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Preference for Hidden Income and Redistribution to Kin and Neighbors A Lab-in-the-field Experiment in Senegal

Marie Boltz*, Karine Marazyan†, Paola Villar‡ §

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Abstract

Informal redistribution play a preponderant role in individual risk management in developing economies. However, strategies to reduce the pressure to redistribute are rather widespread and often costly, while under-explored in the economic literature. In this paper, we identify the potentially distortionary effects of informal redistribution on individual resource allocation choices, through exogenous variations on one hand of the share of unobservable income and on the other hand, of the pool of observers. For this, we conducted an original experiment combining both a lab-in-the-field and a randomized controlled trial in poor urban communities in Senegal on a randomly selected sample. A first contribution of the paper is to elicit in the lab the willingness-to-pay to hide one's lab lottery gains from kin and neighbors. Second, we estimate the impact of the non-observability of this windfall income on resource allocation decisions of participants out of the lab. We find a high willingness-to-pay for hiding: 65% of subjects prefer to receive their gains in private rather than in public and among them, they are ready to forgo on average 14.3% of their unobserved income for the privacy option. Also, we find that the determinants of the willingness-to-pay to hide income while correlated with redistributive pressure differ across gender. Moreover, while lottery public winners are found to spend 22% of their windfall income on transfers to kin, lottery private winners showing preferences for hidden income transfer 24% less and reallocate this extra money in health and private expenditures.

JEL Classification: D13, D14, D31, C91, C93, O12

Keywords: informal redistribution, income observability, intra-family resource allocations, lab experiment in the field, Sub-Saharan Africa.

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1 Introduction

In countries with limited or no access to formal financial markets and to public redistribution, individuals are structurally vulnerable to life risks and economic shocks. They rely heavily on social networks as channels for informal redistribution and risk-sharing. However, social norms for redistribution can induce transfers beyond risk-sharing motives and can make it difficult to circumvent or refuse transfer demands, even when it comes at a cost for individual needs (savings or investment). Anecdotal evidence shows that strategies to reduce the pressure to redistribute are widespread and often costly (Boltz and Villar, 2013; Platteau, 2014). This paper is aimed at identifying the potential distortive effects of social norms of redistribution on individual resource allocation choices. It relies on an original experiment combining both a lab-in-the-field and a randomized controlled trial conducted in poor urban communities in Senegal.

Informal risk-sharing arrangements are prevalent in contexts with scarce access to financial markets, low welfare-state provision and structural vulnerability of household incomes to shocks, like Sub-Saharan Africa, and as been well documented in the economic literature, (Coate and Ravallion, 1993; Dercon and Krishnan, 2000; Fafchamps, 1992; Kimball, 1988, e.g.). It translates into transfers of various types (monetary and non-monetary) between individuals of a common social network –mainly based on kinship, friendship, or geographic proximity. The extended family plays a preponderant role in this risk-sharing, which helps to protect against certain risks, in particular idiosyncratic ones, although full risk-sharing is almost never achieved¹. Informal transfers are not all motivated by risk-sharing. Customs, social prestige seeking, pure altruism or well-internalized norms are other motivations for inter-personal transfers (Wright, 1994). The potential inefficiencies in behavioral responses to this redistributive pressure, akin to an informal tax, differ from standard strategic moral hazard reactions to formal taxation, specifically because these transfers respond to alternative motives than pure impersonal risk-sharing. Some authors have suggested that informal redistribution within social networks, motivated by risk-sharing, witchcraft or social norms, can have a strong distortive effect on resource allocation (Baland et al., 2011; Platteau, 2000, 2006, e.g.). Rigorous causal evaluations of such an assessment are however scarce given the difficulty to properly identify social networks and their underlying redistributive pressure.

The objective of this paper is to better understand the hidden costs of informal redistribution and who bears them. We focus on a specific strategy of circumvention of redistributive norms, which consists in keeping revenues as unobservable as possible. In our country of study, Senegal, pressure for redistribution within the extended family is strong and well-internalized while sharing norms among neighbors relies on enforcement through social image stigma (Boltz and Villar, 2013). One may wonder whether these questions are specific to the Senegalese context. Platteau (2014) provides numerous references from the sociological and anthropological literature describing the prevalence of redistributive norms and coping strategies – the strategy we

¹For a review, see: Cox and Fafchamps (2007).

analyze being one of the most widespread – in the whole African continent and more largely in all lineage-based societies. This suggests that the focus of this paper on informal sharing rules in Senegal has implications for other countries as well and is not specific to this society or to Muslim countries. Moreover, studies in other African countries such as in Ghana ([Castilla and Walker, 2013](#)), in Kenya ([Jakiela and Ozier, 2012](#)) or in Burkina Faso ([Hadness et al., 2013](#)) but also on other continents, such as in the Philippines ([Ashraf, 2009](#)) show that there is a propensity to hide resources even within the household.

Our original experiment took place in May and June 2014² in 7 poor urban areas of Pikine, a densely populated urban department of the region of Dakar, for a randomly selected sample of 947 individuals. It combines both a lab-in-the-field and a randomized controlled trial. The experiment started by a baseline survey carried out in each community on a randomly selected sample of individuals who were all invited to participate to the lab a few days later. The lab-in-the-field part of our experiment was twofold: first we elicited the willingness-to-pay to hide income for each participant, and second, we proceeded to organize a public lottery where some participants could have the option to keep part of their lottery gains unobserved from other participants. For the randomized controlled trial we identified the effects of private income on out-of-the-lab resource allocation choices, by re-surveying all subjects one week after the lottery. Another interesting feature of our experiment is that we further randomized within each household the number of participants (one or two), allowing us to disentangle the effects of redistributive pressure coming from household members or from neighbors.

We find a high willingness-to-pay for hiding: 65% of subjects prefer to receive their gains in private rather than in public and they are ready to forego on average 14.3% of their unobserved income for privacy. Also, we find that the determinants of the willingness-to-pay to hide income are correlated with redistributive pressure but differ across gender. Among subjects with preferences for privacy, lottery private winners are found to spend more on health and private expenditures and to transfer 22% less to kin than lottery public winners. Moreover, we find that among subjects with public gains, those who participated in pairs are transferring 59% more to kin than those selected alone. The effect of hidden income on pairs is not significantly different from the effect on unpaired subjects for transfers to kin, while strongly negative for transfers to non-kin.

Only a few papers in the literature have attempted to identify the distortive role of social norms for redistribution of resource allocation in and out of the household in a controlled lab experiment in the field framework. [Jakiela and Ozier \(2012\)](#), using wind-fall income, explored how observability among participants from the same community in rural Kenya affects investment choice within the lab and show that women with kin participating in the experiment were willing to hide more. However, the experiment suffers from self-selection of the pool of participants in the lab and does not look at how income observability affects non-investment allocation choice

²The data have been ready to be exploited only since very recently: the analysis of the data is therefore still preliminary.

out of the lab. [Goldberg \(2010\)](#) conducted two lotteries among agriculture clubs in Malawi, one private and one public. The objective of the paper is to identify to what extent preference for present can be related to the observability of income by peers. She measures differences in expected use of the windfall income between the two lottery-winner types and finds that public lottery winners spend 35% more than private winners directly after the lottery. She also re-surveyed her sample a few months later to estimate the variations between expected and actual use of the windfall income but faced a very high attrition rate. Finally, [Castilla and Walker \(2012, 2013\)](#) look more specifically at how income unobservability may distort income pooling within the household between spouses. They carried out in Ghana a field experiment where spouses in rural villages were randomly allocated windfalls either in cash or in kind, with half of the prizes awarded in public and the other half in private. They show that spouses behave non-cooperatively and that the effect of prize-winning on out-of-the-lab expenditures varies depending on the publicity of the prize and the gender of the recipient.

Inspired by the pioneer experiments mentioned above, our paper contributes to this literature in at least five dimensions. First, we directly elicit preferences for hiding income for all participants, and not only for subjects in a specific treatment group. This enables us to identify the effect of winning a private prize versus a public and to test if this effect is heterogeneous in *ex ante* preferences for privacy. Second, we do not impose any transfer or investment decision in the lab setting because this would be too abstract or distorted from real life and narrow in terms of the variety of allocation choices available in the lab. We observe our resource allocation decisions out of the lab one week later, for all participants with an attrition below 3%. Third, thanks to the random *ex ante* selection of participants at baseline, we have an exogenous composition of the pool of participants in a same lab session. As opposed to most lab experiments in the field based on voluntary participation, we are able to control for the relatively low attrition between the selection and the lab phase, thanks to the baseline survey. Hence, the composition effect of the pool of observers of lottery outcomes, such as the number of direct kin or neighbors, is exogenous in our set-up. Fifth, and last important contribution, we are able to link the literature on intra-household non cooperative behavior, e.g. [Castilla and Walker \(2012\)](#), with the literature that looks at the role of redistribution beyond the household, within social networks. In our setting, we exogenously selected either one or two participants per household in the baseline. This enables us to identify to what extent the overall results are affected by redistribution that takes place between household members or between neighbors.

Finally, it is worth stressing that this paper contributes to a better understanding of the linkages between social networks and investment and saving decisions in contexts of limited or no access to formal financial markets and thus brings to light on the possible causes of poverty traps in Sub-Saharan Africa. This is crucial for adequately targeting public policies for social protection and financial inclusion, as well as for designing relevant financial products in this context.

The remainder of the paper is organized as follows: Section 2 presents the experimental setting and Section 3 describes the experiment sample. In Section 4, the empirical strategies for the

estimation of the willingness-to-pay for income unobservability and for the identification of the impact of income hiding on resource allocation are presented. Results are discussed in Section 5. Section 6 analyzes two mechanisms that may be at play: redistributive pressure coming from the household or coming from neighbors. Section 7 concludes.

2 Experimental Design

2.1 General setting

We designed this experiment so as to answer two main questions and therefore a two-step experiment. In a lab-in-the-field setting we start by eliciting the marginal propensity to pay to keep one's windfall income hidden from other members of the community and then we proceed to a lottery. Second, to estimate the impact of the unobservability of lottery income on the choices of resource allocation, we followed up with the subjects out of the lab, one week later with an additional questionnaire.

The experiment was conducted from the end May till mid-June 2014, in 7 different poor communities in the department of Pikine, in the region of Dakar, Senegal³. The areas covered were urban, sometimes very densely populated. For each community, the experiment was conducted over two weeks. The first week we proceeded to the sample selection and the administration of both the household and individual baseline questionnaires from Tuesday to Friday and the lab phase was organized on Sunday. One week later, the enumerators went back to administer a questionnaire to subjects.

2.2 *Pre-lab* stage

The baseline sample was made up of 947 individuals surveyed in the 7 communities. The individuals were randomly selected based on a random walk sampling method that was followed by the enumerators⁴. A household was selected if at least two members satisfied the eligibility criterion : aged between 18 and 60 years old and to have earned some income in their life⁵. Once this criterion was verified, the enumerator could start the household survey and proceed to the random selection of the player among the pool of eligible household members. Importantly, so as to ensure no possible *ex ante* manipulation in the selection of participants, the enumerator would not mention any lottery gain and would not proceed to the random draw of the players before having established the complete roster of household members.

³The survey lasted approximately three weeks. We selected the communities enough apart so as to prevent any learning or overlap in subject populations.

⁴Each enumerator was assigned one or two blocks of dwellings and a starting point; he/she had to follow a strict rule: only every other habitation was pre-selected. If this dwelling had only one floor, and if more than one household was living there, the household living at the right after the entrance was pre-selected. In case of a dwelling with several floors, first the floor was randomly selected and then, the same rule of the right-hand side household was followed.

⁵If this selection criterion was not satisfied, the enumerator left the dwelling and started again the random walk procedure.

We introduced an additional layer of heterogeneity in our study by varying randomly the number of individuals selected per household: in one selected household out of two, only one player was selected while two players were selected out of the next household ⁶. This enables us to capture the intra-household dimension in the pressure for redistribution.

