column 1; log average value of cash gift given in column 2; number of gifts given in column 3. Value of Private/Public Cash prize is divided by 10 $\in \{0, 1, 2, 3.5, 5, 7\}$. Tobit estimator used in all columns with a lower bound of zero.

Intensity

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Intensity

Key Takeaways

1. Strongly reject 'no giving from private winnings' null
2. Cannot reject 'no giving from public winnings' null
3. Each result inconsistent with informal insurance or social taxation models based solely on self-interested behavior.

Need a more encompassing theory!

Enriched Model

modify foster and rosenzweig (REStat 2001)

- Standard 2 agent stochastic dynamic game - i.e., insurance contract with limited commitment.

- Gift requests increase in network size and observability of income - i.e., social taxation exists

- Impurely altruistic preferences over others' utility
  - Implies giving even with private income.
  - Warm glow decreases in number of gifts
  - Maintaining solidarity link requires costly effort.

- **NEW IMPLICATION: Shut-down hypothesis:** HHs w/ big networks do not give from observable income shocks.

- **NEW IMPLICATION: Progressive altruistic transfers:** Private income shocks spark altruistic transfers to least well-off households.

Model Setup

build on foster and rosenzweig (2001)

- **Environment**
    - 2 households: 1 and 2
    - Period t state-dependent income: $y_i(s_t)$, $i \in \{1, 2\}$
        - $s_t \in S$, the set of all states
        - h_t, history of state sequences
    - HH i consumption: $c_{it}(h_t)$

- **Preferences:**
    - Concave utility in consumption: $u_i(c_{it}(h_t))$
    - $0 \le \gamma < 1$: Altruistic preferences over other's utility
    - Maximize lifetime discounted ($\delta < 1$) utility surplus, U_i

- **Solution:**
    - Transfers from 1 to 2, $\tau(h_t)$
    - Dynamic Limited Commitment Nash Equilibrium

Model Setup

our modifications

- **Environment**
  - Gift network size: $g_i \in \mathbb{Z}^+$
  - Three types of income for each household:
    1. No shock to income
    2. Unobservable (private) increase in income
    3. Observable (public) increase in income

- **Preferences**
  - $\gamma(h_t, g_i)$: altruism concave function in network size
  - $\alpha(g_i)$: cost of maintaining gift ties

- **Assumptions:**
  1. More gift requests when income is observable
  2. Altruism decreasing in gifts given
  3. Costly network maintenance
  4. Must treat all gifts requests equally
  5. Reneging implies subsequent autarky

Formal Model   Predictions

Predictions

Prediction 1 (The Shut-down Hypothesis) *Large gift-giving networks shut down giving, esp. after public winnings.*

Prediction 2 (Private = Higher Average Transfer Value) $\tau_{zv} > \tau_{bz}$ *on average.*

Prediction 3 (Public = Higher Number of Gifts Given) *Prior to shutdown* $\sum_{j=1}^{N} \mathbb{1}(\tau_{ij}(zb) \neq 0) > \sum_{j=1}^{N} \mathbb{1}(\tau_{ij}(zv) \neq 0)$

Prediction 4 (Public = Larger Total Transfers) *Prior to shutdown* $\sum_{j=1}^{N} \mathbb{1}\tau_{ij}(zb) > \sum_{j=1}^{N} \mathbb{1}\tau_{ij}(zv)$

Prediction 5 (Consumption Increasing in Others' Winnings) *Specifically in private winnings:* $c_1(vz) > c_1(zz)$

Prediction 6 (Dynamic Social Cost of Shutting Down) *Gift receipts decreasing in past public winnings due to shutdown*
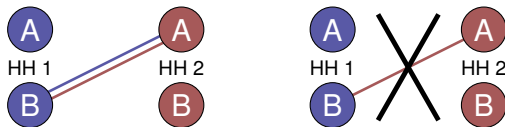
Network Data Presentation Backup

Reciprocal Gift Networks

Feb '09 —— Apr '09 —— June '09 —— Aug '09 —— Oct '09 —— Dec '09

- "Have you given gifts to XX (for all in sample)?" (receive)

A — A   A ✕ A
HH 1   HH 2   HH 1   HH 2
B   B   B   B

- **Reciprocal link:** both households indicate at least one reciprocal connection to someone in the other household.

