

# Income Hiding and Informal Redistribution

## A Lab-in-the-field Experiment in Senegal

*UNU-WIDER Conference  
Public Economics for Development*

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<sup>1</sup> This project benefited from the financial support of the CEPREMAP, the Labex OSE, the ANR

## Informal redistribution is prevalent in sub-Saharan Africa

- In developing countries, transfers within the extended family and beyond and gifts during ceremonies are frequent and may represent substantial amounts (Foster and Rosenzweig, 2001; Rao, 2001; Banerjee and Duflo, 2007; Lemay-Boucher et al., 2013)
- Motivations ? Interactions with public transfers if public safety nets were to be implemented ?
- From the anthropological and economic literature, transfers may have several motives:
  - *Informal insurance mechanisms* in context with limited access to financial markets (for a review, Cox and Fafchamps, 2008)
  - *Social status seeking* (about gifts during ceremonies, see Bloch, Rao and Desai, 2003)
  - *Strategic motives* (gifts to reduce risk of thefts, see Schechter, 2007)
  - *Pure altruism*
  - *Well-internalized redistributive norms*

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## Benefits and limitations of informal redistribution

- Benefits : empirically, informal transfers **permit risk-sharing** but **full-risk sharing is almost never achieved** (Coate and Ravallion 1993, Platteau 1997, Ligon et al. 2001, Attanasio and Rios-Rull 2000)
- Limitations of informal redistribution ?
- Theoretical : **risk of poverty traps** (Hoff, 1996) ; persistence of **inequality** and **patronage** (Fafchamps, 2011)

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## Distorsive effects on economic decision of informal redistribution

- Empirical

- (Various SSA countries) Negatives effects on **effort** (Hadness et al., 2013), on **savings** (Goldberg, 2011; Boltz, 2015), on **investment** (Grimm et al., 2011; Di Falco and Bulte, 2012; Jakiela and Ozier, 2015, Squires, 2015)
- (Cameroon) Unnecessary borrowing (Baland et al., 2011)
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## Research questions

1. *Are people ready to pay to reduce the observability of their income? And if yes, how much?*
  - 1.1 Estimation of the Willingness-To-Pay (WTP) to hide a share of a public lottery gain (& avoid potential redistribution)
2. *From whom are people hiding? Their household members, their kin outside the household, or their neighbors?*
  - 2.1 Exploit exogenous variations in the composition of the pool of lottery gain observers
3. *Does the opportunity to reduce income observability lead to allocate differently resources?*
  - 3.1 Compare lottery-gain allocation choices made during the week following the lottery between individuals who had the opportunity to hide a share of the lottery gain and those who had not
  - 3.2 Expected: expenses 'forced' due to redistribution should decrease at the benefit of expenses 'constrained'

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## Preview of the results

1. *Are people ready to pay to reduce the observability of their income? And if yes, how much?*
  - 2/3 of participants prefer income privacy, and are **ready to forgo 14%** of their private gains to receive a share of their gain in private.
2. *From whom are people hiding?*
  - Not from household members; from **kin outside the household** especially for women
3. *Does the opportunity to reduce income observability lead to allocate differently resources?*
  - On average, getting the opportunity to hide allows to:
    - decrease by 50% the share dedicated to transfers to kin outside the hh
    - reallocate this money in personal expenditures
  - Remains true for **people willing to hide**. For them, getting the opportunity to hide allows to:
    - decrease by 60% the share dedicated to transfers to kin outside the hh
    - decrease by 18% the share dedicated to transfers to kin in the hh
    - reallocate this money in personal and health related expenditures

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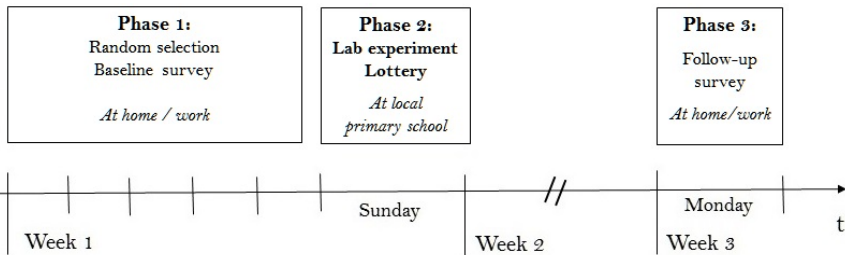
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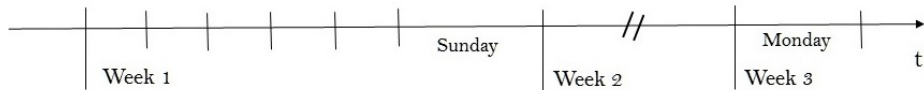
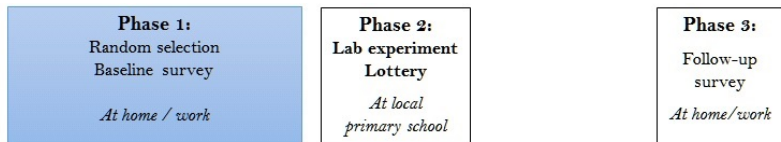
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- 5 Annexes

