Motives for Household Private Transfers in Rural Burkina Faso

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Abstract

This paper explores the motives for inter-household private transfers in rural Burkina Faso. Given the importance of private transfers in household income, quantitatively evaluating the response of private transfers to recipient incomes is informative for the design and the implementation of public interventions, such as policy alleviation programs, which often include transfer programs. To the extent that private transfers interact with public ones, the overall impact of public transfers might be offset, leaving income distribution unchanged. I use the transfers model proposed by Cox, and two national surveys from Burkina to test whether private transfers are motivated by altruism, exchanges or by risk sharing objectives. The econometric estimations control for income endogeneity via instrumental variables, and use three alternative specifications: a spline regression, which is standard in the literature, a friction model which controls for the large fraction of non-participants, and a partial linear model which relaxes the functional form assumption between transfers and income. The findings support the equalizing effects of private transfers. Furthermore, transfers received are reduced by pre-transfers incomes and the effect is larger for low income households. These results support altruistic motives for transfers. In the highest quartile, exchanges motives seem to prevail as indicated by the semi-parametric explorations. Transfers are also used to cope with income risk, although the response to transitory income shocks is relatively small. Overall, the findings provide evidence on the interactions between private and public transfers, which may limit the net effects of public interventions which use transfers to pursue income equality objectives.

1 Introduction

This paper analyzes the relationships between private transfers and household resources in Burkina Faso in an effort to examine how private transfers are affected by changes in recipient incomes. There are several reasons why private income transfers between households are important, especially for a poor but reforming economy like Burkina Faso. First, private old-age support can act like social security for many elderly household members. Second, private transfers have been found to act like credit markets in helping households overcome borrowing constraints (Cox, 1990; Udry, 1990). Third private transfers assist households in coping with risk (Cox, Eser and Jimenez, 1998; Morduch, 1999; Townsend, 1994). In sum, in developing countries, private transfers perform some of the functions that public transfers and financial markets do in developed countries.

In a country like Burkina, where private transfers represent a substantial fraction of households' income, understanding the determinants of private transfers is informative in evaluating the impact of public programs, such as poverty alleviation policies, which often carry important resource transfer components. An examination of two national surveys reported in table (1), indicates that about 39 percent of the households surveyed in 1994 and 42 percent of those surveyed in 1998 report some transfer activity, either as donor, recipient, or both [1]. Transfers contributed on average to 33 percent and to 19 percent in recipient households income in 1994 and 1998, respectively. Most households were transfer recipient only: 23 percent received transfers in 1994 and 28 percent in 1998. This suggests that eventual interactions between private and public transfers might impact the welfare of a large fraction of the population.

The paper sets out to examine household survey data to test whether transfer

[1] These surveys are the first and second Priority Surveys conducted by the Institut National de la Statistique et de la Dmographie.

flows follow a pattern consistent with some of the predictions of theory. Specifically, the paper asks whether private transfers in the context of rural Burkina are consistent with altruistic, exchange, risk sharing motives or some combination of the three. These three motives have been used to rationalize household private transfers behavior. Since Becker's seminal work on social interactions (Becker, 1974), it is recognized that altruism can explain transfers observed among relatives. For instance, altruistic motives can be used to explain the tendency for parents to invest in childrens education, for children to support parents in old age, or for family members with higher incomes to support those with lower incomes (Stark 1996; Lee 1994; Willis 1982). On the other hand, such behaviors can also be explained by self-interested motivations, consistent with exchange relationships. For example, parents may invest in children in anticipation of future old-age support, and high earners may support those with low earnings in anticipation of a subsequent reversal of fortunes or in compensation for services that the later provide (Lucas and Stark, 1985; Oded and Falk, 1998). Moreover, if households engage into informal risk sharing arrangements, transfers can be used to smooth consumption against idiosyncratic shocks (e.g. Cochrane, 1991; Townsend, 1994). To summarize, private transfers can be determined by altruistic, by exchange motives, or by risk sharing objectives.

