

Is Informal Redistribution Costly? Evidence from a Lab-in-the-Field Experiment in Senegal

Marie Boltz, Karine Marazyan, and Paola Villar

Abstract

In Sub-Saharan Africa, individuals frequently transfer a substantial share of their resources to members of their social networks. Social pressure to redistribute, however, can induce disincentive effects on resource allocation decisions. This paper measures and characterizes the costs of redistributive pressure by estimating individuals' willingness to pay (WTP) to hide their income. The study estimates a social tax due to informal redistribution of 10 percent. Moreover, it shows that individuals are willing to escape from the redistributive pressure exerted mainly by extended family members.

JEL classification: C91, C93, D13, O12, O15, O17

Keywords: income observability, informal redistribution, extended families, willingness to pay, Lab-in-the-field experiment, Africa

1. Introduction

In Sub-Saharan Africa, individuals frequently transfer a substantial share of their resources to members of their social networks (Baland, Guirking, and Mali 2011; di Falco and Bulte 2011; Baland et al. 2016). These transfers can fulfill a risk-sharing role (Cox and Fafchamps 2007) and can also be driven by social motives such as altruism, charity, social prestige, and strong social obligations for redistribution (Platteau 2014). While transfers motivated by a risk-sharing purpose are potentially reciprocal in nature, transfers motivated by social obligations for redistribution are akin to a tax and may create some inefficiencies. Recent studies have found that social pressure to redistribute can induce direct disincentive effects on resource accumulation decisions, such as labor supply or investment (Grimm, Hartwig, and Lay 2013; Hadness, Vollan, and Kosfeld 2013; Squires 2018), and indirect distortions in resource allocation choices (Baland, Guirking, and Mali 2011; di Falco and Bulte 2011; Boltz 2015; Baland et al. 2016; Goldberg 2017).

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This paper measures and characterizes the costs of redistributive pressure by estimating individuals' willingness to pay (WTP) to hide their income. To this end, the study conducted a lab-in-the-field in May and June 2014 in seven different poor communities of the Dakar region in Senegal. In addition to providing a direct monetary measure of the inefficiency induced by the social pressure to share, this experiment answers three questions: (i) To what extent are individuals willing to hide their income? (ii) Who are the individuals who are willing to pay to hide their resources? (iii) From whom are they hiding?¹ Few papers have been able to properly identify the costs of redistributive pressure. Among those who have relied on lab-in-field experiments to assess the WTP to hide income, [Jakiela and Ozier \(2016\)](#) and [Beekman, Gatto, and Nillesen \(2015\)](#) are the closest papers to this article. This study's main contribution to this literature is to correlate, in a single framework, the WTP to three experimental variations in the pool of observers that have been shown to be relevant one by one: whether a kin member outside the household is present (see, for instance, [Jakiela and Ozier 2016](#)), whether a household member is present (see, for instance, [Castilla and Walker 2013](#)), and whether an acquaintance is present (see, for instance, [Goldberg 2017](#)).²

2. Experimental Design

The baseline sample consisted of 920 individuals, randomly selected within the surveyed communities. Moreover, in half of the households sampled, one participant was selected, while two participants were selected in the other half. The lab phase took place within a few days following the baseline interviews. It included four sessions covered on a single day per community. On average 30 individuals from the same or nearby dwelling blocks were invited to the same session.

To measure the cost of redistributive pressure, the study elicited the WTP to hide income for all participants in the lab phase, through a multiple-price list method. During a session, participants were invited to a private interview followed by a private lottery. In this lottery, participants chose cards at random from a box; the cards determined their income from the experiment and whether some of their income would be announced publicly to other attendees. Before the lottery took place, to reveal their preference for income unobservability, participants were asked to state their preferences between two options of payoffs for different cards: option A corresponds to receiving 9,000 CFA francs (FCFA) in public,³ that is, in front of the other session participants, while option B means receiving 1,000 FCFA in public and 8,000 FCFA minus some varying amount p in private. Here, p is the price of the income-hiding option and equals 0, 200, 500, 700, or 1,000 FCFA. Each choice, that is, for each value of p , was presented one after the other, in ascending order. The enumerator made clear to the participant that the choices made would be implemented after the lottery draw.⁴ The WTP for unobservable income can be directly recovered from these responses. The final experimental sample is of 788 participants, two-thirds of whom were women, 19 percent of household heads, and 41 percent of the sample contribute to the household food expenses.⁵