## Protocol: timeline of the experiment



# 1. Baseline survey



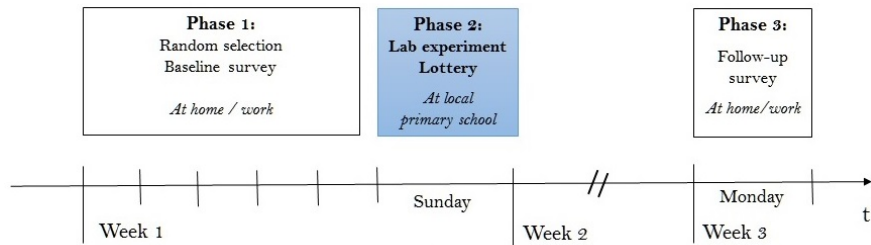


# 1. Baseline survey

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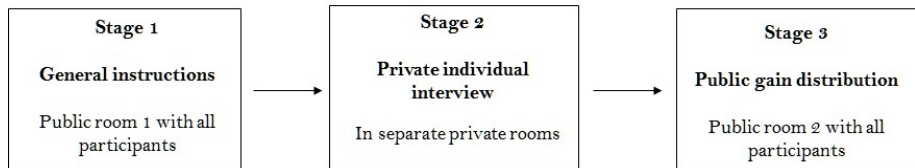
1. **Random selection of households**
2. **Within each household, random selection of one or two participants**
3. **Individual baseline questionnaire:** Socio-demographic characteristics, personal income and expenses, transfers habits etc.
4. **Same appointment for the lab given in adjacent blocks**

## 2. The lab phase



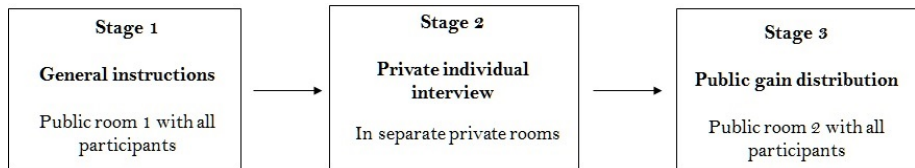
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- Players invited at a given hour follow **3 steps** :

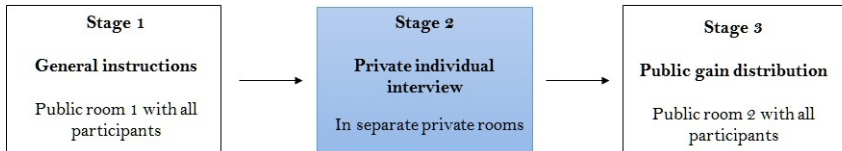


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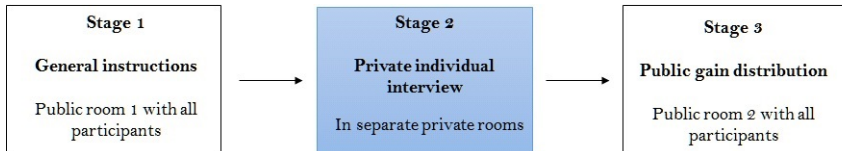