    - 3,648 out of 27,303 possible links (13.4%)

Back

Household Summary Statistics

For the Enhanced Model

	N	Mean	Sd	Percentile 5th	Percentile 95th
Network Size:					
N of HH in Network	315	11.40	10.08	0	32
Food Consumption (last month, GH¢):					
PC Food	1,462	24.20	17.54	7.43	52.88
PC Purchased Food	1,462	18.14	16.59	3.75	45.20
Network Average Lottery Winnings (GH¢):					
Average Value of Private Network Prize	1,257	2.30	5.24	0	9.23
Average Value of Public Network Prize	1,257	2.08	3.93	0	8.75
Adjusted Average Value (Private)	1,257	0.20	1.20	0	0.63
Adjusted Average Value (Public)	1,257	0.20	1.10	0	0.74

Adjusted Network Winnings

$$\overline{\text{Private}}'_{it} = \sum_{j=1}^{N} \frac{\frac{\text{Private}_j}{\sum_{k=1}^{N} \mathbb{1}(g_{jk}==1)} \times \mathbb{1}(g_{ij}==1)}{\sum_{j=1}^{N} \mathbb{1}(g_{ij}==1)}$$

Model Predictions U Figure τ Figure

GIFT-GIVING BEHAVIOR WITH THE SHUT-DOWN EFFECT

$$y_{itk} = \alpha + \beta_v \text{Private}_{it} + \beta_b \text{Public}_{it} + \text{hh}_i + \text{r}_{tk} + \epsilon_{it}$$
$$+ \beta_{vg} \text{Private}_{it} \times \text{Network}_i + \beta_{bg} \text{Public}_{it} \times \text{Network}_i$$
$$+ \text{hh}_i + \text{r}_{tk} + \epsilon_{it}$$

y_{it}: N Gifts Given, Value (Total), Value (Average)

Network: Reciprocal Gift-Network Size

Predictions			
Shutdown	Value (Average)	N Gifts Given	Total Value
	$\beta_b < \beta_v$ ✓	$\beta_b ? \beta_v =$	$\beta_b ? \beta_v = (<)$
$\beta_b > 0, \quad \beta_{bg} < 0$		$\beta_b > \beta_v$	$\beta_b \geq \beta_v$

Model Predictions U Figure τ Figure

gift-giving behavior with the shut-down effect

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Gift-giving with Shut-down Hypothesis

interacting network size

		Gift Giving		
Dependent Variable:		Value (Total) (1)	Value (Average) (2)	Number (3)
Randomized Explanatory Variables With Network Size Interaction				
Value of Private Cash Prize	$\beta_v > 0$	0.296***	0.199**	0.226**
		(0.114)	(0.092)	(0.094)
Value of Private Cash Prize $\times$ N	$\beta_{vg} \leq 0$	-0.012*	-0.005	-0.005
		(0.007)	(0.006)	(0.006)
Value of Public Cash Prize	$\beta_b > 0$	0.264**	0.115	0.420***
		(0.111)	(0.088)	(0.091)
Value of Public Cash Prize $\times$ N	$\beta_{bg} < 0$	-0.029***	-0.016**	-0.041***
		(0.010)	(0.008)	(0.008)
Household FE		Yes	Yes	Yes
Round $\times$ Village FE		Yes	Yes	Yes
$H_0 : \beta_v = \beta_b$		0.84	0.50	0.13
$H_0 : \beta_v + \beta_{vg} \times 5 = \beta_b + \beta_{bg} \times 5$		0.32	0.15	0.88
$H_0 : \beta_v + \beta_{vg} \times 10 = \beta_b + \beta_{bg} \times 10$		0.05	0.02	0.05
$H_0 : \beta_v + \beta_{vg} \times 20 = \beta_b + \beta_{bg} \times 20$		0.02	0.02	0.00
N at Shut Down		9.15	7.27	10.25
Left-censored Obs.		946	946	946
Observations		1,561	1,561	1,561

Note: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Dependent Variable equals log total value of cash gifts given in household in column 1; log average value of cash gift given in column 2; number of gifts given in column 3. Value of Private/Public Cash prize is divided by 10 = $\in \{0, 1, 2, 3.5, 5, 7\}$. Tobit estimator used in all columns. Null hypotheses are tested using Wald tests of equivalence specified for network size (N) of 0, 5, 10 and 20. P-values reported under each column for each of the hypotheses. N denotes network size. N at Shutdown is equal to $-\frac{\beta_b}{\beta_{bg}}$.