The household survey includes information on the household composition and on household expenditures. The individual questionnaire administered to each player provides us with data on socio-economic and demographic characteristics, social capital held in one’s kinship and community network, and on personal assets and expenditures. At this stage, players were invited at a given hour on the following Sunday to pursue the survey; they were only informed that this would involve a few additional questions and a small lottery where everyone would win something, to buy “something to drink” as a compensation for the time spent with us.

2.3 Lab experimental design

The lab phase took place on the Sunday following the baseline interviews in a primary school within the community so as to minimize travel cost⁷. In each community, there were four sessions at 9am, 11am, 1pm and 3pm. Players surveyed by the same enumerators, and therefore, from the same or nearby blocks were assigned to the same sessions. On average thirty players were invited to the same session. Importantly, the players were not aware of the lottery amounts at stake before the lottery day. Each session is split into three steps. First, all players from the same session are gathered in the same large room where everyone can observe who else is invited to participate. At this stage, they learn that they can gain at least 1000 FCFA and up to 9000 FCFA if they agree to pursue the interview with us. 9000F is a considerable gain: in this sample, 527 FCFA is the average per capita food expenditure for one day and the mean size of households is 11 members ⁸. Second, each subject, who agrees to stay, is then invited one by one for a private interview in one of the eight separate small rooms, based on the order of arrival at the lab session. People are asked to make choices in order to establish their preference for income unobservability and then participate in a lottery ⁹. Third, after all private interviews have taken place, all subjects of the session are gathered again in a large room where all public pay-offs are declared and distributed in front of all participants of the session.

The first part of the private interview is devoted to questions on identifying who she knows among the participants at the session and what relationships she shares with those people. Then, the enumerator explains the rules of the lottery game, reading first the “consent” (see Appendix), in French or in Wolof, the dominant local language¹⁰. Subjects are shown all the

⁶As indicated above, to be eligible, a household had to include at least two eligible members so that one-player households and two players households were comparable

⁷Subjects had to walk between 5 to 10 minutes to get to the school.

⁸The average per capita food expenditure for one day in the departement of Pikine is of 465 FCFA and the average household size is 13 according to PSF, a nationally representative survey of Senegal collected in 2006. Thus we selected slightly richer households or communities than the average ones

⁹if she refused to continue to participate, they player was told that she would receive 500 FCFA publicly at the end of the session

¹⁰Subjects who were neither French nor Wolof speakers, were given a translated version of the consent in their

potential cards they may draw from the ballot box. The enumerators place particular emphasis on the difference between two types of cards: preference-based ones and non-preference-based ones. The latter are respectively: receiving 1000 FCFA in public and nothing in private, receiving 9000 FCFA in public and nothing in private, and, finally, receiving 1000 FCFA in public and 8000 FCFA in private. Preference-based cards are detailed below. Additionally, the participant is told that if she draws a preference-based card, the outcome of the lottery is going to be conditional on her preferences, namely the choices she is about to make.

Elicitation of preferences for income unobservability

To elicit preferences for income unobservability, each subject is asked to make a series of choices illustrated by the preference-based cards. On each card, two options are presented: option A corresponds to receiving 9000 FCFA in public, i.e. in the presence of the other participants of the session, while option B means receiving 1000 FCFA in public and 8000 FCFA minus some varying amount p , where p (price of the income hiding option) takes, in turn the value of 0, 200, 500, 700 and 1000 FCFA; in total the pay-offs for option B amount to 9000 FCFA minus p . Each choice, i.e. for each value of p , is asked one after the other, in ascending order, until reaching 1000 FCFA, no matter what the previous answer. The various choices are shown in Table 5. The enumerator makes clear that some of these cards are in the ballot box, meaning that each choice the subject will make will potentially be implemented after the lottery¹¹. Subjects showing multiple switches are re-explained the questions and the stakes of the choices; if they change their initial choices, the revised choices are recorded. Choosing A for the first choice when $p = 0$ indicates a strong preference for income *observability*. For subjects ready to pay up to 1000 FCFA to get only 1000 FCFA in public, the enumerator asks the maximum amount the player was ready to forego in order to get the minimum in public.

Lottery and pay-offs distribution

After all choices made, the enumerator recalls that all non-preference-based cards and *some* of these preference-based cards are in the ballot box and if drawn, the decisions made will be implemented. For feasibility and power constraints, only two “preference-based cards” are actually put in the ballot box, the ones with $p = 200$ and $p = 700$. However, this information is not revealed to subjects. The different cards included in the ballot box are presented in Table 6. Subjects also do not know about the actual distribution of cards, so that they cannot infer when public pay-offs were distributed how many people had actually chosen to hide. Moreover, inference about who did choose to hide is made impossible since everybody knows that some “unlucky” people get 1000 FCFA in public and nothing in private, irrespectively of their preference for income unobservability –the control group $C_{1000,NP}$. Treatment (T) and control (C) groups are characterized by the following notations: P (resp. NP) stands for “preference-based

mother tongue as well.

¹¹After the lottery draw, if the subject does not agree on her previous choice, he or she can leave the game with 500 FCFA.

card” (resp. “non-preference-based”).

The distribution is fixed: in each session, there are 5 cards with 1000 FCFA in public without choice, 7 cards with 9000 FCFA in public without choice, 8 cards with 1000 FCFA in public and 8000 FCFA in private without choice, 9 choice cards with the hiding price p set at 200 FCFA, 8 choice cards with the hiding price p set at 700 FCFA¹².

Once everything is perfectly clearly explained and understood, the subject draws a card from the ballot box. If it is a “choice card”, the enumerator recalls the choice made before and asked the subject whether he/she still agrees with his/her previous choice, indicating that the alternative is receiving 500 FCFA in public. The private gains are distributed in the private room in a separate envelope. A ticket is given to the subject stating the amount he/she will receive in public, namely 1000 FCFA or 9000 FCFA.

Lastly, additional questions are asked on the future use of the gains in an open question (so as not to influence any response in the lab or out of the lab behavior)¹³ on how information concerning their gains is expected to spread in the community according to the subject and on the expected redistributive pressure he/she might face. Subjects after the private interview are then invited to wait in a separate large room until everyone has finished¹⁴. Once every interviewee of the sessions had played, the public gains were disclosed to the assembly and distributed publicly.

2.4 *Post-lab survey*

An originality of our experiment design, as compared to the literature is that we did not force any in-the-lab transfers. We measured in a framed lab setting the willingness to pay to hide one’s income and then, varied exogenously who received the opportunity to hide or not. In order to measure the impact of the observability of personal gains by other participants on transfers and resource allocation decisions, we analyze spending decisions made out of the lab. One week later we visited the subjects to administer a short additional questionnaire on the expenditures and events of the past week. At the end of the survey, we asked how they specifically allocated the pay-offs of the gains in an open question. We put a particular emphasis on the identification of the recipient of transfers made by the participant, and especially if the latter also took part in the lab-experiment. Symetrically, we listed the transfers received by the participant from other participants. Finally, what they learned about the pay-off of the other household member (if selected in pair).

¹²However, since participation varied from one location to another and from one session to another, the final distribution of drawn cards is slightly different from the distribution in the ballot box. This difference is nevertheless totally random. Moreover, since there are eight rooms running simultaneously the private interviews, the 37 cards are distributed randomly in eight ballot boxes.

¹³We made clear to the enumerators and to the subjects that subjects were totally free to use their money as they wanted to. No explicit or implicit declaration was made so as to influence their answers in the lab and their choices out of the lab. However, we cannot eliminate the fact that the money was gained in a lottery and from French researchers, which may be different from real life income.

¹⁴Beverage were given to help people wait. On average, a session lasted 1 hour and a half, with a maximum of two hours.

3 Experimental Subjects

3.1 Sample description

Table 7 describes the sample of individuals that attended the experiment phase –thereafter: the “lottery sample”–, and tests if baseline characteristics are balanced across treatment and control groups.

In this sample, two thirds of the players are women¹⁵. The average age is 37 years. Household heads account for 20% of the sample while spouses and children of the head represent each a quarter of the distribution. Two thirds of the subjects are married, among which 18% in a polygynous union. One fifth of the sample has no education and 40% contributes to the food expenditures of their households. The informal sector represents 86% of the last or current jobs held. Overall, most variables are not significantly different accross groups but some differences remain – ethnicity, marital statuses, having a responsibility in the community and risk aversion – that we will control for in the subsequent empirical analysis.

3.2 Distribution of treatment and control groups

Table 8 presents the final distribution of drawn cards: 352 out of 797 subjects, i.e. 44.2%, received a share of their pay-offs in private either based on their previously elicited preferences ($T_{p200,P}$, $T_{p700,P}$) or not ($T_{free, NP}$)¹⁶. The number of subjects who drew a public card at 1000 FCFA, $C_{1000, NP}$, is smaller than the others since its primary role was to make sure that people could not infer whether players chose to hide or truly only received 1000F, as explained above. Players who drew a card with the possibility to hide for $p = 200$ FCFA (resp. $p = 700$ FCFA) had expressed a willingness-to-pay larger than 200 FCFA (resp. 700 FCFA) in 57% of the cases (respectively, 49%), which means that they accepted to hide at this price (Table 9). We observe only a very slight decrease in the demand for income unobservability between the two price levels.

3.3 Attrition between the pre-lab interview and the lab phase

Table 10 describes the attrition between the baseline and the lottery sample. The attrition rate is 13%. Individuals that did not come to the lottery live in smaller and richer households (in terms of daily food expenditure), with a relatively larger share of adults members. They are more likely to be single men that were not selected with another member of the household¹⁷. They are more educated, are more likely to work in the formal sector and to fund their personal

¹⁵A great care was given to have both men and women in the sample, therefore all the experimental sessions took place on Sundays and enumerators were flexible about when to fill the baseline questionnaire –coming back when people, mostly men, were coming back from work, or very early in the morning before they left the house.

¹⁶In table 8 we removed 19 inconsistent observations, in terms of preferences. These observations are also dropped in the subsequent tables and analyses.

¹⁷Part of this attrition among pairs come from the fact that no delay or report to the next session was tolerated for paired individuals in order to be sure to have the two paired individuals attending the same session.

expenses exclusively by their labor or capital revenues. These differences have to be taken into account for the rest of the analysis.

3.4 Attrition between the lab phase and post-lab interview

The attrition between the lab and the post-lab survey was very low: only 25 individuals were lost, representing 3% of the lottery sample. The main reason (16 observations) is that those people were traveling the week after the post-lab out of the Dakar region and not reachable for a face-to-face interview. Table 11 compares the characteristics of the attrited players (column 2) and the non-attrited ones (column 3). The two groups are rather similar. Players who earned only 1000 publicly are however less likely to be re-interviewed¹⁸.

4 Empirical strategy

4.1 Estimation of privacy option demand and the willingness-to-pay to keep revenues unobservable

As described above, to elicit the willingness to pay to hide revenues in our experiment, we adopted an approach à la Holt and Laury (2002), where subjects had to choose between two options, A or B. In option A, their payoff was always disclosed in public; in option B, they could pay a price p which varied from 0 to 1000 FCFA, to have only 1000 out of 9000 FCFA in public, the remaining part in private. To make choices incentive compatible, we made clear that in the lottery, if they pick up a card corresponding to one of these choices, their answers will be implemented. To characterize this choice, as in Jakiela and Ozier (2012), we assume that the utility, U_{ik} , of subject i for choosing option k between options A or B, takes the form of an additive random utility model (ARUM)¹⁹: $U_{ik} = V_{ik} + \zeta_i + \epsilon_{ik}$, where ζ_i is an individual effect normally distributed with variance σ_ζ^2 and ϵ_{ik} is an i.i.d. type 1 extreme value distributed preference shock, with variance $\sigma_\epsilon^2 = \pi/3$. V_{ik} is the deterministic utility of choosing option k and is a linear function of observable characteristics X_i and price p : $V_{ik} = \alpha_k + X_i' \beta_k + \gamma_k p$. The probability that subject i chooses to pay p , when p lies in $\{0, 200, 500, 700, 1000\}$, takes thus the standard logit form. We estimate a panel random effect logit model since each individual was asked to choose between options A and B for five different prices; the random individual intercept ζ_i captures the combined effect of all omitted subject-specific covariates that cause some subjects to be more prone to choose option B than others. This model allow us to estimate the price elasticity for income privacy controlling for observable characteristics of the subjects.