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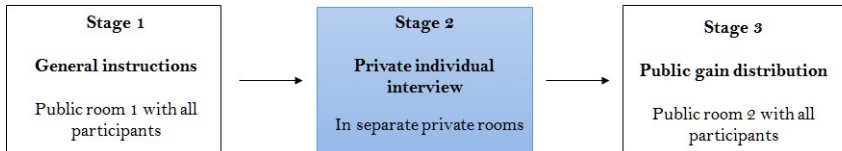
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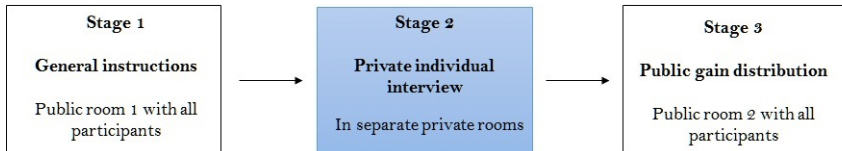
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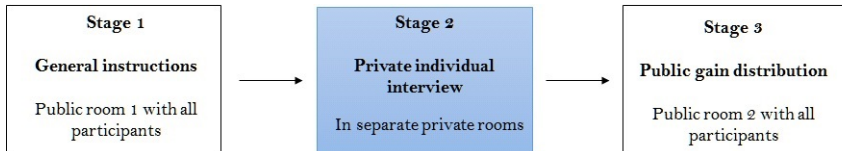
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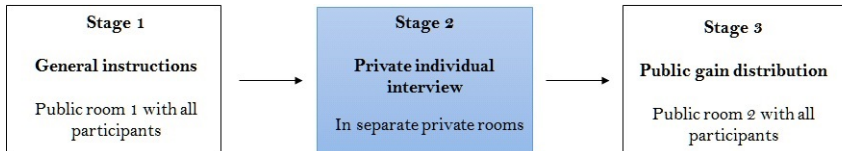


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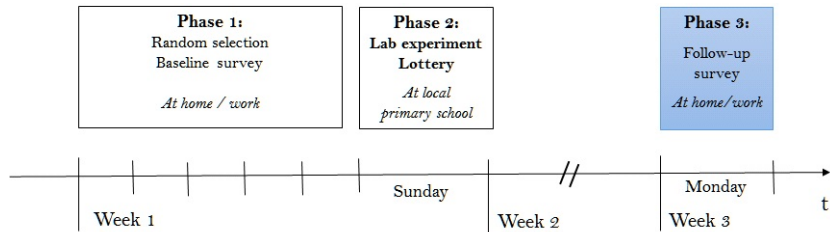
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### 3. The follow-up survey

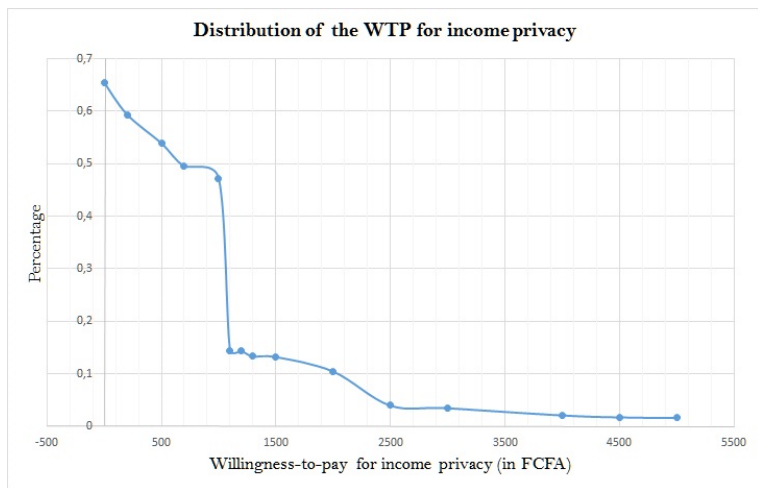


- 7 days after the lottery
- Questions on past week activities, transfers, income
- At the end of survey: open questions on how gains were used

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# 1/ How much people value escaping redistributive pressure?

→ Estimation of the WTP to hide income



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**Table:** Descriptive statistics of the WTP to hide income

	Whole sample			Sample with WTP $\geq 0$		
	All players	Women	Men	All players	Women	Men
N	788	534	254	512	345	167
Mean (in FCFA)	708	643	845	1089	994	1285
% of potential private gains	8.9	8.0	10.6	13.6	12.4	16.1
Median (in FCFA)	600	500	1000	1000	1000	1000
Std. Dev.	874	783	1026	871	774	1019

1000 FCFA = 1.52 EUR; median daily household food expenditure per capita = 420 FCFA.

## 2/ From whom are people hiding?

► Empirical model

**Table:** The effects of the exogenous group composition on the WTP to hide  
*Interval-censored estimation on the WTP to hide (in FCFA)<sup>†</sup>*