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Non-parametric shut-down hypothesis

Total Value
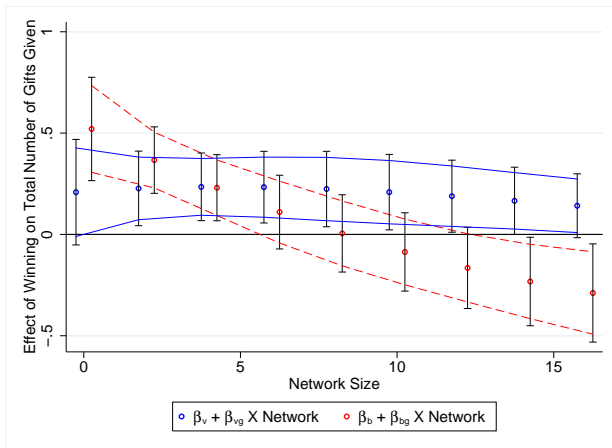
Note: Dependent variable equals number of gifts given. Includes 2nd and 3rd order polynomial interactions on network-size variable. Dots represent point estimates of $\beta_b + \beta_{bg} \times N + \beta_{bg^2} \times N^2 + \beta_{bg^3} \times N^3$ (repeat for private, β_v). Blue line represents 90% confidence interval for linear combination of private coefficients; dotted red line represents the 90% confidence interval for linear combination of public coefficients. Bars represent 95% confidence intervals. Plots of public coefficients offset by one for ease of viewing.

Shut-down Hypothesis in Dyadic Data

dyadic analysis Equation

Dependent Variable:		Amount (3)	Amount (4)
		Gift Giving Within Dyad: From *i* to *j*	
Network Size	γ_g	-0.036	-0.017
		(0.027)	(0.018)
Randomized Explanatory Variables With Interactions			
Value in Private	β_v	0.318	0.239
		(0.235)	(0.157)
Value in Private × N	β_{vg}	-0.005	-0.007
		(0.009)	(0.009)
Value in Public	β_b	0.177	0.341**
		(0.399)	(0.164)
Value in Public × N	β_{bg}	-0.034	-0.044***
		(0.025)	(0.016)
Round × Village FE		Yes	Yes
All Dyads Included		No	Yes
P-value: $\beta_v = \beta_b$		0.76	0.64
P-value: $\beta_{vF} = \beta_{bF}$			
Left-censored Obs.		16,190	107,944
Observations		16,270	108,082

Note: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Dependent Variable equals log total value of (cash) gifts given from household *i* to household *j* in columns 3 and 4 — estimated using Tobit with observations censored to the left by zero. Value in Private/Public $\in \{0, 1, 2, 3.5, 5, 7\}$. Analysis only includes dyads in reciprocal gift-giving network at baseline in column 3. All within-sample dyads represented in column 4. Standard errors clustered by dyad. N denotes network size.

Shut-down Hypothesis in Dyadic Data

dyadic analysis Equation

		Gift Giving Within Dyad: From *i* to *j*	
Dependent Variable:		Amount (3)	Amount (4)
Network Size	γ_g	-0.036 (0.027)	-0.017 (0.018)
Randomized Explanatory Variables With Interactions			
Value in Private	β_v	0.318 (0.235)	0.239 (0.157)
Value in Private × N	β_{vg}	-0.005 (0.009)	-0.007 (0.009)
Value in Public	β_b	0.177 (0.399)	0.341** (0.164)
Value in Public × N	β_{bg}	-0.034 (0.025)	-0.044*** (0.016)
Round × Village FE		Yes	Yes
All Dyads Included		No	Yes
P-value: $\beta_v = \beta_b$		0.76	0.64
P-value: $\beta_{vF} = \beta_{bF}$			
Left-censored Obs.		16,190	107,944
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Note: $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Dependent Variable equals log total value of (cash) gifts given from household *i* to household *j* in columns 3 and 4 — estimated using Tobit with observations censored to the left by zero. Value in Private/Public $\in \{0, 1, 2, 3.5, 5, 7\}$. Analysis only includes dyads in reciprocal gift-giving network at baseline in column 3. All within-sample dyads represented in column 4. Standard errors clustered by dyad. N denotes network size.

Transfers to Relatively Poor Households

dyadic analysis Equation

Dependent Variable:		Gift Giving Within Dyad: From i to j	
		Amount (1)	Number (2)
(Food$_{it}$ − Food$_{jt}$)	γ_F	0.073 (0.204)	0.029 (0.106)
Randomized Explanatory Variables With Interactions			
Value in Private	β_v	0.182 (0.153)	0.136* (0.078)
Value in Private × (Food$_{it}$ − Food$_{jt}$)	β_{vF}	0.305** (0.127)	0.117** (0.058)
Value in Public	β_b	-0.286 (0.265)	-0.234 (0.166)
Value in Public × (Food$_{it}$ − Food$_{jt}$)	β_{bF}	-0.098 (0.064)	-0.055 (0.042)
Round × Village FE		Yes	Yes
All Dyads Included		No	No
P-value: $\beta_v = \beta_b$		0.12	0.05
P-value: $\beta_{vF} = \beta_{bF}$		0.00	0.01
Left-censored Obs.		16,190	
Observations		16,270	16,270

Note: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. Dependent Variable equals log total value of (cash) gifts given from household i to household j in column 1 — estimated using Tobit with observations censored to the left by zero. Number of gifts in column 2, estimated using Poisson estimator. Value in Private/Public $\in \{0, 1, 2, 3.5, 5, 7\}$. Food$_{it}$ − Food$_{jt}$ is difference in log per capita food consumption.