We also estimate the determinants to the willingness to pay to hide, using as a dependent variable the maximum price people declared to be willing to pay to have the revenue partly unobservable. However, we only observe the *interval* in which this maximum price lies. Therefore, we run an

¹⁸This is not worrisome to our study since as already mentioned above, this group mainly served in the lab phase to protect people choosing to keep a share of their income unobservable.

¹⁹See Hey and Orme (1994) and von Gaudecker et al. (2011), for modeling of stochastic choices in experiments.

interval-censored-data regression model²⁰, where the dependent variable is the price intervals implied by each question in the experiment²¹:

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

4.2 Estimation of the effects of income hiding

The second objective of this paper is to estimate the effect of income unobservability on resource allocation choices made out of the lab one week later following the lottery. The aim here is to test whether individuals with a share of revenues unobservable are making different choices of consumption or transfers than the ones with observable income:

$$Y_{ij} = a \text{PrivateCard}_i + X_i' b + \mu_c + \mu_s + u_i \quad (4.1)$$

where Y_{ij} represents the share of the lottery gain dedicated to choice of allocation j by individual i as reported by the individual one week after the lottery. Our variables of interest, *private card*, takes 1 when the subject draws a card giving him or her the opportunity to hid, either unconditionally her preference for private income ($T_{free, NP}$) or conditionally based on their previously stated preferences ($T_{p200, P}$; $T_{p700, P}$). The estimated coefficient a thus represents the Intention-to-Treat effect of private gains since not all subjects who drew the private card were willing to hide. Standard errors, u_i , are assumed to be normally distributed while μ_c and μ_s correspond respectively to fixed effects of the community and of the attended session. X_i is a set of controls including socio-demographic and economic characteristics of the individual and his/her household, as well as some measure of his/her position in the kinship and in social networks in the community²². As this set of expenditure shares are correlated at the individual level (each share can be written as one minus the sum of all other shares) and thus the error terms in the regression equations are correlated, we estimate the system through a seemingly unrelated OLS regression (SUR) system.

²⁰An interval-data regression is similar to an ordered probit, except that here the interval boundaries are known. See [Cameron and Trivedi \(2010\)](#) (pages 548-550), for a discussion on the differences among censored and interval data models. Let $p = X'\beta + \epsilon$ be the model we want to estimate. p is a continuous outcome, even if not observed on a continuum. Our model assumes $\epsilon \sim \mathcal{N}(0, \sigma^2 I)$. Observations $j \in \mathcal{I}$ are intervals, we know only that the unobserved p_j lies in the interval $[p_{1j}, p_{2j}[$, where the list of intervals was given just above. We thus maximize the following log likelihood:

$$\ln L = \sum_{j \leq 0} \log \Phi \left(\frac{-x\beta}{\sigma} \right) + \sum_{j \geq 1000} \log \left\{ 1 - \Phi \left(\frac{1000 - x\beta}{\sigma} \right) \right\} + \sum_{j \in \mathcal{I}} \log \left\{ \Phi \left(\frac{p_{2j} - x\beta}{\sigma} \right) - \Phi \left(\frac{p_{1j} - x\beta}{\sigma} \right) \right\}$$

²¹Subjects who prefer having their payoffs observable even at a null price, we assume that they have a preference for income observability, subsequently a willingness to pay to keep income observable, namely a negative price $p \in [-\infty, 0[$.

²²We include sex, age, link to household head, religion, ethnicity, marital status, Koranic education, French or Arabic education, household size, share of adult members and of women in the household, sector of activity, average of labor income over last 3 months in log, contributor to household food expenditures, household total food expenditures per day and per capita in log, whether the house is not owned by the household.

Going one step further, we also investigate how the heterogeneity of this effect differs across preferences for income privacy. Indeed, we expect the opportunity to hide to enable the participant to make expenses that could be constrained due to redistributive pressure within her network. If the willingness-to-pay to hide income is positively correlated to this redistribution pressure, the interaction of the opportunity of hiding and the willingness-to-pay is a way to test this assumption. Thus, we estimate the following equation :

$$Y_{ij} = \alpha_1 PrivateCard_i + \alpha_2 \mathbb{1}_{(WTP \geq 0)_i} + \alpha_3 PrivateCard * \mathbb{1}_{(WTP \geq 0)_i} + X'_i \beta + \mu_c + \mu_s + u_i \quad (4.2)$$

where $\mathbb{1}_{(WTP \geq 0)}$ is a dummy variable that takes 1 when the player has a non-null willingness-to-pay to hide income. α_1 captures the effect of drawing a private card while having no preference for income privacy²³, $\alpha_1 + \alpha_3$ accounts for the effect of the private card with non-null preferences for income hiding while α_3 measures the difference of these effects, namely between subjects with positive and non-positive preferences for income hiding.

The identification of a causal effect of hidden income in model (4.2) relies on the exogeneity of the possibility to hide part of the gains, due to the lottery draw, for a given preference. In other words, we posit that, conditional on a given *ex ante* stated preference, the likelihood to pick up a private card is random. Table 12 shows that the probability to draw a card allowing to hide gains is not correlated with preference for hiding income, irrespective of the inclusion of community, session and/or enumerator fixed effects.

In both specifications, we exclude the 1000 FCFA winners, therefore the possible lottery gains are 8300, 8700 and 9000 FCFA. We do not control for the lottery windfall income as certain values -8300 and 8700 FCFA - are reachable only when the willingness-to-pay to hide income is positive. We thus make the implicit assumption that the relative lottery income allocation choices are not directly affected by the windfall income level differences but rather by preferences and the private card treatment. We test for this assumption in section 5.3 by restricting the analysis to the subsample of subjects who randomly won exactly 9000 FCFA: comparing the ones who received 9000 FCFA in public, $C_{9000, NP}$, and the ones who won 1000 FCFA in public and 8000 FCFA in private, $T_{free, NP}$, irrespective of the preference for income privacy for both groups. Table 17 shows the results.

5 Main results

5.1 The willingness to pay to hide income

Raw statistics from the lab experiment

The willingness-to-pay (WTP) for unobservable income can be directly recovered from the responses during the lab, before the lottery. It can be inferred from the choices made at each

²³Subjects who drew the card $T_{free, NP}$ were receiving 8000 FCFA in private irrespective of their preferences.

price $p \in \{0, 200, 500, 700, 1000\}$ and from the question asked to people who were ready to pay 1000 FCFA “what is the maximal amount they are ready to pay out of 9000 FCFA to get only 1000 FCFA in public and the remaining in private?”. This allows us to capture the maximal willingness to pay even for the individual who had very high preferences for income unobservability²⁴.

Descriptive statistics of the elicited WTP are shown in Table 1. The average WTP in the whole sample is of 747 FCFA, 637 FCFA for women and 947 FCFA for men. 65% of players are willing to hide at a zero price and this rate is similar for men and women. Conditional on preferring unobservable income, half of the sample of both men and women is ready to pay up to 1000 FCFA to have only 1000 FCFA in public and the remaining in private. On average, the willingness to pay to hide is 1144 FCFA (14.3% of the gains that could be hidden) ; women are ready to pay 988 FCFA (12.3%), whereas men are ready to pay 1423 FCFA (17.8%). Under the assumption that preference for income unobservability reflects the implicit tax rate people will face on their observable revenues, the observed WTP is really high.

Table 1: The Willingness-To-Pay (WTP) to hide income

	Any WTP			WTP > 0		
	All players	Men	Women	All players	Men	Women
N	795	263	527	519	175	340
Mean (in FCFA)	747	947	637	1144	1423	988
Median (in FCFA)	700	1000	500	1000	1000	1000
Std. Dev.	1047	1395	784	1107	1499	779

1000 FCFA = 1.52 EUR = 1.71 USD

Taking a conservative approach, the willingness-to-pay statistics are computed at the lower bound of the price interval. Ex: if a participant is ready to pay to receive a share of the gains in private rather than in public 200 FCFA but not 500 FCFA, her maximum WTP is registered as being equal to 200 FCFA.

Determinants of the WTP to hide income

Table 13 presents the estimation results of the panel logit model with random individual effects, estimating the probability to hide conditional on the price and other baseline characteristics. We find a demand for hidden income decreasing with price. Conditional on the reference 0 FCFA price, the larger the offered price, the lower the probability to hide. Moreover, the willingness to hide income decreases more slowly with the price for men than for women. This is in line with the descriptive statistics of Table 1. This model estimating the sensitivity of the WTP to hide income to prices is robust to alternative specifications, such as a pooled panel logit model where panel robust standard errors are estimated by clustering them at the individual level (see Table 14 in Appendix).

²⁴During the pilot phase, the take-up for $p = 200$ was 40% and 22% for $p = 500$ therefore we chose to range prices from 0 to 1000 FCFA. However, the results of the experiment show that we could have asked for higher prices. Our results are hence rather a lower bound of the WTP for income unobservability given our framing.

Table 2: Willingness-to-pay for income unobservability estimation – Interval regression model

	1	All 2	3	Women 3w	Men 3m
Selected in hh pair	-45.2 (198.5)	-331.2 (262.9)	-408.2 ⁺ (261.0)	-554.3* (283.7)	-501.3 (533.2)
Male	222.9 (264.3)	185.5 (270.8)	140.2 (279.2)		
Head of household	596.2 ⁺ (373.3)	658.4* (380.2)	759.2** (378.3)	867.7* (470.8)	1377.3* (704.7)
Spouse of head <i>Ref: any other link to head</i>	564.2* (304.1)	650.7** (307.7)	715.2** (303.6)	641.6** (303.5)	
Single <i>Ref: is/was married</i>	550.0* (293.7)	522.2* (301.2)	615.2** (309.0)	500.6 (378.9)	1466.8** (671.9)
Household size	34.0 ⁺ (21.7)	36.4* (22.0)	39.6* (22.1)	57.7** (23.7)	47.8 (48.5)
Formal sector	-368.2 (293.9)	-456.5 (300.2)	-474.4 ⁺ (299.4)	-549.5 (358.4)	-300.8 (583.6)
Daily household food consumption [†]	234.2 (254.0)	307.4 (259.6)	333.4 (256.2)	257.7 (289.7)	668.6 (469.0)
Household doesn't own house	-109.7 (229.1)	-130.6 (235.0)	-104.2 (234.7)	138.9 (257.1)	-1220.1** (584.5)
Always lived in this community		192.3 (236.2)	218.2 (234.7)	646.9** (269.1)	-856.6 ⁺ (548.4)
Responsibility in community		-902.7** (355.7)	-1068.2*** (357.9)	-207.2 (385.0)	-2873.9*** (799.0)
Father alive		207.4 (220.3)	225.7 (219.5)	349.8 (243.9)	701.3 (456.0)
Any neighbor in same session		56.1 (244.3)	-2.8 (244.9)	-342.2 (262.0)	1215.0** (586.8)
Any kin in same session		378.8 (254.6)	371.1 (252.3)	478.2* (277.7)	314.4 (547.6)
Can rely on someone in household		-73.0 (222.1)	-84.6 (224.5)	-188.9 (262.6)	-24.7 (462.2)
Can rely on someone in neighborhood		55.5 (314.0)	190.1 (316.0)	376.9 (354.1)	302.5 (664.1)
Can rely on someone outside neighborhood <i>Ref: Can rely on nobody</i>		235.8 (223.9)	274.0 (225.5)	391.1 ⁺ (250.8)	-76.1 (459.2)
Anyone relies on <i>i</i> in household		136.8 (210.9)	26.6 (208.9)	305.2 (221.0)	-1336.7** (542.9)
Anyone relies on <i>i</i> in the neighborhood		-637.8** (288.4)	-691.5** (295.7)	-693.8** (321.9)	-1087.3 ⁺ (672.2)
Anyone relies on <i>i</i> outside neighborhood <i>Ref: Nobody can rely on i</i>		-217.1 (235.9)	-187.8 (233.9)	-138.3 (260.8)	-252.4 (496.1)
Borrower			-139.5 (205.3)	62.1 (221.8)	-768.6* (451.3)
Owns some savings			233.2 (212.3)	151.4 (243.8)	485.2 (439.8)
Owns cattle and/or poultry			525.0* (280.9)	400.3 (311.3)	1330.6** (612.0)
Very risk averse for money use			-190.1 (212.1)	-118.8 (235.1)	-959.5** (450.1)
High discount rate of future			407.9** (203.2)	342.4 (220.3)	430.1 (441.2)
Expenses funded by personal transfers			-151.2 (237.5)	-151.7 (280.2)	-385.4 (479.9)
Expenses funded by savings or loans <i>Ref: funded by capital or labour</i>			-42.5 (268.4)	-441.5 (313.3)	1022.9* (561.8)
Constant	-1851.2 (1917.7)	-2332.4 (1947.3)	-2535.6 (1915.4)	-2287.4 (2154.3)	-1362.2 (3735.1)
Lab-session fixed effects	X	X	X	X	X
N	782	768	747	511	236
AIC	2061.7	2031.8	1982.5	1418.3	599.8