For policy purpose, different transfer motives imply different predictions regarding the relationship between private transfers and recipient pre-transfer income (Cox, 1987; Cox and Jakubson, 1995), which in turn lead to distinct policy implications. First, under altruism, public transfers reduce the transfers received, given the recipient pre-transfer income. For instance if government were to initiate a transfer program targeting the poor, transfer flows from the wealthier to the poor may be reduced. It is then possible that welfare levels remain unchanged for low income households and increase for high income households. This crowding out effect can potentially offset the effects of public interventions in places where private transfers are already

important (Cox, Hansen and Emmanuel, 2002).

Second, if transfers are motivated by exchanges where the recipient receives transfers in compensation for some services that he provides to the donor, public transfers will not necessarily displace private ones (Cox, 1987). Under certain circumstances, which are discussed later, it is possible that public transfers crowd in private transfers. Cox et al. (2002) provide some evidence using Filipino data that at high income levels, public transfers do indeed increase private ones.

Finally under the complete risk sharing hypothesis, targeted public transfers are likely to displace private ones if the public interventions are initiated in response to transitory shocks. This is implied by the risk sharing model that predicts that idiosyncratic changes and not permanent incomes are pooled (e.g. Cochrane, 1991; Townsend, 1994). Hence, only transfers perceived as transitory may enter the risk sharing pool. For instance, relief programs or unemployment insurance programs might crowd out private transfers, while pension programs which tend to be permanent may have a little effect.

Previous studies provide mixed results on the existence and the magnitude of the crowding out effect. A number of studies (e.g. Cox and Jakubson, 1995; Cox and Rank, 1992; Altonji, Hayashi and Kotlikoff, 1997) have found a significant but small effect of public transfers on private ones. In contrast other studies (e.g. Cox and Jimenez, 1992, 1995; Cox et al., 2002) found a substantial effect of the displacement of private transfers by public ones. The literature offer three alternative explanations. First, analysis using data from developed countries are less likely to find significant crowding effect because public transfers have already reduced private ones (Cox et al., 2002). Second, the response of private transfers might differ depending on the type of public interventions. For instance,Cox and Jimenez (1995) estimate that an unemployment insurance system would have a strong crowding out effect in the Philippines, while the degree of crowding out associated with pensions is much less

significant. Third, it is possible that transfers be motivated by altruism when recipient income is low, and then exchange motives become determinant when the recipient income reaches a certain threshold (Cox et al., 2002). These non-linearities, when not properly controlled, may affect estimated transfer function parameters.

In this paper, the transfers model developed by Cox (1987) is used to motivate the empirical work. Then the relationship between net transfers and recipient pre-transfer income is explored using both parametric and semi-parametric regressions, and controlling for household characteristics. Data used come from two national surveys conducted in 1994 and 1998 by the Burkinabe national statistical agency. The main findings can be summarized in the following three points. First, transfers flow from more affluent to less affluent households, thus reducing income inequality. Second, both permanent and transitory income components are found to significantly affect transfers, although the effect is small. An increase of 1 unit in permanent and transitory income is met with a reduction in transfers of .11 and .10 unit, respectively. The reduction is more substantial, .29 and .12 when the presence of friction is accounted for [2]. Third, the semi-parametric estimates suggest that below an annual income level of about CFA Franc 25000 per adult, transfers received are decreasing with pre-transfers income. Above this threshold, transfers received are concave in recipient income, with the turning point situated around CFA Franc 35000 per adult per year. In sum, the results indicate a negative relationship between private transfers and income. Hence the effects of public interventions seeking to redistribute income may be partly offset, if the interactions between private and public transfers are ignored.

The second section presents the theoretical framework used to motivate the empirical specifications. The third section describes the data used. The fourth section present the empirical specification. The fifth section discusses the empirical results,

[2] All units are expressed in local currency or CFA Franc

and the sixth section.

2 Theoretical framework

The analytical framework developed by Cox (1987) is used to motivate transfers functions, which relate transfers received to the recipient income. The model generates two predictions on the relationship between the recipient income and the amount transfer received. On the one hand, if transfers are altruistically motivated, then transfers received should decrease as the recipient income increases. On the other hand, transfers received will decrease as recipient income rises if exchanges were the underlying motive. Moreover, under certain circumstances, the model allows transfers to rise with recipient income.