Transfers to Relatively Poor Households

dyadic analysis Equation

Dependent Variable:		Gift Giving Within Dyad: From i to j	
		Amount (1)	Number (2)
$(\text{Food}_{it} - \text{Food}_{jt})$	γ_F	0.073 (0.204)	0.029 (0.106)
Randomized Explanatory Variables With Interactions			
Value in Private	β_v	0.182 (0.153)	0.136* (0.078)
Value in Private $\times$ $(\text{Food}_{it} - \text{Food}_{jt})$	β_{vF}	0.305** (0.127)	0.117** (0.058)
Value in Public	β_b	-0.286 (0.265)	-0.234 (0.166)
Value in Public $\times$ $(\text{Food}_{it} - \text{Food}_{jt})$	β_{bF}	-0.098 (0.064)	-0.055 (0.042)
Round $\times$ Village FE		Yes	Yes
All Dyads Included		No	No
P-value: $\beta_v = \beta_b$		0.12	0.05
P-value: $\beta_{vF} = \beta_{bF}$		0.00	0.01
Left-censored Obs.		16,190	
Observations		16,270	16,270

Note: $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Dependent Variable equals log total value of (cash) gifts given from household i to household j in column 1 — estimated using Tobit with observations censored to the left by zero. Number of gifts in column 2, estimated using Poisson estimator. Value in Private/Public $\in \{0, 1, 2, 3.5, 5, 7\}$. $\text{Food}_{it} - \text{Food}_{jt}$ is difference in log per capita food consumption.

PUBLIC INCOME CROWDS OUT ALTRUISM

QUANTILE REGRESSION OF FOOD CONSUMPTION ON NETWORK WINNINGS EQUATION

Blue dots (lines): β_{vn} – Private'   Red dots: β_{bn} – Public'
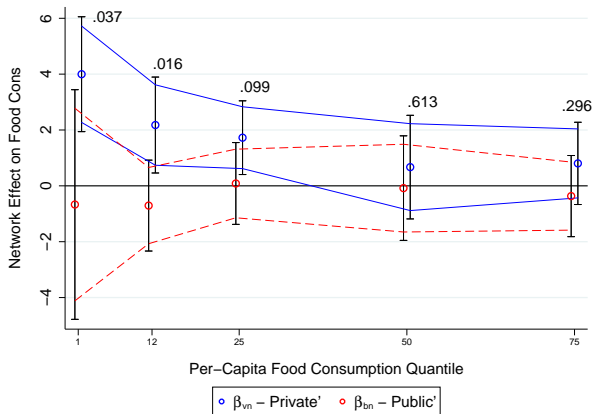
Note: Results of a simultaneous quantile regression at 1st, 12.5th, 25th, 50th, and 75th quantiles bootstrapped over 1,000 iterations. Dependent variable is log home-produced per capita food consumption over the last month. Quantiles represented on the x axis. Blue dots (lines) show the coefficient estimates (90% confidence interval) on adjusted private network winnings, $\overline{\text{Private}}_{it}$, at each quantile. Red represents public network winnings, $\overline{\text{Public}}_{it}$. Blue dots offset by one along x-axis for ease of viewing. The numbers above each point represent the quantile specific p-value of the Wald test $H_0 : \beta_{vn} = \beta_{bn}$.

Additional Results and Robustness Checks

Back

- **Selfish Network Formation**
- **Endogenous Networks**
- **Precautionary Savings/Investment in Others**
- **Endogenous Opt Out**
- **Coordinated giving**
- **Reject Full Insurance:** Reject full insurance null w/n solidarity network in favor of partial risk pooling. Townsend Test
- **Friends vs. Family:** Private winners give to friends, public winners give to family. Friends & Family Table
- **Punishing Defectors:** those who shut down do not subsequently receive gifts Reciprocity

Test of Full Risk Pooling

Townsend (1994)