Interval-data regression model; Robust s.e. in (); $+p < 0.12$, $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Dependant variable: max WTP price intervals: { } $]-\infty; 0[$; $[0; 200[$; $[200; 500[$; $[500; 700[$; $[700; 1000[$; $[1000; +\infty[$ }

Mean of the dependant variable : 746.9 FCFA; *Controls non significant not shown (included in all col.):* Age, ethnicity, religion, child of household head, French/Arabic education, Koranic education, can read & write, contributes to household daily food expenses, monthly revenues in log, eldest in sibship, share of women in hh. *In columns (3,3w,3m):* lender

[†] Household daily food consumption per capita, taken in logarithm.

Estimation results of the interval-censored-data regression model of the determinants to the WTP to hide income are shown in Table 2. Columns 1 through 3 are estimated on the whole sample, column 3w and 3m on the respective subsamples of female and male players. The gender variable is not a determinant of the willingness-to-pay: men are not willing to pay significantly more than women for income privacy, although the sign is positive. However, looking at columns 3w and 3m, it appears clearly that men and women do not share the same determinants of their WTP to hide income. Therefore, we focus hereafter on these two specifications.

For women, the characteristics correlated with a higher WTP to hide income are closely linked to the position they hold in their extended family. Being the household head or the spouse of the head increases the WTP by 867 FCFA for the former, by 642 FCFA for the latter. For each additional household member, a woman is ready to pay 58 FCFA. This means that a woman is ready to pay 520 FCFA more were she in an average household of 11 members rather than just living with her husband. Moreover, a woman who has always been living in the community, which implies that she may have had longer interactions with members of the community and potentially extended family members, is willing to pay 650 FCFA more. Similarly, having any kin attending the same lab session increases a woman's WTP to hide income by 480 FCFA. However, when selected at the baseline to participate in the lab with another household member, the WTP to hide decreases by 554 FCFA. Two different interpretations could explain this result: first, having another household member present in the lab, who knows all the rules of the lab like herself, could induce her to be willing to hide less. Second, if the pressure to redistribute is faced at the household level, having another household member in the session who also receives extra income represents a source to share the redistribution and lowers the incentives to hide. Finally, having someone in the community on which a woman can rely makes her willing to pay 390 FCFA more while, reversely having someone in the community who may rely on her drives her to decrease by 694 FCFA. Interestingly, this indicates that women who usually benefit from transfers are more willing to hide than women who are sending transfers.

For men, the only similitude with women is that being the household head leads also to a higher WTP to hide income. The magnitude is however different: male heads are willing to pay 1377 FCFA while, as mentioned above, female heads, 868 FCFA. Determinants of the WTP to hide income for men can be distinguished in two broad dimensions: on the one hand, characteristics

related to the economic position, – a better economic position is correlated with a higher WTP and a worse-off position with a lower WTP –, and on the other hand, the observable social position in the community, where any salient strong social position is correlated with a *lower* WTP.

With respect to the social dimension, we find that men who have always lived in the community decreases the WTP 857 FCFA, as opposed to women. Similarly, holding a responsibility in the community²⁵ induces a WTP lower by 2880 FCFA. If men are a support for someone in the household (resp. in the neighborhood), their WTP for hiding income is 1337 FCFA (resp. 1087 FCFA) lower. However, knowing a neighbor in the lab session increases the WTP by 1215 FCFA. This indicates that it is only a salient social position that induces lower WTP. Looking at proxies for economic status, we see that being single, i.e. having fewer people financially at charge, encourages men to pay 1467 FCFA more to keep income private. Renting a house, often correlated with a weaker economic situation, as well as having debts decrease the WTP to hide income by 1220 FCFA and 769 FCFA respectively. This suggests that poorer men are less ready to forego some money to keep income unobservable. However, for the borrowing variable, building on [Baland et al. \(2011\)](#), it could mean that having contracted loans is already part of a strategy to escape redistributive pressure and subsequently making the costly opportunity to hide redundant. Owning some cattle or poultry leads to a WTP higher by 1330 FCFA. Two interpretations can be put forward: owning livestock may be correlated with a higher WTP because being richer makes you less financially constraint in foregoing some revenues. Alternatively, if investing in livestock represents a way to escape family taxation, it means that men with livestock are facing more redistributive pressure and therefore are also more eager to pay to keep income unobservable.

As a conclusion, we find that for both men and women, variables that seem correlated with a higher redistributive pressure are also determinants of a higher WTP to hide income. These variables differ however across gender. Thus, women with more and stronger family ties in the community are willing to hide more. Men who are better-off economically are willing to pay more to hide, and vice versa for men worse-off. However, men endowed with some observable

²⁵Among individuals that have a responsibility within the community, 21% are responsible of a “tontine” (ROSCAS), 35% are responsible of another type of association and 44% have another kind of responsibility.

high social status, such as responsibility in the community or being a financial support, are negatively correlated with the WTP to hide. Still, simply recognizing a neighbor in the same session increases in a large magnitude the WTP to hide.

5.2 The impact of hidden income on resource allocation decisions

Table 3 presents the results of the impact of income hiding on resource allocation choices. Panel A presents the results of model 4.1 estimating the ITT effect of having drawn a “private card”, namely a card that enables the participant to hide income. In Panel B, we estimate model 4.2: we investigate whether this effect varies depending on the willingness-to-hide, we interact “private card” with a binary variable, being willing to hide for any price larger or equal 0. In Panel C, we present the unconditional means at the reference value, namely for control “public cards” and for public cards and a positive WTP to hide income. Tables 15 and 16 in the Appendix show that results are robust to the inclusion of controls and community and session time fixed effects. Table 18 include all regressors for the main dependant variables.

A first observation of Panel C of Table 3 points to the fact that transfers to kin account for the largest share of expenses of the lottery gains: it represents 22% for people with public cards (i.e. 1980F out of 9000F). The share dedicated to the contribution to the household food expenditures is similar. Transfers to non kin are rather marginal in comparison. Personal expenditures, investment and non-food household expenditures are accounting each for around one tenth of the gains.

Panel A shows that the mere effect of drawing a private card has a strong positive impact on the share of the gains dedicated to personal expenses. For other commodities, we find no significant effect, although we observe a negative sign of the effect on the share allocated to transfers to kin. Panel B subsequently investigates heterogeneity effects depending on the *ex ante* preference for income privacy.

One of the central results of our paper is the effect of private income on the share of the gains transferred to kin. We find that individuals who get the opportunity to hide in the lottery *and* have a positive WTP to hide spend 5.6 p.p. less on transfers to kin, i.e. a share lowered by 24%.

Table 3: Effect of income hiding and preference for hidden income on resource allocation

<i>Dependent var:</i> <i>Commodity shares</i>	Expenditures			Transfers		Loan		Saved gains (10)	Other (11)		
	Personal (1)	Education (2)	Health (3)	Hh non-food (4)	Hh food (5)	To kin (6)	To non-kin (7)			Repayment (8)	Investment (9)
Panel A ($N = 677$)											
Private gain cards	4.881*** (1.732)	0.235 (0.933)	1.610 (1.071)	-2.124 (2.035)	-0.992 (2.678)	-2.225 (2.058)	0.196 (0.553)	0.258 (1.194)	-2.531 (2.210)	0.128 (1.223)	-0.043 (1.078)
R2	0.11	0.034	0.041	0.097	0.13	0.097	0.058	0.047	0.11	0.044	0.064
Controls†	X	X	X	X	X	X	X	X	X	X	X
Time and community fixed effects	X	X	X	X	X	X	X	X	X	X	X
Panel B ($N = 677$)											
Private card (α_1)	2.194 (3.353)	0.911 (1.604)	-0.169 (2.183)	-2.133 (3.296)	-4.283 (4.813)	3.872 (3.706)	0.693 (0.797)	-3.299 (2.101)	-0.902 (4.446)	1.562 (1.983)	2.496 (1.857)
WTP $p \geq 0$ (α_2)	-1.578 (3.621)	0.913 (1.733)	-2.411 (2.357)	-1.592 (3.560)	-5.611 (5.200)	8.016** (4.003)	0.325 (0.861)	-3.306 (2.269)	1.861 (4.802)	0.835 (2.141)	4.108** (2.006)
Private card \times WTP $p \geq 0$ (α_3)	4.139 (4.201)	-1.056 (2.010)	2.823 (2.729)	0.067 (4.130)	5.098 (6.038)	-9.508** (4.644)	-0.766 (0.998)	5.513** (2.632)	-2.528 (5.571)	-2.205 (2.484)	-3.985* (2.327)
$\alpha_1 + \alpha_3$	6.334** 2.492	-0.145 1.193	2.653* 1.615	-2.065 2.451	0.815 3.596	-5.636** 2.756	-0.073 0.592	2.214 1.562	-3.430 3.305	-0.643 1.474	-1.489 1.381
R2	0.11	0.03	0.04	0.10	0.12	0.10	0.06	0.05	0.11	0.05	0.07
Controls†	X	X	X	X	X	X	X	X	X	X	X
Time and community fixed effects	X	X	X	X	X	X	X	X	X	X	X
Panel C: Unconditional means											
For public cards	12.79	1.10	2.04	10.93	21.86	22.21	1.55	2.68	12.83	2.48	2.34
For public cards and WTP $p \geq 0$	14.40	1.20	1.78	11.46	20.49	23.46	1.46	1.38	13.51	3.13	3.06

Dependent var: Share of total gains allocated to the various commodities. One column per commodity. Panel A: OLS regression without controls and fixed effects. Panel B: System of linear equations estimated with a SUR model, with controls and fixed effects.

Sample: all individuals but the ones who drew the card 1000 FCFA in public.

Control var in Panels A & B†: sex, age, hh head, link to hh head, religion, ethnicity, Koranic & French education, marital status, household composition, sector of activity, ln aver. income over last 3 months, contributes to hh food expenditures, log hh food expenditures per day per cap, rented residence

Included in Panel B: community and lab-session fixed effects.

S.e. in (); + $p \leq 0.11$, * $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

Strikingly, this effect is significantly different for private card winners who were not willing to hide income even at a 0 price: for them, the impact of the private card treatment is positive and the difference between these two groups is large, 9 p.p., representing a relative decrease of 40%. Interestingly, among the players who drew a public card, players with a positive WTP transfer 8 p.p more than those with a strictly negative WTP. One interpretation of this, and which is in line with our previous results, is that individuals facing redistributive pressure are those with a high WTP. Therefore, when they are not able to hide their income, these individuals are exposed to more redistributive pressure, and subsequently transferring more to kin. In the subsequent section, we investigate whether this pressure comes from kin in or out the household and learn that it comes mostly from household members rather than from kin in the community.