Formally, assume that there are two individuals, the donor denoted by d and the recipient denoted r. The amount of transfer is T and the recipient provides some services S to the donor, which by assumption do not have market substitute. Furthermore, I assume a one-sided altruism from the donor. The donor utility U is increasing in his consumption of an aggregate good C_d, the amount of services consumed S and the recipient utility V. The last relationship captures altruism in the model. The recipient utility V is increasing in his consumption C_r and decreasing in S. The donor solves the following program:

$$U_d = U(C_d, S, V(C_r, S)) \tag{1a}$$

$$C_d = I_d - T \tag{1b}$$

$$C_r = I_r + T \tag{1c}$$

$$V(I_r + T, S) \geq V_0(I_r, 0) \tag{1d}$$

Where equations (1b) and (1c) represent the budget constraints faced by the donor and the recipient respectively. Equation (1d) is the participation constraint, which states that the recipient entering in the relationship must not lower his utility. Cox (1987) shows this programs generates two regimes, depending on whether the participation constraint is binding or not.

Under the first regime, the participation constraint is not binding ($V > V_0$). The transfers are then altruistically motivated, and the recipient is more than compensated for his services. The net transfers received decrease with the recipient income. The predicted relationship between transfers and income is $\partial T/\partial I_d - \partial T/\partial I_r = 1$, which is the transfer income derivative tested by Altonji et al. (1997).

Under the second regime, the participation constraint is binding (for instance the recipient pre-transfer income is high enough), the transfers are motivated by exchanges, and the recipient is compensated for his services. This regime can be pictured as if transfers were made in order to compensate services S which have an implicit price P. Thus the relationship between transfers and services is can be expressed as: $T = PS$. Cox shows that transfers first increase with income and then fall, thus generating an inverted U shape[3].

The model presented here does not distinguish between permanent and transitory income components, and thus does not explicitly consider risk sharing motives. However, in the empirical work, permanent and transitory incomes will enter the transfers function separately. This specification is then used to explore the role of transfers in

[3]More formally, the argument proceeds as follows:

$$\frac{\partial T}{\partial I_r} = \frac{\partial S}{\partial I_r} P + \frac{\partial P}{\partial I_r} S$$

The first term in the right hand side is negative, and the second term positive. Thus, the overall effect depends whether the price or the quantity effect dominates. Cox shows that the price effect will initially dominate, and then the quantity effect dominates as recipient decreases the quantity of services at certain pre-transfer income level. Thus, the transfers first increase with income and then fall. One should note the argument is that this pattern is consistent with exchanges motivated transfers, but does not constitute a proof of exchanges motivated transfers, since other behavior may generate similar empirical pattern (for instance see Lucas and Stark (1985) for the relationship between remittances and home household income in Botswana.

risk sharing. From the risk sharing model (Cochrane, 1991; Townsend, 1994), if the sole purpose of transfers were to is coping with unpredicted income shocks, then only transitory income affect transfers, and permanent income should not be a significant determinant of transfers [4].

In conclusion, t two theoretical predictions are explored. First there is a negative linear relationship between transfers and recipient income under a first regime where recipient income is very low. And, at a certain threshold transfers become motivated by exchanges, with transfers received the shadow price of service increasing as the recipient income rises. Finally, from the risk sharing model, transfers received are determined by transitory and not by permanent income.

3 Data and Descriptive statistics

The paper uses the two rounds of the national priority surveys conducted in 1994 and in 1998. The two surveys are very similar in the scope of the information collected, the sampling design and coverage. The surveys are closely related to the World Bank LSMS, and are intended to be nationally representative and the sample selection uses a two-stage stratified random sampling. The number of households interviewed is 8700 in 1994 and 8478 in 1998. Only the sample of rural households is used in this study. This consists of usable data for 5001 households in 1994 and 5523 in 1998.