	All (1)	Women (1w)	Men (1m)
Male	192.4* (105.4)		
Selected in household pair	-17.9 (110.7)	-122.4 (120.5)	110.1 (211.0)
Any known non-kin in the session	-16.0 (150.2)	-94.3 (131.2)	89.5 (335.4)
Any kin in the session (excl. household pairs)	271.1** (134.8)	444.7*** (132.5)	-265.3 (301.0)
.....			
Mean of the WTP to hide (in FCFA)	732.4	651.2	902.7
Number of observations	771	524	247
Test Chi-2 p-value	0.00	0.00	0.00

<sup>†</sup> Dependant variable: maximum price  $p$  willing to pay to hide. It is observed in intervals for a price  $p \leq 1000$  FCFA:  $\{ ]-\infty; 0[; [0; 200[; [200; 500[; [500; 700[; [700; 1000[ \}$ . The exact price is observed for price above 1000 FCFA (specific question).

### 3/ Effect of income hiding: Identification strategy

$$Y_{ij} = a \text{PrivateCard}_i + X_i' b + \mu_c + \mu_s + u_i \quad (1)$$

$Y_{ij}$  : share of the lottery gains spent in expense  $j$  by player  $i$ .

$\text{PrivateCard}$  = 1 if  $i$  draws a card giving him or her the opportunity to hide, = 0 otherwise.

$X_i$ : set of individual and household level controls.

$\mu_c, \mu_s$  respectively community and sessions fixed effects

**Sample:** all lottery gains except 1000 FCFA gains (= 8300, 8800 or 9000 FCFA).

**Subsamples:** condition on being willing to pay to hide or not



## Hiding income allows people to transfer less to kin, and spend more personal expenses

<i>Dependant variables:</i> <i>Commodity shares</i>	Private	Health	Household	Transfers to			Investment	Other
	Goods	Care	Food	Household	Other kin	Non-kin	& Savings	Expenses
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A (N=651): Whole sample</i>								
Card with opportunity to hide	3.890* (2.122)	1.230 (1.341)	-1.256 (3.023)	-1.421 (2.761)	-2.249* (1.170)	0.217 (0.978)	-2.064 (2.900)	0.097 (0.859)
R <sup>2</sup>	0.10	0.05	0.13	0.09	0.07	0.06	0.09	0.07
Chi-2 (p-value)	0.00	0.44	0.00	0.00	0.06	0.09	0.00	0.05
<i>Panel B (N=431): WTP to hide<sup>†</sup> ≥ 0</i>								
Card with opportunity to hide	4.789* (2.726)	2.921* (1.575)	0.258 (3.596)	-5.539* (3.356)	-3.575** (1.553)	1.113 (1.279)	-2.961 (3.534)	0.830 (1.033)
R <sup>2</sup>	0.11	0.08	0.19	0.11	0.12	0.08	0.15	0.10
Chi-2 (p-value)	0.00	0.28	0.00	0.05	0.01	0.23	0.00	0.08
<i>Panel C (N=220): WTP to hide<sup>†</sup> &lt; 0</i>								
Card with opportunity to hide	3.056 (3.433)	-1.232 (2.600)	-5.919 (5.609)	7.248 (5.051)	-1.635 (1.732)	-1.632 (1.485)	0.243 (4.916)	-0.674 (1.553)
R <sup>2</sup>	0.18	0.09	0.17	0.22	0.14	0.18	0.17	0.15
Chi-2 (p-value)	0.02	0.94	0.09	0.00	0.41	0.04	0.13	0.12
<i>Panel E: Unconditional means</i>								
Public cards (N=164)	10.754	2.724	26.445	26.875	4.643	3.144	20.663	2.281
Public cards & WTP ≥ 0 (N=104)	10.989	1.784	24.047	29.811	5.876	2.556	21.125	1.835
Public cards & WTP < 0 (N=60)	10.347	4.352	30.601	21.786	2.504	4.164	19.861	3.053

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<i>Panel C (N=220): WTP to hide<sup>1</sup> &lt; 0</i>								
Card with opportunity to hide	3.056 (3.433)	-1.232 (2.600)	-5.919 (5.609)	7.248 (5.051)	-1.635 (1.732)	-1.632 (1.485)	0.243 (4.916)	-0.674 (1.553)
R <sup>2</sup>	0.18	0.09	0.17	0.22	0.14	0.18	0.17	0.15
Chi-2 (p-value)	0.02	0.94	0.09	0.00	0.41	0.04	0.13	0.12
<i>Panel E: Unconditional means</i>								
Public cards (N=164)	10.754	2.724	26.445	26.875	4.643	3.144	20.663	2.281
Public cards & WTP ≥ 0 (N=104)	10.989	1.784	24.047	29.811	5.876	2.556	21.125	1.835
Public cards & WTP < 0 (N=60)	10.347	4.352	30.601	21.786	2.504	4.164	19.861	3.053