Dependent Variable:	Δlog (PC Food)					
	G	F	G $\notin$ F	F $\notin$ G	G $\cap$ F	$\notin$ (G $\cup$ F)
	(1)	(2)	(3)	(4)	(5)	(6)
First Difference of Network Average Per Capita Food Consumption						
Δlog(Network PC Food)$_{it}$	0.306***	0.328***	0.102	0.034	0.257***	0.022
	(0.087)	(0.098)	(0.077)	(0.063)	(0.078)	(0.224)
Randomized Explanatory Variables						
Value of Private Cash Prize	-0.001	0.011	0.002	0.013	0.002	0.007
	(0.010)	(0.015)	(0.011)	(0.014)	(0.010)	(0.013)
Value of Public Cash Prize	0.006	0.007	0.014	0.004	0.008	0.004
	(0.012)	(0.011)	(0.013)	(0.011)	(0.013)	(0.011)
Private|Network$_{it}$	0.005	0.057	-0.012	0.025	0.014	-0.320**
	(0.027)	(0.043)	(0.030)	(0.021)	(0.023)	(0.156)
Public|Network$_{it}$	-0.006	-0.001	0.016	0.006	-0.038	-0.077
	(0.032)	(0.021)	(0.022)	(0.019)	(0.031)	(0.175)
Round FE	Yes	Yes	Yes	Yes	Yes	Yes
Network Definition						
Gift Network	Yes	—	Yes	No	Yes	No
Family Network	—	Yes	No	Yes	Yes	No
Left-censored Obs.	265	268	233	263	245	303
Observations	969	979	844	961	897	1,107

Back-Data Back-Additional

Family vs. Friends

Giving private lottery winnings to friends, not family

Dependent Variable:		Value of Gifts Given (Average)		
Gifts directed to:		All Family (1)	Direct Family (2)	Village Friends (3)
Randomized Explanatory Variable With Network Size Interaction				
Won Private Cash Prize	β_v	-0.298	-1.065	0.875**
		(0.726)	(0.828)	(0.431)
Won Public Cash Prize	β_b	1.912***	2.029***	1.287***
		(0.686)	(0.652)	(0.491)
Won Private Cash Prize $\times$ N	β_{vg}	0.0237	0.0442	-0.0157
		(0.044)	(0.046)	(0.029)
Won Public Cash Prize $\times$ N	β_{bg}	-0.120**	-0.101**	-0.118**
		(0.051)	(0.049)	(0.048)
Round $\times$ Village FE		Yes	Yes	Yes
N at Shutdown		16	20	11
Left-censored Obs.		1,173	1,307	1,340
Observations		1,561	1,561	1,561

Note: $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Dependent Variable equals log average value of (cash) gifts given in household. Column 1 consists of gifts to all family, column 2 to direct family members (i.e., siblings, grandparents, parents) who have their own households within the village, column 3 to village friends. Won in Private/Public $\in \{0, 1\}$. Tobit estimator used in all columns. N denotes network size.

Back

Shutdown Reciprocity

those likely to shutdown did not receive gifts

		Receiving Gifts		
Dependent Variable		Value (Total) (1)	Value (Average) (2)	Number (3)
Lagged Randomized Explanatory Variables With Network Size Interaction				
Won Private in Past?	β_v	0.160	0.121	0.020
		(0.274)	(0.224)	(0.222)
Won Private in Past? $\times$ N	β_{vg}	-0.011	-0.007	-0.010
		(0.019)	(0.016)	(0.016)
Won Public in Past?	β_b	0.576**	0.415*	0.543**
		(0.282)	(0.232)	(0.223)
Won Public in Past? $\times$ N	β_{bg}	-0.040*	-0.030*	-0.034**
		(0.021)	(0.017)	(0.016)
Round $\times$ Village FE		Yes	Yes	Yes
N at Shut Down		14.29	13.96	15.84
Left-censored Obs.		1,292	1,292	1,292
Observations		1,556	1,556	1,556

Note: $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$. Dependent Variable equals log total value of (cash) gifts received per adult in household in column 1; log average value of (cash) gifts received per adult in column 2; number of (cash) gifts received per adult in column 3. Won Private/Public in Past $\in \{0,1\}$ indicates whether household won lottery at any point in current or up to past 3 rounds. Tobit estimator used in all columns. N denotes network size.

Conclusion

Variables:	Predictions and Results			
	All	Value (Average)	N Gifts Given	Food
No Interaction		$\beta_b < \beta_v$ ✓	$\beta_b ? \beta_v =$	✓
Interaction	$\beta_b > 0$, $\beta_{bg} < 0$ ✓		$\beta_b > \beta_v$ ✓	

- Inter-hh transfers reflect multifunctional social networks. More than just self-interested informal insurance and social taxation; altruism matters.
- Voluntary redistribution towards the needy.
- Social taxation norms induce inefficient redistribution.
- Trade-off between network size and altruistic giving.
- **Policy implications:** Transfer transparency may crowd out altruistic motives that lead to efficient redistribution.