Turning to other expenses, we find that the marginal effect of getting a private card while having preference for hiding income on the shares of personal expenditures corresponds to an increase of 6.3 p.p. of total gains; this accounts for a 44% increase in share of personal expenditures as compared to public card winners. However, as opposed to transfers to kin, the effect of getting a private card on personal expenses is not significantly different between subjects willing to hide and the ones who do not. We find another interesting result following a similar pattern as that of personal expenditures, on the share dedicated to health expenditures. The marginal effect of getting a private card while being willing to hide is of 2.7 p.p. of the gains spent more on health expenditures, this effect is substantial since it represents multiplying by 2.5 the share of expenses in health of public card winners. As for personal expenses, this effect is not significantly different among private card winners between the ones who are willing to hide and the ones who are not, although the effect of a private card on the subjects with no preference for hiding is null. Lastly, we find that private card winners willing to hide spend 5.5 p.p more of their gains on loan repayments than private card winners with no preference for hiding.

In brief, the key result here is that allowing people exogenously to hide their gains decreases considerably the share dedicated to transfers to kin, with more money being spent on health and private expenditures. The result on transfers concerns exclusively subjects who show *ex ante* a preference towards privacy.

5.3 Robustness check

In our model 4.1, we do not control for the windfall gains obtained in the lab, since the lottery gains take the following values $\{8300; 8800; 9000\}$. We thus made the assumption that the 700 FCFA difference between the subjects who earned 8300 and those who earned 9000 FCFA is not large enough to induce different patterns in the *shares* of expenditures. To test for this assumption, and whether our results in Table 3 are not driven by this mechanism, we estimate Model 4.1 on the subsample of individuals who randomly drew the card $C_{9000, NP}$ or $T_{free, NP}$. The idea being that all of these individuals earned 9000 FCFA but some were randomly awarded 8000F in private while others were not, all irrespective of their *ex ante* stated preferences. Hence, the comparison of these two groups is not affected by the issue raised above and the difference will capture only the effect of having hidden income. By restricting our sample our analysis will suffer from low statistical power. Table 17 presents the results. We find results close to Table 3 both in sign and magnitude. Since we restrict our sample to only two groups, we lose the significance of our results. We find that getting hidden income decreases by 4.3 p.p. the shares devoted to transfers to kin and raises by around 6.6 p.p. the share of personal expenditures (in Table 3, it was resp. 5.6 and 6.3 p.p).

5.4 Competing channel

Our argument here is that the willingness-to-pay to keep income private is driven by the fear of out of the lab claims over gains from kin or neighbors. However one may wonder whether an alternative or competing story might be an aversion for public attention: whether fear or distaste of being publicly exposed, irrespective of their income from the experiment, is revealed or not. We think that our experiment does not suffer from this competing story. Indeed, an important feature of our experiment is that everybody was publicly exposed in the lab. Each participant was named and received in public at least 1000 FCFA even when some gains were received in private.

6 Intra-household treatment effects

An additional dimension of our experiment is that we randomize the number of household members who participate in the same session: in some households, a unique member is selected

while in others, two members are. This feature enables us to identify whether the effect of unobservable income on resource allocation is driven by intra-household or out-of-household pressure for redistribution. As described in the experimental design, all households –irrespective of the number of selected members– had to satisfy the condition of having at least two eligible members, so as to ensure comparability between individuals selected alone and those selected in pairs. Selection of members were drawn randomly among all eligible members, with no additional restrictions such as that only the head and his spouse could be selected. Therefore, unsurprisingly in the context of Senegalese extended households, there is a large heterogeneity in the types of relationship shared in the selected pairs, as shown by Table 19. Spouses represent only 15.9% of pairs, while child-parent or siblings account respectively for 18.9% and 24%.

We estimate a model similar to the one previously estimated (4.1), where we interact the variable of interest *private* with *pair*. Some individuals selected in pairs attended the lab session alone, either because the other household member could not participate or because he/she was late, and thus not able to participate²⁶. Therefore, in the subsequent econometric model, we estimate the Intention-To-Treat (ITT) effects by using the variable “selected in household pair”, as defined randomly at the baseline²⁷. Moreover, in case the individual was selected in a pair, we also control for the other household member’s windfall gains in log, R_k . The definition of variables and of fixed effects are unchanged from model 4.1:

$$Y_{ij} = \alpha_1 \textit{Private} + \alpha_2 \textit{Pair} + \alpha_3 \textit{Private} * \textit{Pair} + X_i' \beta + \gamma_1 R_i + \gamma_2 R_k + \mu_c + \mu_s + u_i \quad (6.1)$$

Results are presented in Table 4. Two definitions of the variable of interest *Private* are used: in Panel A, *Private* designates *Private card*, i.e. participants who drew a card allowing to hide gains (ITT effect), while in Panel B, *Private gains*, i.e. participants who received part of the windfall income in private –either based on their *ex ante* choice, or not.

Looking at the marginal effect of being selected in pairs with a public card drawn in the lottery, we see in Panel A that individuals with public income and selected in pairs are transferring 12 p.p. more to kin: this represents an increase of 59% in the share of transfers to kin. Remarkably, we see almost no difference between Panels A and B for this variable, meaning that this effect

²⁶In order not to separate pairs, we did not allow them to be split across lab sessions.

²⁷The variable “attended the lab session in pair” may suffer from endogenous attrition.

on transfers is not driven by preferences for income *observability* but by the mere fact of being selected in pairs. Moreover, we also see that this increase in transfers is compensated by a decrease of 8.6 p.p. in household non-food expenditure for Panel A and of 11.1 p.p. in Panel B, accounting for respectively a decrease of 68% and 88%.

The estimated coefficient for *Private card* in Panel A (resp. *Private gains* in Panel B) represents the marginal effect of drawing a card allowing to hide (resp. of having hidden gains) for individuals not selected in pairs. Although not significant in Panel A, results in Panel B are consistent with the sign of those of Panel A. Hence, in Panel B, the effect of hiding income for non-paired individuals induces a strong decrease of 7.3 p.p. in the share of household non-food expenditures: this represents a 58% decrease in the share of this commodity. We also find that as compared to non-paired public income winners, non-paired private winners spend 1.8 p.p. more in transfers to non-kin. These results are mainly driven by individuals who had preferences for private income since in Panel A, these effects are not significant, although going in the same direction with a smaller magnitude for household non-food expenditures.

Finally, the interaction term captures the double difference between the marginal effect of having received a private card rather than a public card in Panel A (resp. public gains in Panel B) for paired subjects relatively to unpaired subjects. A first observation is that the main effects are found in Panel B, meaning that they are driven by the sub-sample of subjects in pairs willing to hide. Hidden income, while selected in pairs, does not significantly reduce transfers to kin but drastically those to non-kin, relatively to the effect of hidden income on unpaired individuals. Moreover, we find a strong positive differential effect of hidden income between paired and unpaired subjects on the share of health and household non-food expenditures: having private gains for pairs induces respectively 3.8 p.p. and 6 p.p. more spending on health and household non-food expenditures, as compared to unpaired subjects. Finally, we observe that subjects with hidden gains selected in pairs are decreasing their saving share by 3.5 p.p. relatively to the ones not selected in pairs.

Table 4: Hidden gains and intra-household treatment

<i>Dependant var:</i> <i>Commodity shares</i>	Expenditures			Transfers			Saving	Other			
	Personal	Education	Health	Hh non-food	Hh food	To kin			To non-kin	Loan back	Investment
Panel A: Effect of lottery draw											
Private card	3.774 (3.316)	0.293 (1.345)	0.939 (1.900)	-2.186 (3.125)	2.537 (4.416)	-1.718 (3.690)	1.118 (0.945)	-1.907 (1.925)	-1.645 (3.921)	-0.283 (1.742)	-1.267 (1.654)
Selected in hh pair	1.333 (4.876)	0.953 (1.977)	1.951 (2.789)	-8.574* (4.595)	2.298 (6.476)	11.985** (5.425)	1.966 (1.389)	-1.934 (2.830)	-0.728 (5.764)	-4.065 (2.562)	-3.420 (2.432)
Private card X hh pair	2.160 (3.824)	-0.333 (1.551)	1.033 (2.185)	0.482 (3.605)	-5.481 (5.087)	-1.825 (4.255)	-1.371 (1.090)	3.775* (2.220)	-1.056 (4.522)	0.947 (2.010)	2.079 (1.908)
N	780										
R2	0.11	0.041	0.041	0.10	0.14	0.11	0.068	0.047	0.10	0.042	0.058
Panel B: Effect of hidden income											
Private gains	4.660 (3.094)	0.564 (1.255)	-2.388 (1.771)	-7.303** (2.908)	0.253 (4.120)	-0.544 (3.439)	1.840** (0.877)	-0.178 (1.798)	0.223 (3.660)	1.902 (1.624)	0.203 (1.545)
Selected in hh pair	3.269 (4.434)	1.080 (1.799)	1.126 (2.537)	-11.068*** (4.167)	-0.627 (5.900)	11.102** (4.929)	2.039+ (1.256)	-0.283 (2.576)	-0.212 (5.244)	-1.889 (2.327)	-2.136 (2.214)
Private gains X hh pair	0.156 (3.706)	-0.751 (1.503)	3.807* (2.116)	5.989* (3.483)	-1.888 (4.942)	-1.999 (4.120)	-2.484** (1.050)	2.323 (2.153)	-3.048 (4.384)	-3.492* (1.945)	0.417 (1.851)
N	780										
R2	0.11	0.041	0.043	0.11	0.13	0.12	0.069	0.046	0.10	0.046	0.058
Panel C: Average shares by commodity:											
<i>For public card & not pair</i>	10.39	0.61	2.06	12.54	21.49	20.22	1.17	4.06	12.36	3.27	3.73
<i>For public card & hh pair</i>	14.16	1.38	2.03	10.01	22.07	23.35	1.76	1.90	13.11	2.03	1.54
<i>For public cards</i>	12.79	1.10	2.04	10.93	21.86	22.21	1.55	2.68	12.83	2.48	2.34

Dependant var: Share of total gains allocated to the various commodities. One column per commodity. System of linear equations estimated with a SUR model.
Control var: sex, age, hh head, link to hh head, religion, ethnicity, Koranic & French education, marital status, household composition, sector of activity, ln aver. income over last 3 months, contributes to hh food expenditures, log hh food expenditures per day per cap, rented residence
Included: community and lab-session fixed effects.
S.e. in (); *0.1, ** 0.05, *** 0.01

7 Conclusion

We rely in this paper on an original lab-in-the-field experiment coupled with an *ex post* out-of-the-lab randomized controlled trial design that we conducted in the suburbs of Dakar, Senegal. We estimate in the lab the willingness-to-pay to hide income and analyze out-of-the-lab how the effect of having hidden income affects the choices of resource allocation. We first find a high willingness-to-pay for hiding: 65% of subjects prefer to receive their gains in private rather than in public and among them, they are ready to forego on average 14.3% of their unobserved income. We find that for both men and women, variables that seem correlated with a higher redistributive pressure are also determinants of a higher willingness-to-pay to hide income, although these determinants differ across gender. Second, looking at the effect of hidden income on out-of-the-lab allocation choices, individuals with preferences for hidden income are found to spend 23% of their windfall income on transfers to kin, when receiving the gains in public. Private winners who are willing to hide their income transfer 22% less and reallocate this extra money in health and private expenditures. These two steps of the experiment corroborate the idea that the preference for hidden income is driven by a strategy to escape redistributive pressure. We further randomize within each household the number of participants (one or two), allowing us to disentangle the effects of redistributive pressure coming from household members or from neighbors. We find that subjects with public gains who participated in pairs are transferring 59% more to kin than subjects selected alone also with public gains. The effect of hidden income on pairs is not significantly different from the effect on unpaired subjects for transfers to kin while strongly negative for transfers to non-kin.