**On average**, getting the opportunity to hide allows to:

- **decrease by 50% the share dedicated to transfers to kin outside the hh**
- **reallocate this money in personal expenditures**

**For individuals with a preference for privacy**, getting the opportunity to hide allows to:

- **decrease by 60% the share dedicated to transfers to kin outside the hh**
- **decrease by 18% the share dedicated to transfers to kin in the hh**
- **reallocate this money in personal and health related expenditures**

## Results are also robust to:

- **Income effect:** the results are not driven by the small differences in income level between some participants (max 700 FCFA).
- **Changes in specifications:** with or without controls, SUR estimation or other specifications,...
- **Fungibility issue :** no substitution effect between lottery gains and other income source for transfers.

- 1 Introduction
  - Motivation
  - Research questions
  - Preview of the results
- 2 Protocol
  - 1. The baseline survey
  - 2. The lab
  - 3. The follow-up
- 3 Results
  - 1/ How much people value escaping redistributive pressure?
  - 2/ From whom are people hiding?
  - 3/ Effect of redistributive pressure on allocation choices
- 4 Conclusion
- 5 Annexes

## Conclusion: What did we learn?

- Quantify a **direct** cost of pressure to redistribute : estimation of a cost of 14% of the gains for people willing to hide.
  - Quantify a **hidden** cost of pressure to redistribute : lower share of income dedicated to personal (and health) expenses
  - Giving individuals tools to gain control over their resource allocation choices does not lead them to eliminate transfers
- ⇒ Call for the design of adequate financial products, e.g. savings, offering more control over resources to individuals
- ⇒ Open question: costs for those who used to receiving transfers of not receiving the same amount

## Attrition between baseline and lab

[← Return](#)

<i>Samples</i>	Baseline		Lab		Attrited		Diff.
	N	Mean	N	Mean	N	Mean	P-values
Selected with another mbr of hh	922	0.64	816	0.65	106	0.55	0.03
Male	922	0.35	816	0.33	106	0.48	0.00
Age	932	37.07	826	37.44	106	34.15	0.01
Hh head	921	0.19	815	0.20	106	0.18	0.70
Spouse of hh head	921	0.24	815	0.25	106	0.20	0.25
Muslim	922	0.96	816	0.96	106	0.95	0.79
Wolof	922	0.46	816	0.46	106	0.48	0.66
Edu.: French/Arabic education	947	0.60	841	0.59	106	0.68	0.09
Married- Monogamous	922	0.48	816	0.48	106	0.49	0.86
Single	922	0.25	816	0.23	106	0.38	0.00
Has always lived in the community	922	0.35	816	0.35	106	0.32	0.51
Has a resp. in the community	922	0.09	816	0.09	106	0.06	0.23
Eldest in same parent sibship	922	0.25	816	0.25	106	0.23	0.54
Father alive	922	0.44	816	0.43	106	0.51	0.12
Informal sector	947	0.82	841	0.83	106	0.74	0.01
Contributes to hh's food exp.	924	0.41	821	0.42	103	0.37	0.34
N. hh members	930	11.49	825	11.73	105	9.60	0.00
Share of adult mbr in the hh	929	0.63	825	0.63	104	0.68	0.01
Hh daily food cons. p.c. (in log)	926	6.12	822	6.10	104	6.28	0.00
Expenses only funded by labor/capital	907	0.32	803	0.30	104	0.46	0.00
Expenses only funded by private transfers	907	0.21	803	0.21	104	0.25	0.34

## Balanceness checks across treatments

[← Return](#)