Thank you for your interest and time!

Please send feedback to :

- cbb2@cornell.edu
- vnourani@mit.edu

Gifts as Share of Per Capita Food Expenditure
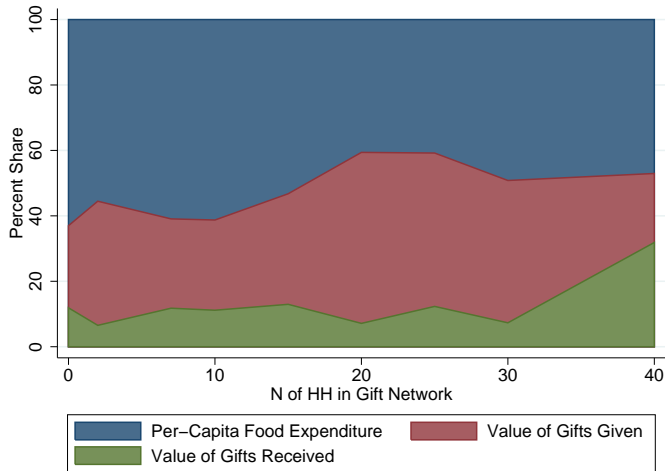
Unsolicited and Solicited Gifts in Our Data

Unsolicited Gift (N=2,480) — 9%, 90%
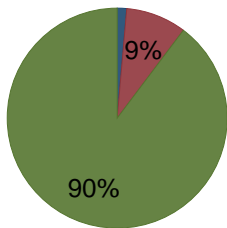
Solicited Gift (N=218) — 19%, 3%, 78%

Alcohol Clothing Food
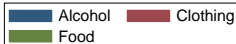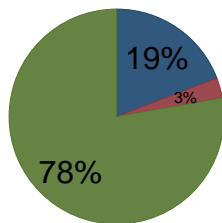
State Space
Five States - matching the empirical context

1. *zz* - Neither household wins a cash lottery
2. *zb* - Household 1 wins a **puBlicly** revealed prize.
3. *zv* - Household 1 wins a **priVately** revealed prize.
4. *bz* - Household 2 wins **puBlicly**
5. *vz* - Household 2 wins **priVately**

When income is observable, more gifts requested

$$p_1(zb) > p_1(s') \quad \text{for all } s' \neq \{zb\} \text{ and}$$
$$p_2(bz) > p_2(s'') \quad \text{for all } s'' \neq \{bz\}$$

Formal Model

- Single-period utility (HH 1):

$$u_1(y_1(s_t) - (h_t)) + \gamma(h_t, g_1)u_2(y_2(s_t) + \tau(h_t))$$

$$U_1^s(U_2^s) = \max_{\tau_s, (U_1^r, U_2^r)_{r=1}^S} \quad u_1(y_1(s) - \tau_s) - u_1(y_1(s))$$

$$+ \; \gamma_1(g_1(s))u_2(y_2(s) + \tau_s) - \gamma_1(g_1(s))u_2(y_2(s))$$

$$- \; \alpha_1(g_1) + \delta \sum \pi_{sr} U_1^r(U_2^r) \text{ subject to}$$

$$\begin{array}{rll}
\lambda: & \text{Promise keeping} & \\
\delta\pi_{sr}\mu_r: & U_1^r(U_2^r) \geq \underline{U}_1^r = 0 & \forall r \in S \\
\delta\pi_r\phi_r: & U_2^r \geq \underline{U}_2^r = 0 & \forall r \in S \\
\psi_1, \psi_2: & Non-negativity &
\end{array}$$

Contract Solution

- Solution: characterize contract using λ (Ligon and Worrall, 1988)

$$\frac{u'_1(y_1(s_t) - \tau(h_t)) + \gamma_1(g_1(h_t))u'_2(y_2(s_t) + \tau(h_t))}{u'_2(y_2(s_t) + \tau(h_t)) + \gamma_2(g_2(h_t))u'_1(y_1(s_t) - \tau(h_t))} = \lambda + \frac{\psi_2 - \psi_1}{u'_2(y_2(s_t) - \tau(h_t)}$$ (1)

$$\lambda(h_{t+1}) = \begin{cases} \underline{\lambda}_s \text{ if } \lambda(h_t) < \underline{\lambda}_s \\ \lambda(h_t) \text{ if } \underline{\lambda}_s \leq \lambda(h_t) \leq \overline{\lambda}_s \\ \overline{\lambda}_s \text{ if } \lambda(h_t) > \overline{\lambda}_s. \end{cases}$$