This paper contributes to the growing but still scarce literature on the potential adverse effects of informal redistribution in developing economies. Our paper is the first to identify the willingness to pay to hide revenues from peers and to be able to disentangle in a neat experiment the effect of redistribution within and between households. We find that redistribution takes place mostly within the kinship networks and especially within the household. Importantly, allowing to keep revenues unobservable did not impact investment decisions, but pushes allocation choices away from transfers towards personal and health expenditures. The strong willingness-to-pay for income privacy and the considerable impacts on resource allocation it induces point the impor-

tance of designing adequate financial products such as savings, especially when they guarantee secrecy from other household or kin members and would offer more control over resources to individuals. However, further research is necessary to capture the general equilibrium effects, including the benefits of social redistribution in terms of risk-sharing as well as the distortionary costs as identified here.

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8 Tables

Table 5: Elicitation of preference for income unobservability: “preference-based cards”

	p	Option A		Option B		Total
		Public	Private	Public	Private	
Choice 1	0	9000	0	1000	8000	9000
Choice 2	200	9000	0	1000	7800	8800
Choice 3	500	9000	0	1000	7500	8500
Choice 4	700	9000	0	1000	7300	8300
Choice 5	1000	9000	0	1000	7000	8000

Table 6: Cards in the ballot box and their associated pay-offs

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

C stands for “Control group”, T for “Treatment”, P for “preference based” and NP for “non-preference based”

Table 7: Lottery sample and balancedness across treatment and control groups

	Full sample		Private cards		Public cards		Diff. in means (1)-(2) P-val.
	N	mean	N	mean	N	mean	
Selected with another household member	816	0,65	537	0,67	278	0,63	0,29
Male	816	0,33	537	0,32	278	0,34	0,57
Age	816	37,40	537	37,72	278	36,74	0,25
Household head	815	0,20	536	0,21	278	0,17	0,19
Spouse of head	815	0,25	536	0,25	278	0,26	0,78
Son or daughter of head	815	0,28	536	0,28	278	0,29	0,90
Sibling of head	815	0,06	536	0,06	278	0,07	0,55
Muslim	816	0,96	537	0,97	278	0,94	0,10
Wolof	816	0,46	537	0,48	278	0,41	0,06
No education	816	0,23	537	0,23	278	0,21	0,51
Koranic School	816	0,36	537	0,36	278	0,36	0,92
French/Arabic education	816	0,61	537	0,59	278	0,65	0,13
In a monogamous union	816	0,48	537	0,44	278	0,56	0,00
In a polygamous union	816	0,18	537	0,18	278	0,17	0,50
Single	816	0,23	537	0,26	278	0,19	0,05
Other marital status	816	0,10	537	0,12	278	0,07	0,02
Has always lived in the community	816	0,35	537	0,37	278	0,32	0,22
Has a resp. in the community	816	0,09	537	0,10	278	0,07	0,09
Eldest in same parent sibship	816	0,25	537	0,26	278	0,24	0,66
Father alive	816	0,43	537	0,43	278	0,44	0,81
Mother alive	813	0,72	535	0,70	277	0,75	0,13
Informal sector	816	0,86	537	0,85	278	0,87	0,45
Monthly earnings (in log)	810	6,59	531	6,53	278	6,70	0,67
Contributes to household's food exp.	811	0,42	534	0,43	276	0,38	0,20
N. household members	815	11,75	537	11,88	277	11,54	0,47
Share of adult household members	815	0,63	537	0,63	277	0,63	0,96
Share of female household members	815	0,52	537	0,51	277	0,53	0,12
Household daily food consumption p.c. (log)	812	6,09	536	6,09	275	6,11	0,57
House is rented	816	0,33	537	0,35	278	0,29	0,13
Any close friend among players	811	0,08	533	0,07	278	0,09	0,31
Any neighbor among players	811	0,79	533	0,79	278	0,79	0,87
Any kin members among players	811	0,53	533	0,55	278	0,49	0,15
Borrower	816	0,41	537	0,42	278	0,38	0,35
Lender	814	0,37	536	0,37	277	0,38	0,71
Owens some cattle	816	0,10	537	0,10	278	0,10	1,00
Owens some poultry	816	0,06	537	0,07	278	0,05	0,13
Very risk averse for financial decisions	816	0,33	537	0,31	278	0,36	0,13
Risk averse for financial decisions	816	0,06	537	0,07	278	0,02	0,00
Risk neutral/taker for financial decisions	816	0,06	537	0,06	278	0,05	0,34
High discount rate for future	810	0,64	531	0,64	278	0,64	0,88
Personal exp. only funded by labor/capital earnings	803	0,30	528	0,30	274	0,29	0,67
Personal exp. only funded by private transfers	803	0,21	528	0,22	274	0,19	0,32
Personal exp. fund by savings	803	0,12	528	0,12	274	0,13	0,61
Personal exp. fund by loans	803	0,07	528	0,08	274	0,07	0,89
Can rely on someone in household	816	0,65	537	0,64	278	0,67	0,31
Can rely on someone in neighborhood	816	0,15	537	0,15	278	0,14	0,96
Can rely on someone outside neighborhood	816	0,49	537	0,47	278	0,51	0,31
Anyone in household can rely on him/her	816	0,63	537	0,64	278	0,61	0,39
Anyone in neighborhood can rely on him/her	816	0,22	537	0,21	278	0,23	0,44
Anyone outside neighborhood can rely on him/her	816	0,34	537	0,35	278	0,34	0,81

Table 8: Distribution of cards in the lottery

	Public cards		Private cards			Total
	$C_{1000, NP}$	$C_{9000, NP}$	$T_{free, NP}$	$T_{p200, P}$	$T_{p700, P}$	
Preference based cards (P)	No	No	No	Yes	Yes	
<i>Draws from lottery:</i>						
Frequency	106	166	155	186	184	797
Percentage	13.3%	20.8%	19.5 %	23.3%	23.1%	100%

NP stands for “not preference based”, P for “preference based”.

Table 9: Distribution of gains for preference based cards

	Price	Choice made between A and B at given price		Total
		Option A (All public)	Option B (Partly private)	
<i>Card $T_{p200, P}$</i>	200 FCFA			
Frequency		80	106	186
Percentage*		43.0%	57.0%	100%
<i>Card $T_{p700, P}$</i>	700 FCFA			
Frequency		93%	91	184
Percentage*		50.5%	49.5%	100%

* It corresponds to the % of having chosen option A (resp. B) for a given card and at the corresponding price level. The difference between the take-ups for price = 200 and p=700 is not significantly different from zero at the 5% level.

NP stands for “not preference based”, P for “preference based”.

Table 10: Attrition between baseline and lab surveys

<i>Samples</i>	Baseline		Lab		Attrited		Diff.
	N	Mean	N	Mean	N	Mean	P-values
Selected with another household member	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
Household head	921	0.19	815	0.20	106	0.18	0.70
Spouse of Household head	921	0.24	815	0.25	106	0.20	0.25
Son or daughter of Household head	921	0.29	815	0.28	106	0.33	0.33
Sibling of Household head	921	0.06	815	0.06	106	0.06	0.85
Muslim	922	0.96	816	0.96	106	0.95	0.79
Wolof	922	0.46	816	0.46	106	0.48	0.66
No education	922	0.22	816	0.23	106	0.17	0.19
Koranic School	947	0.36	841	0.35	106	0.42	0.20
French/Arabic education	947	0.60	841	0.59	106	0.68	0.09
In a monogamous union	922	0.48	816	0.48	106	0.49	0.86
In a polygamous union	922	0.17	816	0.18	106	0.08	0.02
Single	922	0.25	816	0.23	106	0.38	0.00
Other marital status	947	0.09	841	0.10	106	0.05	0.09
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
Monthly revenues (in log)	915	6.58	810	6.59	105	6.45	0.80
Contributes to household's food exp.	924	0.41	821	0.42	103	0.37	0.34
N. household members	930	11.49	825	11.73	105	9.60	0.00
Share of adult household members	929	0.63	825	0.63	104	0.68	0.01
Share of female household members	929	0.52	825	0.52	104	0.50	0.31
Household daily food consumption p.c. (log)	926	6.12	822	6.10	104	6.28	0.00
House is rented	947	0.32	841	0.32	106	0.29	0.50
Borrower	921	0.39	816	0.41	105	0.30	0.03
Lender	919	0.38	814	0.37	105	0.40	0.62
Owns some cattle	922	0.11	816	0.10	106	0.18	0.02
Very risk averse for money use	947	0.33	841	0.32	106	0.41	0.06
Risk averse for money use	947	0.05	841	0.05	106	0.05	0.78
Risk neutral/taker for money use	947	0.05	841	0.06	106	0.05	0.71
High discount rate of future	915	0.64	810	0.64	105	0.61	0.53
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
Expenses only funded by savings	907	0.12	803	0.12	104	0.10	0.49
Expenditures fund by loans	907	0.07	803	0.07	104	0.06	0.53
Can rely on someone in household	922	0.63	816	0.65	106	0.51	0.01
Can rely on someone in neighborhood	922	0.15	816	0.15	106	0.14	0.91
Can rely on someone out of neighborhood	922	0.48	816	0.49	106	0.44	0.42
Anyone in household can rely on him/her	922	0.63	816	0.63	106	0.66	0.51
Anyone in neighborhood can rely on him/her	922	0.22	816	0.22	106	0.25	0.36
Anyone outside neighborhood can rely on him/her	922	0.35	816	0.34	106	0.44	0.04

Table 11: Attrition between lab and post-lab surveys

<i>Samples</i>	Lab		Post-lab		Attrited		Diff.
	N	Mean	N	Mean	N	Mean	P-values
Positive WTP to hide	797	0.65	772	0.66	25	0.52	0.16
Pref.-based card - Public Income	797	0.22	772	0.22	25	0.08	0.09
Pref.-based card - Private Income	797	0.25	772	0.24	25	0.32	0.39
Card 8000-1000	797	0.19	772	0.20	25	0.16	0.66
Control 9000	797	0.21	772	0.21	25	0.16	0.55
Control 1000	797	0.13	772	0.13	25	0.28	0.03
Selected with another household member	797	0.65	772	0.66	25	0.52	0.15
Male	797	0.32	772	0.32	25	0.56	0.01
Age	797	37.42	772	37.27	25	42.20	0.03
Household head	796	0.19	771	0.19	25	0.28	0.25
Spouse of head	796	0.25	771	0.25	25	0.24	0.90
Son or daughter of head	796	0.29	771	0.29	25	0.24	0.58
Sibling of head	796	0.06	771	0.06	25	0.08	0.61
Muslim	797	0.96	772	0.96	25	0.96	1.00
Wolof	797	0.46	772	0.46	25	0.48	0.82
No education	797	0.23	772	0.23	25	0.16	0.42
Koranic School	797	0.36	772	0.35	25	0.52	0.09
French/Arabic education	797	0.61	772	0.61	25	0.68	0.47
In a monogamous union	797	0.48	772	0.48	25	0.48	0.98
In a polygamous union	797	0.18	772	0.18	25	0.24	0.45
Single	797	0.23	772	0.24	25	0.20	0.68
Other marital status	797	0.10	772	0.10	25	0.08	0.73
Has always lived in the community	797	0.35	772	0.35	25	0.32	0.77
Has a resp. in the community	797	0.09	772	0.09	25	0.12	0.58
Eldest in same-parent sibship	797	0.25	772	0.25	25	0.24	0.89
Father alive	797	0.43	772	0.43	25	0.44	0.92
Informal sector	797	0.86	772	0.86	25	0.84	0.78
Monthly revenues (in log)	791	6.57	767	6.54	24	7.59	0.35
Contributes to household's food exp.	792	0.42	767	0.41	25	0.56	0.14
N. household members	796	11.78	771	11.79	25	11.52	0.84
Share of adult household members	796	0.63	771	0.63	25	0.64	0.66
Share of female household members	796	0.52	771	0.52	25	0.48	0.17
Household daily food consumption p.c. (log)	793	6.09	769	6.09	24	6.12	0.79
House is rented	797	0.33	772	0.33	25	0.44	0.23
Borrower	797	0.41	772	0.41	25	0.24	0.09
Lender	795	0.37	770	0.37	25	0.40	0.78
Any cattle	797	0.10	772	0.10	25	0.20	0.10
Any close friend among players	793	0.08	768	0.08	25	0.08	0.97
Any neighbor among players	793	0.79	768	0.79	25	0.76	0.69
Any kin members among players	793	0.53	768	0.53	25	0.52	0.93
Very risk averse for money use	797	0.32	772	0.33	25	0.32	0.96
Risk averse for money use	797	0.06	772	0.05	25	0.12	0.15
Risk neutral/taker for money use	797	0.06	772	0.06	25	0.00	0.20
High discount rate of future	792	0.64	767	0.64	25	0.64	0.98
Expenses only funded by labor/capital	785	0.30	761	0.30	24	0.38	0.40
Expenses only funded by private transfers	785	0.21	761	0.21	24	0.13	0.30
Expenses only by savings	785	0.12	761	0.12	24	0.13	0.94
Expenses only by loans	785	0.07	761	0.07	24	0.13	0.33
Can rely on someone in household	797	0.65	772	0.66	25	0.52	0.16
Can rely on someone in neighborhood	797	0.14	772	0.14	25	0.20	0.42
Can rely on someone outside neighborhood	797	0.49	772	0.49	25	0.40	0.37
Anyone in household can count on him/her	797	0.63	772	0.63	25	0.76	0.18
Anyone in neighborhood can rely on him/her	797	0.22	772	0.21	25	0.28	0.43
Anyone outside neighborhood can rely on him/her	797	0.34	772	0.34	25	0.36	0.82