	All		Public cards		Private cards		Diff pvalues
	N	mean	N	mean	N	mean	
Household size	794	11.78	271	11.48	523	11.93	0.35
% adults in hh	794	0.63	271	0.63	523	0.63	0.98
Daily food cons. p.c.	791	513.82	269	501.80	522	520.02	0.62
HH head responsibility in community	783	0.09	267	0.09	516	0.09	0.69
HH pays rents for house	794	0.26	271	0.22	523	0.28	0.06
Male	795	0.32	272	0.34	523	0.31	0.39
Age	795	37.39	272	36.90	523	37.64	0.39
HH head	794	0.19	272	0.17	522	0.20	0.30
Spouse of hh head	794	0.25	272	0.25	522	0.25	0.93
No education	795	0.23	272	0.21	523	0.23	0.52
Only Koranic education	795	0.16	272	0.14	523	0.18	0.17
Only French/Arabic education	795	0.41	272	0.43	523	0.40	0.47
Both Koranic and French/Arabic edu.	795	0.20	272	0.22	523	0.19	0.29
Single	795	0.24	272	0.20	523	0.25	0.08
Always lived in this community	795	0.35	272	0.32	523	0.37	0.17
Responsibility in community	795	0.09	272	0.07	523	0.10	0.10
Nb. same-parent siblings	782	4.87	269	4.66	513	4.99	0.15
Intra-hh pair	795	0.66	272	0.63	523	0.67	0.25
Eldest in same-parent sibship	795	0.25	272	0.24	523	0.26	0.52
Father alive	795	0.43	272	0.43	523	0.43	0.96
Contributes to hh daily food expenses	790	0.41	270	0.39	520	0.43	0.24
Earned a revenue in last 7days	790	0.64	272	0.64	518	0.64	0.98
Private informal non-agr. sect.	790	0.86	271	0.87	519	0.86	0.71



## Q.2/ Estimating the determinants to the WTP to hide income

$$wtp_i = a + \gamma_1 R_i + \gamma_2 Z_i + \mu_c + \mu_s + \epsilon_i$$

With:

$wtp_i$  is the price at which the player switches from preferring unobservability (option B) to observability (option A)

$$wtp \in \{ ]-\infty; 0[; [0; 200[; [200; 500[; [500; 700[; [700; 1000[; [1000; +\infty[ \}$$

$R_i$  exogenous experimental variations: selected in household pair, having kin in the same session

$Z_i$  set of controls for demographic, socio-economic individual and household characteristics, position in the extended family and community.

$\mu_c, \mu_s$  resp. community and sessions fixed effects

Estimated with an interval-censored-data regression model.

[Return](#)

Q2./ Women: stronger position in extended family → higher WTP

Men: having more responsibilities or being poorer → lower WTP [← Return](#)

Maximum WTP to hide <sup>a</sup>	All (1)	Women (2a)	Men (3a)
<b>Experimental variations</b>			
Selected with another hh member	-17.9 (110.7)	-122.4 (120.5)	110.1 (211.0)
Any known non-kin in the session	-16.0 (150.2)	-94.3 (131.2)	80.5 (335.4)
Any kin in the session (excl. pairs)	271.1** (134.8)	444.7*** (132.5)	-265.3 (301.0)
<b>Individual demographics</b>			
Male	192.4* (105.4)		
Age	-1.9 (5.1)	-5.3 (5.9)	1.2 (12.0)
French/Arabic education	-66.9 (104.7)	-77.7 (129.0)	-18.4 (199.2)
Koranic schooling	-100.4 (103.3)	-137.7 (112.2)	11.1 (174.8)
Single	232.7** (116.3)	185.5 (145.6)	558.1** (252.9)
<b>Individual economic situation</b>			
Formal sector	-154.9* (92.2)	-167.6 (120.6)	-95.9 (253.2)
Average income in last 3 months (log)	12.3** (6.0)	15.2* (7.8)	11.1 (14.1)
Has some savings	102.8 (77.2)	54.0 (107.6)	263.2 (181.5)
<b>Individual position in the household</b>			
Household head	355.2** (170.9)	433.0* (224.6)	473.9** (232.9)
Spouse of household head	275.5* (145.4)	273.3* (150.2)	
Child of household head	40.6 (143.8)	-138.0 (172.9)	390.8* (217.1)
Contributes to household food expenses	35.2 (111.7)	-20.4 (116.3)	24.4 (243.9)
<b>Individual position in the community</b>			
Has always lived in this community	193.0 (135.0)	379.2*** (189.9)	-314.1 (247.1)
Has a responsibility in the community	-494.2*** (113.9)	-91.4 (164.6)	-1315.8*** (296.7)
<b>Household characteristics</b>			
Household size	14.4 (11.4)	19.5 (12.7)	17.3 (22.2)
Share of dependent household members (%)	-3.6 (3.0)	-7.9** (3.3)	8.4 (6.7)
Household daily food consumption p.c. (log)	21.18* (121.8)	94.5 (116.2)	405.8* (267.6)
House is rented	-111.4 (107.3)	-11.7 (131.6)	-450.6** (197.2)
Constant	-980.2 (791.8)	315.9 (787.5)	-3486.6* (2010.7)
Mean of the WTP to hide (in FCFA)	732.4	651.2	902.7
Number of observations	771	524	247
AIC	7512.7	4914.9	2592.5
Test Chi-2 (p-value)	0.00	0.00	0.00