- Depends on nature of overlap of

$$\left[\underline{\lambda}(s), \quad \overline{\lambda}(s)\right] \text{ and } \left[\underline{\lambda}(r), \quad \overline{\lambda}(r)\right]$$
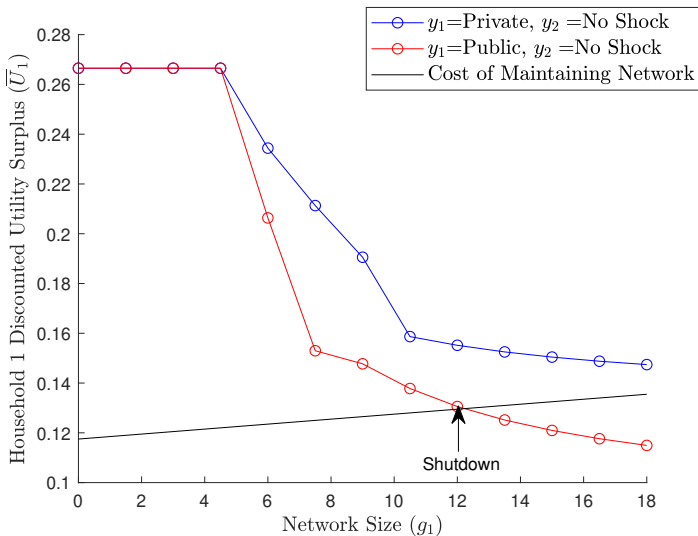
Contract Intuition

Ligon *et. al* (2002)
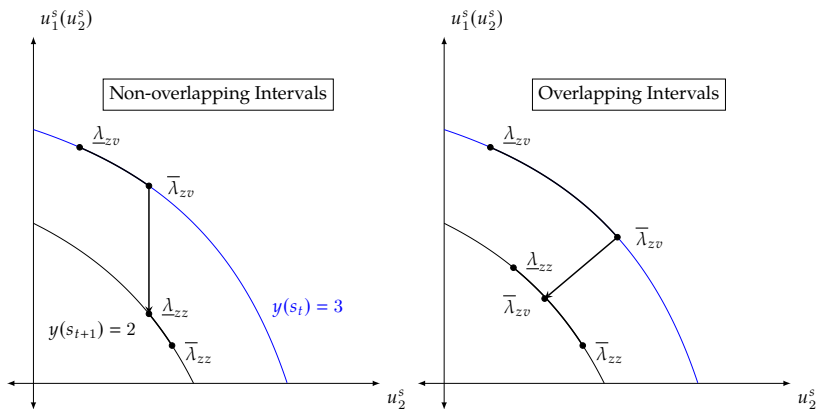
Contract Intervals
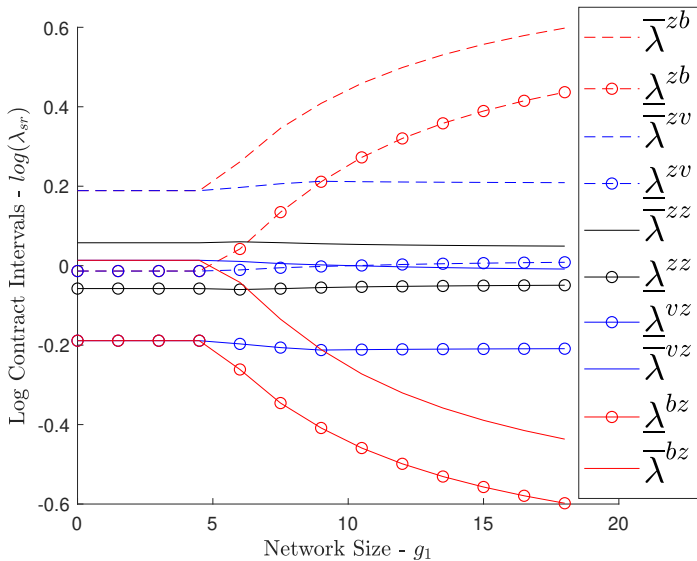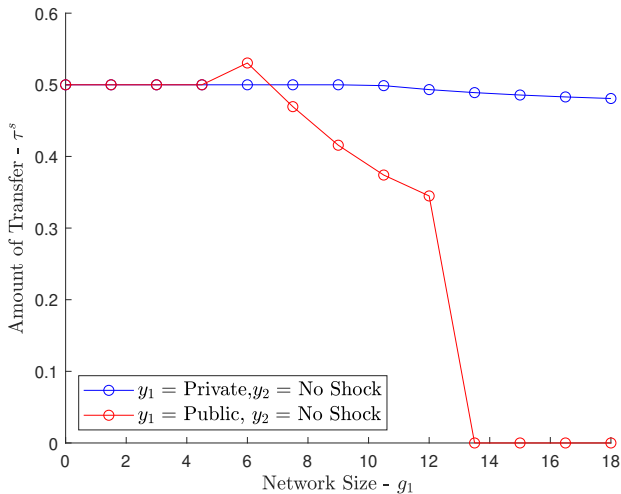
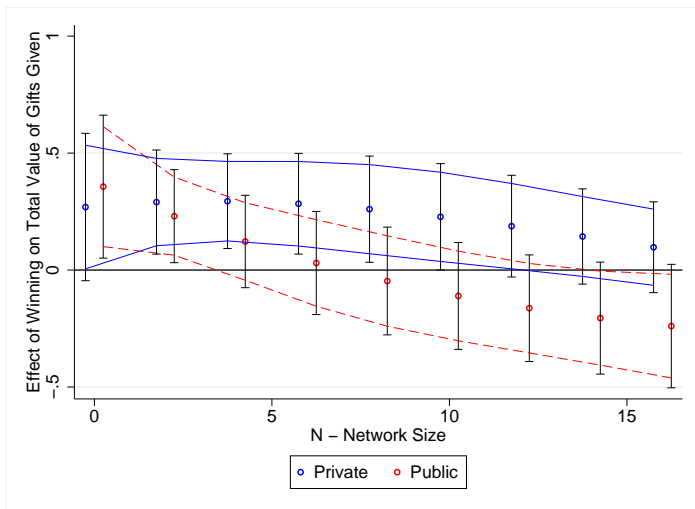# Prediction 1 - Shut-down Hypothesis