- 1 The lab-in-the-field was designed to also evaluate how redistributive pressure affects individuals' resource allocation decisions out of the lab. Results and more details relative to the design of the lab are available in [Boltz, Marazyan, and Villar \(2019\)](#).
- 2 See [Boltz and Villar \(2013\)](#) for qualitative evidence on how kin and neighbors may affect individuals' resource allocation decisions in Senegal.
- 3 527 FCFA is the average daily per capita food expenditure in the surveyed areas. The lottery payoffs, which vary between 1000 FCFA and 9000 FCFA represent 1.9 to 17 days of individual food consumption for the participants.
- 4 For subjects ready to pay up to 1,000 FCFA to get only 1,000 FCFA in public, the enumerator asked the maximum amount the player was ready to forgo.
- 5 Attrition between the baseline and the lab was 11.5 percent. The study controls for the variables driving attrition in the analysis—namely household size, level of daily food expenditure, share of working-age household members, marital status, whether the participant was selected with another member of the household, education level, and whether

Table 1. Measures of the Willingness-to-Pay (WTP) to Hide Income

	Whole sample			Sample with WTP ≥ 0		
	All players (1)	Women (2)	Men (3)	All players (4)	Women (5)	Men (6)
<i>Panel A: Whole sample</i>						
Number of observations	788	534	254	512	345	167
Mean (in FCFA)	523	508	554	805	786	843
Median (in FCFA)	600	500	1000	1000	1000	1000
Std. Dev.	476	476	477	350	362	320
<i>Panel B: < Median of household daily food expenditures per cap.</i>						
Number of observations	394	266	128	253	171	82
Mean (in FCFA)	508	495	535	791	769	836
Median (in FCFA)	500	500	1000	1000	1000	1000
Std. Dev.	478	475	484	363	374	336
Relative WTP [†]	1.73	1.69	1.81	2.70	2.63	2.83
<i>Panel C: \geq Median of household daily food expenditures per cap.</i>						
Number of observations	394	268	126	259	174	85
Mean (in FCFA)	538	521	573	818	802	850
Median (in FCFA)	700	500	1000	1000	1000	1000
Std. Dev.	474	475	472	336	349	306
Relative WTP ^a	0.87	0.87	0.87	1.33	1.34	1.29
<i>Test difference in mean WTP - Panels B vs. C (p-Val)</i>	0.38	0.40	0.77	0.37	0.52	0.52
<i>Test difference in relative WTP - Panels B vs. C (p-Val)</i>	0.00	0.00	0.00	0.00	0.00	0.00

Source: Authors' own calculations, based on original data collection.

Note: Taking a conservative approach, the WTP statistics are computed at the lower bound of the WTP interval. For example, if a participant is ready to pay 200 FCFA but not 500 FCFA, her maximum WTP is registered as being equal to 200 FCFA. For individuals with a negative WTP, the value is fixed at 0. The median daily household food expenditure per capita is 420 FCFA.

1000 FCFA \approx 1.5 EUR \approx 1.7 USD.

^aRelative WTP corresponds to the ratio of the WTP to hide income to the household daily food expenditures per capita. The difference of the average WTP between men and women is not significant at standard levels in the whole sample, but is significant at the 10 percent level in the sample with WTP ≥ 0 .

3. Results

What is the Willingness to Pay to Hide?

Table 1 provides some descriptive statistics of the WTP. More than two-thirds of subjects preferred to receive their gains in private rather than in public, and among them, they were ready to forgo on average 10 percent of their unobserved income (the mean WTP being equal to 805 FCFA for individuals with a positive WTP). This share is smaller for women (9.8 percent) than for men (10.5 percent).⁶

Going one step further, the study provides an additional measure of the redistributive pressure by reporting the relative WTP computed as the ratio of the WTP to the household daily food expenditure. This supplemental measure shows that individuals living in poorer households reveal levels of WTP that are twice as large as those living in richer households, in both men and women samples.