# Identification assumption test [← Return](#)

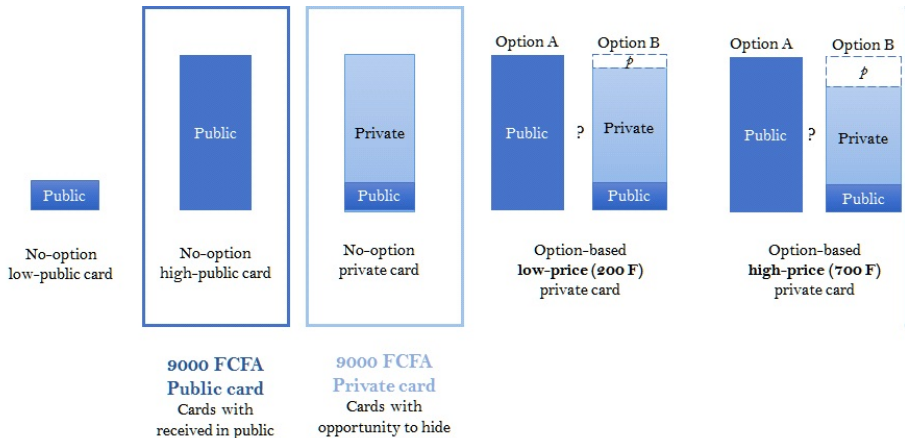
Table: Correlation between preferences and lottery outcome

	(1)	(2)	(3)	(4)	(5)
$WTP \geq 0$	0.042 (0.235)	0.044 (0.225)	0.044 (0.225)	0.043 (0.245)	0.043 (0.245)
N	795	795	795	795	795
AIC	1073.1	1120.3	1120.3	1156.5	1156.5
R2	0.0018	0.010	0.010	0.049	0.049
Community & Session-time f.e.		X		X	
Session f.e.			X		X
Interviewer f.e.				X	X

Dependant var: Dummy, drawing a private card versus a control public card. OLS estimates.  
p-values in (); <sup>+</sup>0.11, \* 0.1, \*\* 0.05, \*\*\* 0.01

## Income effect test:

Comparing outcomes outside the lab between public vs private **9000-FCFA** cards



## Fungibility between lottery gains and other income sources?

[← Back](#)

- **Lottery gains are not fungible in our setting if:**

An increase in the expenses in a given item using lottery gains is compensated by a decrease in the expenses in this item using other income sources.

→ If so, our previous results could hide general equilibrium effects that may cancel out our estimated impact.

- **To test for this fungibility issue:** we exploit information about:

- the total income perceived between lottery and re-survey
- the 5 largest transfers done and received during this time

- The test is as follows:

- *If lottery gains are fungible:* we should find similar results on transfer share for *total income*, as for lottery gains

Testing the fungibility of the gains relative to *total* income[← Back](#)

Commodity shares	Non-transfer consumption	Transfers	
		To kin	To non-kin
<b>Panel A (N=669): Whole sample</b>			
Card with opportunity to hide	3.870* (2.155)	-4.158** (1.934)	0.156 (0.988)
R <sup>2</sup>	0.07	0.08	0.04
Chi-2 (p-value)	0.00	0.00	0.33
<b>Panel B (N=439): WTP to hide<sup>†</sup> ≥ 0</b>			
Card with opportunity to hide	4.364* (2.574)	<b>-5.866***</b> (2.268)	1.736 (1.272)
R <sup>2</sup>	0.07	0.09	0.06
Chi-2 (p-value)	0.14	0.01	0.38
<b>Panel C (N=230): WTP to hide<sup>†</sup> &lt; 0</b>			
Card with opportunity to hide	3.610 (3.928)	-2.327 (3.568)	-2.113 (1.584)
R <sup>2</sup>	0.16	0.17	0.09
Chi-2 (p-value)	0.01	0.01	0.69
<b>Panel E: Unconditional means</b>			
Public cards (N=164)	78.576	18.279	3.399
Public cards & WTP >=0 (N=104)	78.76	18.655	2.585

S.e. in (). <sup>†</sup> p ≤ 0.12, \* p ≤ 0.1, \*\* p ≤ 0.05, \*\*\* p ≤ 0.01

Community fixed effects included in all panels.