Table 12: Test of correlation between preferences for hidden income and lottery outcome

<i>Drawing a private card</i>	(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. LPM model. P-values in (); *0.1, ** 0.05, *** 0.01

Table 13: Willingness to hide income – Random-effect panel logit model

	1	All 2	3	Women 3w	Men 3m
Price = 200 FCFA	-2.31*** (0.36)	-2.32*** (0.38)	-3.11*** (0.47)	-3.26*** (0.54)	-2.20*** (0.75)
Price = 500 FCFA	-4.50*** (0.43)	-4.42*** (0.47)	-5.77*** (0.59)	-5.70*** (0.66)	-5.20*** (0.92)
Price = 700 FCFA	-6.30*** (0.47)	-6.20*** (0.53)	-8.07*** (0.69)	-8.05*** (0.76)	-7.11*** (1.00)
Price = 1000 FCFA	-7.17*** (0.49)	-7.09*** (0.59)	-9.34*** (0.73)	-9.35*** (0.82)	-8.12*** (1.03)
Controls 1 [†]	X	X	X	X	X
Controls 2 [‡]		X	X	X	X
Controls 3 [#]			X	X	X
N	3910	3840	3735	2555	1180
AIC	2050.9	2039.5	1987.1	1423.0	600.2

Panel logit with random effect model; Community and time fixed effects incl.; robust s.e. in (); * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Dependant variable: $Hide_{ik} = 1$ if subject i wants to hide at price $p = k$.

[†] *Controls not shown 1:* Selected in hh pair, male, age, position within the household, ethnicity, religion, child of hh head, education, can read & write, not married, household size, contributes to hh food expenses, daily hh food cons. per cap, rented housemonthly revenues in log, eldest in sibship, share of women in hh, share of adults in hh, job in formal sector.

[‡] *Controls not shown:* has always lived in the community, responsibility in the community, father alive, mother alive, any kin in same session, any neighbor in same session, HH head responsibility in community, can rely on so in hh/in neighborhood/out of neighborhood; so out/in neighborhood can rely on i .

[#] *Controls not shown:* borrower, lender, owns some cattle or poultry, risk aversion, discount rate of future, expenses funded by savings/loans, by capital/labour.

Table 14: Willingness to hide income – logit model with panel robust s.e.

	All			Women	Men
	1	2	3	3w	3m
Price = 0 FCFA	-0.06*** (0.01)	-0.06*** (0.01)	-0.06*** (0.01)	-0.07*** (0.01)	-0.04*** (0.01)
Price = 200 FCFA	-0.12*** (0.01)	-0.11*** (0.01)	-0.12*** (0.01)	-0.12*** (0.01)	-0.10*** (0.02)
Price = 700 FCFA	-0.15*** (0.01)	-0.15*** (0.01)	-0.15*** (0.01)	-0.17*** (0.02)	-0.12*** (0.02)
Price = 1000 FCFA	-0.18*** (0.01)	-0.17*** (0.01)	-0.18*** (0.01)	-0.19*** (0.02)	-0.14*** (0.02)
Selected in hh pair	-0.01 (0.03)	-0.05 (0.04)	-0.06 (0.04)	-0.10* (0.05)	-0.04 (0.08)
Male	0.05 (0.05)	0.04 (0.05)	0.04 (0.05)		
HH head	0.09 (0.06)	0.10 (0.07)	0.12* (0.07)	0.14 (0.09)	0.15+ (0.09)
Spouse of hh head <i>Ref: any other link to head</i>	0.09* (0.05)	0.11** (0.05)	0.12** (0.05)	0.11* (0.06)	
French/Arabic education	-0.03 (0.04)	-0.02 (0.04)	-0.03 (0.04)	0.00 (0.05)	-0.17* (0.09)
Single <i>Ref: is/was married</i>	0.09* (0.05)	0.09* (0.05)	0.11** (0.05)	0.10 (0.07)	0.15* (0.09)
Household size	0.01+ (0.00)	0.01* (0.00)	0.01* (0.00)	0.01*** (0.00)	0.01 (0.01)
% adults in hh	0.09 (0.11)	0.09 (0.11)	0.08 (0.11)	0.23* (0.13)	-0.43** (0.20)
Daily hh food cons. p.c. (in log)	0.06 (0.04)	0.07 (0.05)	0.07 (0.04)	0.06 (0.06)	0.09 (0.06)
HH doesn't own house	-0.02 (0.04)	-0.02 (0.04)	-0.02 (0.04)	0.03 (0.05)	-0.18*** (0.07)
Always lived in this community		0.03 (0.04)	0.04 (0.04)	0.10** (0.05)	-0.11 (0.07)
Responsibility in community		-0.17*** (0.06)	-0.20*** (0.06)	-0.06 (0.08)	-0.47*** (0.10)
Any neighbor in same session		0.00 (0.04)	-0.00 (0.04)	-0.07 (0.05)	0.16** (0.08)
Any kin in same session		0.06 (0.04)	0.06 (0.04)	0.07 (0.05)	0.06 (0.08)
Can rely on so out of neighborhood <i>Ref: Can rely on nobody</i>		0.04 (0.04)	0.05 (0.04)	0.07 (0.05)	0.01 (0.07)
So. in hh rely on <i>i</i>		0.02 (0.04)	0.00 (0.04)	0.04 (0.04)	-0.17*** (0.07)
So. in neighborhood rely on <i>i</i>		-0.11** (0.05)	-0.12** (0.05)	-0.14** (0.06)	-0.14+ (0.09)
So. out neighborhood rely on <i>i</i> <i>Ref: Nobody can rely on i</i>		-0.03 (0.04)	-0.02 (0.04)	-0.02 (0.05)	-0.04 (0.07)
Borrower			-0.03 (0.04)	-0.00 (0.04)	-0.08 (0.06)
Owns some savings			0.04 (0.04)	0.02 (0.05)	0.09 (0.06)
Owns cattle and/or poultry			0.09* (0.05)	0.08 (0.06)	0.14* (0.07)
Very risk averse for money use			-0.03 (0.04)	-0.01 (0.04)	-0.14** (0.06)
High discount rate of future			0.07** (0.03)	0.07* (0.04)	0.05 (0.06)
Expenses funded by savings or loans <i>Ref: funded by capital or labour</i>			-0.02 (0.05)	-0.08 (0.06)	0.09 (0.08)
N	3910	3840	3735	2555	1180

Logit with s.e. clustered at indiv. level; Community and time fixed effects incl.; Marginal effects reported, robust s.e. in (); * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. *Dependant variable: Hide_{ik} = 1* if subject *i* wants to hide at price $p = k$. *Controls non sign. not shown (incl. in all col.):* Age, ethnicity, religion, child of hh head, Koranic edu., can read & write, contributes to hh food expenses, monthly revenues in log, formal sector, eldest in sibship, share of women in hh. *Controls not shown (col. 3,4,5):* HH head responsibility in community, can rely on so in hh / in neighborhood; so out neighborhood can rely on *i*, expenses funded by private transfers, lender, father alive

Table 15: Effect of income hiding on resource allocation

<i>Dependant var:</i> <i>Commodity shares</i>	Expenditures			Transfers			Loan			Other (11)	
	Personal (1)	Education (2)	Health (3)	Hh non-food (4)	Hh food (5)	To kin (6)	To non-kin (7)	Repayment (8)	Investment (9)		Saved gains (10)
Panel A without control ($N = 691$)											
Private gain cards	4.052** (1.480)	0.204 (0.963)	1.378 (0.999)	-1.671 (2.188)	-0.753 (2.592)	-1.807 (2.199)	0.161 (0.514)	0.576 (1.045)	-2.049 (2.328)	0.084 (1.142)	-0.255 (1.110)
Panel B with controls ($N= 677$)											
Private gain cards	4.881*** (1.732)	0.235 (0.933)	1.610 (1.071)	-2.124 (2.035)	-0.992 (2.678)	-2.225 (2.058)	0.196 (0.553)	0.258 (1.194)	-2.531 (2.210)	0.128 (1.223)	-0.043 (1.078)
R2	0.11	0.034	0.041	0.097	0.13	0.097	0.058	0.047	0.11	0.044	0.064
Controls†	X	X	X	X	X	X	X	X	X	X	X
Time and community fixed effects	X	X	X	X	X	X	X	X	X	X	X
Panel C: Unconditional means											
<i>For public cards</i>	12.79	1.10	2.04	10.93	21.86	22.21	1.55	2.68	12.83	2.48	2.34

Dependant var: Share of total gains allocated to the various commodities. One column per commodity. Panel A: OLS regression without controls and fixed effects. Panel B: System of linear equations estimated with a SUR model, with controls and fixed effects.

Sample: all individuals but the ones who drew the card 1000 FCFA in public.

Control var in Panel B†: sex, age, hh head, link to hh head, religion, ethnicity, Koranic & French education, marital status, household composition, sector of activity, In aver. income over last 3 months, contributes to hh food expenditures, log hh food expenditures per day per cap, rented residence

Included in Panel B: community and lab-session fixed effects.