In sum, the study finds a social tax of 10 percent, more than twice as high as the one found by Jakiela and Ozier (2016) in the context of rural Kenya. Redistribution pressure seems to arise mainly from extended family members, especially for women, and not from within the household. In addition, it appears strongly regressive, poorer individuals facing a relatively higher redistributive burden.

the participant worked in the formal sector. In addition, 26 participants revealed inconsistent choices. The associated observations were removed from the final sample. The inclusion of these observations does not modify the analysis (results available upon request).

6 The difference is statistically different at 10%.

Who is Willing to Hide Her Income?

To estimate the determinants to the WTP to hide, the study runs an interval-censored-data regression model.⁷ Tables 2 and 3 present the results for all the covariates of the interval-censored data model respectively on the whole sample and on the subsamples below and above the median household food consumption.⁸ Coefficients represent the additional price people with the considered characteristics are willing to pay.

Looking at columns (1w) and (1m) in table 2, it appears clearly that men and women do not share the same determinants of their WTP to hide income. This is not so surprising, since in the context of West Africa, men and women have generally different social realms; hence the pressure to redistribute may vary across gender. Moreover, men and women do not have the same role as contributors to household expenses. Therefore, the study disentangles its analysis hereafter along the gender dimension.

For women, the characteristics correlated with a higher WTP to hide income are closely linked to the position they hold in their household and in their community. A woman who is a household head is willing to pay 755 FCFA more relative to other women. A woman who has always been living in the community is willing to pay almost 500 FCFA more. Similarly, the increase in the WTP to hide income for single women relative to married women is about 500 FCFA. These two last effects are actually driven by the sample of women from poorer households (table 3). On this sample, the study also observes that women's labor income is positively correlated with the WTP to hide. A possible interpretation is that those women, whether in the middle of the labor income distribution and/or single and/or community natives, are more likely to be taxed by others.

Determinants of the WTP to hide income for men fall into two broad dimensions: on the one hand, characteristics related to the economic position—a better economic position is correlated with a higher WTP—and on the other hand, having a good social position in the community correlates with a lower WTP. Regarding the social dimension, holding a responsible position in the community induces a WTP 2683 FCFA lower. Men choosing a responsible position within the community may have a higher internalized redistributive duty. Alternatively, they may fear less being observed because they may have access to alternative strategies allowing them to avoid taxation. Looking at proxies for economic status, it can be seen that being single, that is, being financially responsible for fewer people, encourages men to increase their WTP to hide income by 1089 FCFA. Proxies for household wealth are positively correlated with the WTP: the level of daily food expenditure (positively), or whether the household is renting a house (negatively).

From Whom are People Hiding?

To answer this question, the study relies on experimental variations of the composition of the pool of participants per session (first three rows of tables 2 and 3). For men, the study finds no significant effect from the experimental variations of the group composition of a lab session on the maximum price they were willing to pay. For women, each additional kin attending the same session (other than the player's potential paired household member) significantly increased the WTP to hide income by 955 FCFA. This effect holds whether women come from poorer or from richer households. Being randomly selected along with another household member appears to have an opposite effect on players' WTP, depending on whether they come from a relatively poorer or a richer household: it is positive for the former, negative for the latter.⁹

Therefore, redistributive pressure, from which individuals try to escape, appears to come more from people outside the household for women from richer households, and from both household members and from extended family members for individuals from poorer households.

7 An interval-censored-data regression is similar to an ordered probit, except that here the interval boundaries are known.

8 The sample of men being too small, the study does not split into subsamples below and above the median.

9 This finding holds for the subsample of female players, although the effects are not significant at standard levels.

Table 2. The Determinants of the Willingness-to-Pay (WTP) to Hide Income: Interval-Censored-Data Regression