PREDICTION 2 AND 3

PRIVATE → LARGER AVERAGE GIFTS; PUBLIC → LARGER N GIFTS (BEFORE SHUTDOWN)

RESULTS N GIFTS GIVEN

NON-PARAMETRIC ANALYSIS OF SHUT-DOWN HYPOTHESIS

Estimation Strategy

own consumption as function of others' winnings

$$y_{it} = \alpha + \beta_v \text{Private}_{it} + \beta_b \text{Public}_{it}$$
$$+ \beta_{vn} \overline{\text{Private}}'_{it} + \beta_{bn} \overline{\text{Public}}'_{it}$$
$$+ \text{hh}_i + \text{r}_t + \epsilon_{it}$$

- $\overline{\text{Private}}'_{it}$ - Adjusted Network Average Value of Winnings
  - $\overline{\text{Private}}'_{it} = \sum_{j=1}^{N} \frac{\frac{\text{Private}_j}{\sum_{k=1}^{N} \mathbb{1}(g_{jk}==1)} \times \mathbb{1}(g_{ij}==1)}{\sum_{j=1}^{N} \mathbb{1}(g_{ij}==1)}$
- Prediction: $\beta_{vn} > \beta_{bn}$ in lower quantiles.

Back

Estimation Strategy

gift-giving within a dyad (i to j)

$$y_{ijtv} = \alpha + \beta_v \text{Private}_{it} + \beta_b \text{Public}_{it} + \text{village}_v + r_t + \epsilon_{ijt}$$
$$+ \beta_{v\chi} \text{Private}_{it} \times (Food_{it} - Food_{jt})$$
$$+ \beta_{b\chi} \text{Public}_{it} \times (Food_{it} - Food_{jt})$$
$$+ \gamma(Food_{it} - Food_{jt}) + \text{village}_v + r_t + \epsilon_{ijt}$$

- **y_{ijtv}** : Log Value$_{ij}$, N Gifts $_{ij}$ (from i to j)

Predictions
$\beta_v > \beta_b$
(Average Gift Value)
$\beta_{v\chi} > 0$
(Gift Amount)

Back

Estimation Strategy

gift-giving within a dyad (i to j)

$$y_{ijtv} = \alpha + \beta_v \text{Private}_{it} + \beta_b \text{Public}_{it} + \text{village}_v + r_t + \epsilon_{ij}$$
$$+ \beta_{v\chi} \text{Private}_{it} \times (Food_{it} - Food_{jt})$$
$$+ \beta_{b\chi} \text{Public}_{it} \times (Food_{it} - Food_{jt})$$
$$+ \gamma (Food_{it} - Food_{jt}) + \text{village}_v + r_t + \epsilon_{ijt}$$

- **y_{ijtv}** : Log Value$_{ij}$, N Gifts $_{ij}$ (from i to j)

Predictions
$\beta_v > \beta_b$
(Average Gift Value)
$\beta_{v\chi} > 0$
(Gift Amount)

Back