S.e. in (); † $p \leq 0.11$, * $p \leq 0.1$, ** $p \leq 0.05$, *** $p \leq 0.01$

Table 16: Heterogenous effect of income hiding on resource allocation, across preference for hiding

<i>Dependant var:</i> <i>Commodity shares</i>	Expenditures			Transfers			Loan		Saved gains (10)	Other (11)	
	Personal (1)	Education (2)	Health (3)	Hh non-food (4)	Hh food (5)	To kin (6)	To non-kin (7)	Repayment (8)			
Panel A without control (N = 691)											
Private card (α_1)	1.120 (3.259)	0.290 (1.456)	-0.467 (1.872)	-0.311 (4.405)	-3.813 (5.051)	4.362 (4.077)	0.530 (0.586)	-3.060 (2.749)	-2.176 (3.679)	1.264 (1.922)	2.176* (1.105)
WTP $p \geq 0$ (α_2)	-1.018 (2.950)	0.063 (1.547)	-2.601* (1.508)	-1.415 (4.059)	-5.788 (5.294)	9.700** (4.592)	0.278 (0.609)	-3.604 (2.489)	0.122 (4.315)	0.913 (2.022)	3.940** (1.682)
Private card \times WTP $p \geq 0$ (α_3)	4.450 (3.559)	-0.133 (1.964)	2.878 (2.320)	-1.990 (4.983)	4.832 (5.780)	-9.663* (5.400)	-0.566 (0.824)	5.611* (2.951)	0.186 (4.697)	-1.810 (2.622)	-3.812* (2.017)
$\alpha_1 + \alpha_3$	5.570*** (1.471)	0.158 (1.292)	2.411* (1.221)	-2.301 (2.348)	1.019 (3.023)	-5.301+ (3.134)	-0.036 (0.680)	2.552*** (0.797)	-1.990 (2.998)	-0.546 (1.576)	-1.636 (1.594)
<i>P-value</i>	0.001	0.904	0.059	0.336	0.739	0.102	0.958	0.003	0.512	0.732	0.314
R2	0.01	0.00	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.00	0.01
Panel B with controls (N = 677)											
Private card (α_1)	2.194 (3.353)	0.911 (1.604)	-0.169 (2.183)	-2.133 (3.296)	-4.283 (4.813)	3.872 (3.706)	0.693 (0.797)	-3.299 (2.101)	-0.902 (4.446)	1.562 (1.983)	2.496 (1.857)
WTP $p \geq 0$ (α_2)	-1.578 (3.621)	0.913 (1.733)	-2.411 (2.357)	-1.592 (3.560)	-5.611 (5.200)	8.016** (4.003)	0.325 (0.861)	-3.306 (2.269)	1.861 (4.802)	0.835 (2.141)	4.108** (2.006)
Private card \times WTP $p \geq 0$ (α_3)	4.139 (4.201)	-1.056 (2.010)	2.823 (2.729)	0.067 (4.130)	5.098 (6.038)	-9.508** (4.644)	-0.766 (0.998)	5.513** (2.632)	-2.528 (5.571)	-2.205 (2.484)	-3.985* (2.327)
$\alpha_1 + \alpha_3$	-0.145 (2.492)	2.653* (1.193)	-2.065 (1.615)	0.815 (2.451)	-5.636** (3.596)	-0.073 (2.756)	2.214 (0.592)	-3.430 (1.562)	-0.643 (3.305)	-1.489 (1.474)	-1.381 (1.381)
Controls†	X	X	X	X	X	X	X	X	X	X	X
Time and community fixed effects	X	X	X	X	X	X	X	X	X	X	X
R2	0.11	0.03	0.04	0.10	0.12	0.10	0.06	0.05	0.11	0.05	0.07
Panel C: Average commodity shares											
<i>For public cards</i>	12.79	1.10	2.04	10.93	21.86	22.21	1.55	2.68	12.83	2.48	2.34
<i>For public cards and WTP $p \geq 0$</i>	14.40	1.20	1.78	11.46	20.49	23.46	1.46	1.38	13.51	3.13	3.06

Dependant var: Share of total gains allocated to the various commodities. One column per commodity. Panel A: OLS regression without controls and fixed effects. Panel B: System of linear equations estimated with a SUR model, with controls and fixed effects.
Sample: all individuals but the ones who drew the card 1000 FCFA in public.
Control var in Panel B¹: sex, age, hh head, link to hh head, religion, ethnicity, Koranic & French education, marital status, household composition, sector of activity, ln aver. income over last 3 months, contributes to hh food expenditures, log hh food expenditures per day per cap, rented residence
Included in Panel B: community and lab-session fixed effects.
S.e. in (); +0.11, * 0.1, ** 0.05, *** 0.01

Table 17: Effect of income hiding on resource allocation $sample^{\diamond}$: C_{9000} & $T_{free, NP}$

<i>Dependant variables:</i> <i>Commodity shares</i>	Expenditures			Transfers		Loan		Investment	Saved gains	Other	
	Personal	Education	Health	Hh non-food	Hh food	To kin	To non-kin				Repayment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A without control ($N = 321$)											
Private card (α_1)	0.287 (5.329)	-1.667 (1.015)	0.526 (3.157)	3.258 (7.138)	-7.668 (7.179)	3.542 (5.663)	0.650 (1.414)	-1.299 (4.562)	-1.446 (5.876)	0.435 (2.351)	1.813 (2.211)
WTP $p \geq 0$ (α_2)	-1.018 (2.958)	0.063 (1.551)	-2.601* (1.512)	-1.415 (4.069)	-5.788 (5.308)	9.700** (4.604)	0.278 (0.610)	-3.604 (2.495)	0.122 (4.326)	0.913 (2.027)	3.940** (1.686)
Private card \times WTP $p \geq 0$ (α_3)	5.757 (5.656)	2.276 (2.080)	0.754 (3.643)	-5.190 (7.965)	8.288 (8.897)	-8.648 (7.014)	-0.772 (1.555)	3.173 (4.779)	-1.784 (7.301)	-0.746 (3.127)	-2.132 (2.974)
$\alpha_1 + \alpha_3$	6.044*** (2.196)	0.610 (1.433)	1.281 (1.346)	-1.932 (2.777)	0.620 (4.522)	-5.105 (3.653)	-0.122 (0.805)	1.874 (1.353)	-3.230 (3.952)	-0.311 (1.605)	-0.319 (1.932)
R2	0.01	0.01	0.01	0.01	0.01	0.02	0.00	0.01	0.00	0.00	0.01
Panel B with controls ($N = 314$)											
Private card (α_1)	1.356 (4.444)	-0.167 (2.027)	0.215 (2.677)	1.359 (4.713)	-8.980 (6.706)	3.046 (4.989)	0.578 (1.143)	-1.993 (2.959)	0.243 (6.343)	0.881 (2.609)	3.151 (2.994)
WTP $p \geq 0$ (α_2)	-0.624 (3.503)	0.304 (1.598)	-2.766 (2.108)	-0.384 (3.716)	-4.881 (5.277)	9.392** (3.934)	-0.118 (0.902)	-3.170 (2.333)	-0.894 (5.001)	0.541 (2.057)	3.976* (2.360)
Private card \times WTP $p \geq 0$ (α_3)	5.237 (5.372)	1.008 (2.450)	1.464 (3.228)	-3.325 (5.698)	5.296 (8.126)	-7.404 (6.032)	-0.335 (1.382)	3.590 (3.578)	-3.144 (7.669)	-0.820 (3.154)	-3.123 (3.619)
$\alpha_1 + \alpha_3$	6.593*** 2.953	0.840 1.347	1.679 1.744	-1.966 3.132	-3.684 4.479	-4.357 3.316	0.243 0.760	1.597 1.966	-2.901 4.215	0.061 1.734	0.028 1.989
Controls [†]	X	X	X	X	X	X	X	X	X	X	X
Time and community fixed effects	X	X	X	X	X	X	X	X	X	X	X
R2	0.17	0.10	0.07	0.21	0.16	0.19	0.09	0.10	0.11	0.10	0.12
Panel C: Average commodity shares											

Dependant var: Share of total gains allocated to the various commodities. One column per commodity. Panel A: OLS regression without controls and fixed effects. Panel B: System of linear equations estimated with a SUR model, with controls and fixed effects.

[◇]Sample: all individuals with either a control card at 9000 FCFA in public or a treatment card with 1000 FCFA in public and 8000 FCFA in private (unconditional of preferences).

[†]Control var in Panel B: sex, age, hh head, link to hh head, religion, ethnicity, Koranic & French education, marital status, household composition, sector of activity, in aver. income over last 3 months, contributes to hh food expenditures, log hh food expenditures per day per cap, rented residence

Included in Panel B: community and lab-session fixed effects.

S.e. in (); ⁺ 0.11, * 0.1, ** 0.05, *** 0.01

Table 18: Effect of income hiding on resource allocation - all controls

<i>Dependant variable: Commodity shares</i>	Expenditures		Transfers	Loan
	Personal (1)	Health (2)	to kin (3)	repayment (4)
Private card	1.453 (3.070)	1.681 (1.745)	-2.480 (3.421)	-3.298* (1.769)
WTP $p \geq 0$	2.774 (3.064)	-0.670 (1.738)	1.731 (3.415)	-3.755** (1.765)
Private card \times WTP $p \geq 0$	-0.117 (3.827)	1.090 (2.168)	-3.421 (4.266)	5.728*** (2.205)
Male	2.242 (2.295)	-0.081 (1.303)	3.057 (2.559)	-1.906 (1.322)
Age	-0.301*** (0.107)	0.109* (0.061)	-0.200* (0.120)	-0.059 (0.062)
HH head	6.702* (3.603)	-1.841 (2.049)	-3.667 (4.016)	2.266 (2.076)
Spouse of hh head	2.637 (2.968)	-1.204 (1.686)	-0.811 (3.309)	1.963 (1.710)
Child of hh head	1.697 (2.575)	0.481 (1.464)	0.273 (2.870)	-1.413 (1.483)
Sibling of hh head	11.056*** (4.280)	-1.714 (2.429)	-4.233 (4.770)	2.651 (2.466)
Muslim mouride	-0.141 (2.016)	-0.206 (1.102)	3.788* (2.229)	-1.254 (1.179)
Muslim other confession	0.467 (3.253)	-2.025 (1.870)	-1.176 (3.597)	-1.747 (1.903)
Christian or other	7.601+ (4.685)	1.150 (2.587)	-2.043 (5.181)	1.337 (2.741)
Koranic education	1.095 (1.915)	0.120 (1.080)	1.437 (2.135)	-0.539 (1.103)
French/Arabic education	0.052 (1.954)	1.861* (1.106)	-0.579 (2.178)	-1.287 (1.126)
Single	1.616 (2.660)	-1.383 (1.511)	7.541** (2.965)	3.748** (1.533)
Household size	-0.137 (0.186)	-0.065 (0.105)	0.726*** (0.207)	0.028 (0.107)
% adults in hh	15.922*** (5.688)	-7.536** (3.233)	1.277 (6.339)	-0.426 (3.277)
Formal sector	-1.333 (2.649)	0.174 (1.500)	0.111 (2.953)	1.698 (1.526)
Average revenues in LN [†]	-0.583 (0.436)	0.377 (0.247)	-0.284 (0.486)	-0.106 (0.251)
Earned a revenue in last 7days	6.032 (4.805)	-4.751* (2.724)	3.543 (5.356)	0.748 (2.768)
Contributes to hh daily food expenses	-6.396*** (2.256)	-1.893 (1.283)	1.156 (2.514)	0.955 (1.300)
HH food expendit. per cap. [‡]	-1.503 (2.290)	-0.147 (1.301)	4.904* (2.552)	0.052 (1.319)
Constant	24.494 (16.311)	3.736 (9.178)	-19.801 (18.182)	6.852 (9.398)
Time and community fixed effects	X	X	X	X
N	782			
R ²	0.09	0.04	0.10	0.05

Dependant var: Share of total gains allocated to the various commodities. One column per commodity. System of linear equations estimated with a SUR model, with controls and fixed effects.

Sample: all individuals but the ones who drew the card 1000 FCFA in public.

Control var in all columns but (2): ethnicity dummies ; [†] :Average revenues over last 3 months if worked last week (LN); [‡] Household food expenditures per capita over last 3 months, in LN
S.e. in (); *0.1, ** 0.05, *** 0.01

Table 19: Relationships shared in the selected intra-household pairs

Relationships	Frequency	Percentage
Spouses	42	15.85
Child-Parent	50	18.87
Siblings	64	24.15
Niece/Aunt-Cousin	24	9.06
Child-in-law/Parent-in-law	9	3.4
Siblings in law	24	9.06
Other kin	24	9.06
Other non kins	9	3.4
Missing link	19	7.17
Total pairs	328	100