	All (1)	Women (1w)	Men (1m)
Selected with another household member	-51.6 (198.4)	-133.6 (213.6)	-171.3 (449.4)
Any known nonkin in the session	165.3 (254.9)	-123.4 (277.8)	844.6 (567.6)
# Kin in the same session (excl. household pairs) ^a	379.6 (270.9)	955.5*** (288.6)	
Min # kin in the neighborhood	-120.0 (122.2)	-68.2 (118.0)	-280.2 (344.3)
Male	150.4 (219.2)	0.0 (.)	0.0 (.)
Age	3.8 (11.6)	-3.9 (11.3)	10.3 (27.9)
Wolof	162.7 (176.8)	46.1 (221.9)	373.5 (436.9)
Muslim	-157.9 (455.2)	-410.6 (467.3)	452.1 (900.8)
French/Arabic education	-130.3 (256.4)	-21.9 (298.6)	-452.7 (601.7)
Koranic schooling	-67.0 (231.9)	-107.5 (254.4)	28.8 (393.0)
Player can read	-8.9 (261.3)	-117.1 (330.8)	361.3 (661.0)
Single	558.0** (273.8)	520.9* (310.2)	1089.0* (623.7)
Formal sector	-185.7 (188.2)	-82.5 (313.1)	20.3 (525.4)
Monthly revenues (in log)	7.0 (13.2)	25.5+ (16.2)	-15.8 (34.3)
Has some savings	166.7 (172.9)	82.6 (221.9)	550.6 (426.6)
Household head	538.6 (385.3)	755.5* (433.7)	680.5 (581.6)
Spouse of household head	440.0 (295.5)	444.7 (296.7)	0.0 (.)
Son or daughter of household head	-16.7 (302.8)	-390.1 (386.3)	562.3 (475.0)
Contributes to household's food expenses	154.7 (247.6)	32.9 (268.8)	32.6 (552.1)
Has always lived in the community	246.4 (255.3)	498.2** (226.2)	-620.6 (605.8)
Has a responsibility in the community	-1024.4*** (239.6)	-262.9 (339.4)	-2683.2*** (596.8)
Household size	36.8 (24.9)	50.2+ (30.8)	35.2 (52.0)
Share of dependent household members	-4.7 (6.6)	-16.7** (8.2)	29.3* (16.1)
Household daily food consumption p.c. (log)	396.2* (210.5)	297.3 (257.9)	849.7* (480.0)
House is rented	-176.7 (285.6)	26.1 (290.0)	-999.4* (551.0)
Any kin members among players- part. exclu.			-146.5 (701.5)
Constant	-2340.9 (1585.6)	-784.2 (1748.2)	-7087.0** (3475.4)
N	771	524	247
AIC	1994.9	1396.3	601.9
chi2 pval	1.9e-14	1.1e-35	3.6e-17

Source: Authors' own calculations, based on original data.

Note: Standard errors are clustered at the session level in parentheses. Dependent variable: WTP to hide, observed in intervals: $p \leq 1000$ FCFA: $f[-\infty; 0]$; $[0; 200]$; $[200; 500]$; $[500; 700]$; $[700; 1000]$. In line with a conservative approach, those means are computed taking the lower bound of the interval, except for observations lying in $[-\infty; 0]$ for which the value of the WTP is set at 0. (Significant at 15, 10, 5 and 1% levels are denoted respectively by +, *, **, ***).

^aFor men, the variable is different; it takes 1 if at least one kin were present in the session (excluding household pairs) and 0 otherwise. Only seven men had more than one kin present, which does not make it possible to exploit variation in the number of kin present in the session.