## Lottery gain: rules

- **Characteristics of the lottery gain:**

- Always a public part – publicly declared to other players at the end of the session
- Potentially a private part at a cost  $p$  – given in the private room

Table: Cards in the ballot box and their associated pay-offs

	Type of cards	Options	Public gain	Private gain	Total
<i>Pref.-based cards</i>	$T_{p200, P}$	A	9000	0	9000
		B	1000	7800	8800
	$T_{p700, P}$	A	9000	0	9000
		B	1000	7300	8300
<i>Non-Pref. based cards</i>	$C_{1000, NP}$	-	1000	0	1000
	$C_{9000, NP}$	-	9000	0	9000
	$T_{p0, NP}$	-	1000	8000	9000

## Lottery gain: rules

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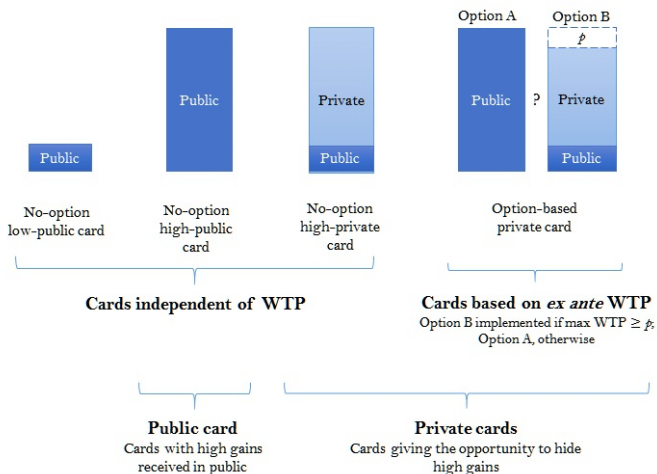
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	$C_{9000, NP}$	-	9000	0	9000
	$T_{p0, NP}$	-	1000	8000	9000



# Lottery gain: rules

[← Back](#)


## Elicitation of the WTP to hide

How much are you ready to pay to have your gains in private?

- Elicitation of WTP to hide for **all players**

	p	Option A		Option B		Total
		Public	Private	Public	Private	
Choice card 1	0	9,000	0	1,000	8,000	9,000
Choice card 2	200	9,000	0	1,000	7,800	8,800
Choice card 3	500	9,000	0	1,000	7,500	8,500
Choice card 4	700	9,000	0	1,000	7,300	8,300
Choice card 5	1,000	9,000	0	1,000	7,000	8,000

- A player choosing option A for  $p = 0$  has strong preference for *observability*
- A player choosing option B for  $p = 1000$  is asked what is her max price
- Choices are **definitive** : they will be implemented if the player draws a preference-based card

◀ Back

# Lottery and treatment distribution

Table: Cards in the ballot box and their associated pay-offs

	Type of cards		Options	Public gain	Private gain	Total	
<i>Pref.-based cards</i>	186 (23.3%)	$T_{p200, P}$	A	9000	0	9000	80 (43%)
			B	1000	7800	8800	106 (57%)
	184 (23.1%)	$T_{p700, P}$	A	9000	0	9000	93 (50.5%)
			B	1000	7300	8300	91 (49.5%)
<i>Non-Pref. based cards</i>	106 (13.3%)	$C_{1000, NP}$	-	1000	0	1000	
	166 (20.8%)	$C_{9000, NP}$	-	9000	0	9000	
	155 (19.5%)	$T_{p0, NP}$	-	1000	8000	9000	

- 66% of total got the opportunity to hide out
- 44% of total received an income in private

◀ Return

# Identification assumption test [Return](#)

Table: Correlation between preferences and lottery outcome

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Session f.e.			X		X
Interviewer f.e.				X	X

Dependant var: Dummy, drawing a private card versus a control public card. OLS estimates.  
p-values in (); <sup>+</sup>0.11, \* 0.1, \*\* 0.05, \*\*\* 0.01