Table 3. Willingness-to-Pay (WTP) to Hide Income: Heterogeneity by Wealth

	All		Women	
	Below (1)	Above (2)	Below (3)	Above (4)
Selected with another household member	599.7** (275.9)	-594.0* (309.7)	418.3+ (262.4)	-544.8+ (344.6)
Any known nonkin in the session	-42.4 (285.0)	291.0 (369.8)	0.4 (316.5)	-85.9 (377.1)
# Kin in the same session (excl. household pairs) ^a	350.0 (346.8)	551.1** (268.5)	889.5** (364.3)	860.1** (363.5)
Min # kin in the neighborhood	-146.0 (186.9)	-88.5 (233.3)	-156.7 (205.7)	49.6 (242.4)
Male	-553.7+ (343.4)	967.1*** (351.2)	0.0 (.)	0.0 (.)
Age	14.3 (13.9)	-7.9 (16.4)	0.7 (14.7)	-22.1 (15.7)
Wolof	431.4** (209.3)	12.7 (265.2)	637.0*** (211.7)	-699.7** (321.0)
Muslim	-271.6 (500.7)	-170.7 (813.1)	-223.4 (524.5)	-366.3 (990.9)
French/Arabic education	-77.3 (428.7)	-140.2 (398.0)	-286.8 (486.8)	254.8 (516.9)
Koranic schooling	106.1 (309.6)	-121.0 (324.2)	138.6 (277.5)	-83.9 (389.5)
Player can read	17.6 (415.8)	-157.8 (348.8)	194.8 (508.4)	-569.9 (453.3)
Single	1026.9*** (384.4)	123.8 (497.1)	788.9* (478.8)	-94.4 (563.8)
Formal sector	-422.4 (371.6)	-97.3 (373.2)	-671.6 (434.7)	443.8 (537.2)
Monthly revenues (in log)	19.8 (22.7)	-25.8 (25.7)	44.7* (25.5)	-14.6 (27.0)
Has some savings	42.2 (223.2)	375.3 (333.6)	182.1 (222.3)	314.3 (359.2)
Household head	825.6* (495.2)	564.5 (574.0)	1131.7+ (713.8)	1012.6* (585.5)
Spouse of household head	-63.2 (325.4)	1203.4** (525.5)	-48.5 (355.1)	1160.3** (541.1)
Son or daughter of household head	-190.2 (309.7)	315.3 (385.2)	-524.5 (396.4)	-7.1 (463.3)
Contributes to household's food expenses	418.2 (359.2)	-186.3 (432.7)	223.4 (352.2)	-89.7 (444.6)
Has always lived in the community	213.8 (259.8)	189.4 (351.3)	516.4* (286.4)	230.2 (433.8)
Has a responsible position in the community	-354.5 (378.1)	-1770.6*** (537.8)	504.6 (670.5)	-956.5* (494.7)
Household size	56.9** (28.1)	-23.7 (42.4)	46.1 (36.9)	42.3 (43.3)
Share of dependent household members	1.4 (9.1)	-11.8 (8.6)	-13.5 (11.4)	-29.3*** (11.1)
Household daily food consumption p.c. (log)	158.9 (576.0)	334.5 (323.5)	498.4 (649.2)	504.9 (622.3)
House is rented	16.2 (275.8)	-731.9* (420.1)	174.0 (289.4)	-251.5 (492.2)
Constant	-2315.4 (3549.4)	-162.3 (2496.6)	-3275.3 (4024.5)	-328.5 (4171.1)
N	408	363	274	250
AIC	1081.7	926.5	748.2	657.8
chi2 pval	0	1.9e-125	2.0e-33	1.8e-18

Source: Authors' own calculations, based on original data.

Note: Standard errors are clustered at the session level in parentheses. Dependent variable: WTP to hide, observed in intervals: $p \leq 1000$ FCFA: $f] - \infty; 0$; $[0; 200$]; $[200; 500$]; $[500; 700$]; $[700; 1000]$.

In line with a conservative approach, those means are computed taking the lower bound of the interval, except for observations lying in $]-\infty; 0$ for which we set the value of the WTP at 0. (Significant at 15, 10, 5 and 1% levels are denoted respectively by +, *, **, ***).

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4. Conclusion

The study estimates a social tax due to informal redistribution of 10 percent. Moreover, it shows that people are willing to escape from redistributive pressure exerted mainly by the extended family. More specifically, women are found to hide from nonhousehold family members and also from household members for the poorest ones.¹⁰

These results thus indicate that a well-designed savings scheme would allow two-thirds of the population to save around 10 percent of their earnings. Such programs can have a large leverage in terms of poverty reduction, as the population at stake is the poorest. Further research is necessary to capture the general equilibrium effects, including the long-term benefits of social redistribution in terms of risk-sharing, and the distortionary effects on resource allocation and income generating activities.

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10 Another dimension of the experiment not discussed here shows that women transfer a lower share of their gains to non-co-living kin when they had the opportunity to receive it in private while men decrease both expenses within the household and transfers to kin outside the household (see Boltz, Marazyan, and Villar 2019).