The surveys collected information on household and individual characteristics, employment status, expenditures and income. Information on transfers was collected at the household level. Transfers given were collected along the consumption module with a month recall period covering the month preceding the survey, while transfers received were collected along with the income module with a recall period covering the previous 12 months. There are two issues related to these differences in the recall

[4]This hypothesis can be understood through the risk sharing literature. In the formal risk sharing model (Townsend, 1994; Cochrane, 1991; Mace, 1991), changes in income, and not permanent income, are redistributed to smooth individual consumption within the insurance group.

periods. First, if seasonal variations are important, then negative transfers given are more likely to be misreported. Second, if intra-annual inflation is important, then nominal values of transfers given and received might be reflecting in fact different real values Paxson (1992).

Descriptive statistics are reported in tables (2) and (3), and a summary of all the variables used in the analysis is presented in table (6) in the appendix. Table (2) reports private transfers expressed in local currency units (CFA Franc) per adult. The pre-transfer income is the estimated income per adult before transfers, and post-transfer income include net transfers received [5]. In both 1994 and 1998, recipients have the lowest pre-transfer average income per adult. After transfers, this group has average income higher than the autarkic group which does not participate in private transfer transactions. For recipients, transfers received represent 34 percent of pre-transfer income in 1994 and 19 percent in 1998. Next, the sample is split by tercile using non-durable expenditures per adult as a wealth indicator. Net transfers are positive for the lowest and the middle income class, and negative for the upper income class. This suggest that transfers flow from wealthier to poor households, and thus may have an equalizing effect. Note that, although the absolute numbers differ between the two years, the qualitative pattern is similar, suggesting a rather stable pattern of private transfers over time.

Further evidence of the equalizing effects of transfers is provided in table (3). The table reports pre- and post-transfers income and consumption inequality as measured by Gini and Theil maximum entropy coefficients. The point estimates are reported along with bootstrapped standard errors [6]. In both years, transfers alter substantially welfare distribution whether expressed in income or in expenditures. Considering income inequality, the Gini coefficient drops from .571 to .555 in 1994 and from .497 to .474 in 1998 after net transfers are taken into account. Distribution of expendi-

[5] Net transfer is calculated as transfer received minus transfer given

[6] Bootstrap consisted of 500 replications, correcting for the two step sampling process

tures is also responsive to transfers. The Gini coefficient drops from .396 to .374 in 1994 and from .383 to .362 in 1998. The Theil inequality measure also indicates a similar pattern. Transfers have an equalizing effect on both income and expenditure distributions (Cox and Jimenez, 1995) have reached to similar conclusions for the Philippines.

4 Empirical specifications

4.1 Functional forms

The theoretical framework suggests an empirical relationship between private transfers and recipient income, which can be written as follows:

$$T = g(Ir) + \beta X + \epsilon \tag{2}$$

Where T is net transfers received, X is a set of controls describing household characteristics, and g is a non-linear function in recipient income.

There are a number of econometric issues associated with the estimation of equation (2). The first concern is the implied functional form of g, which from the theory is non linear. Second, there is the potential endogeneity of income with respect to transfers received, which leads to inconsistent estimates of the main parameter of interest. Finally, as it is apparent from table (1), more than half of the surveyed households neither give nor receive transfers. There are both theoretical and econometrical motivations to account explicitly for this large fraction of corner households. The remaining of this subsection discusses how these issues are addressed.

The theoretical framework suggests that g is non linear, and specifically that g is linear over a certain income range, and then becomes an inverted U. Since the shape of the function is central to the hypotheses considered, the estimation approach attempts

to avoid imposing strong structural form on g. For this purpose two specifications are considered. The first specification uses a spline regressions (Greene, 1997), which allows the income parameter to vary over different income quartiles. Formally, the spline regression is expressed as follows:

$$T_i = \sum_{k}^{4} \gamma_k I_i \cdot I(I_i \in k) + \beta X_i + \varepsilon_i \tag{3}$$

Where T_i is net transfer received by household i, k indicates pre-transfer income quartiles, I_i is household i's pre-transfer income, I is an index variable which is equal to one for I_i falling in quartile k and zero otherwise, and X is a set of variables that affect transfers received. A similar specification has been used by Cox and Jimenez (1995) and also by Cox et al. (2002), however Cox et al. (2002) do not impose the spline's knots a priori.

Although the spline specification allows some flexibility, it still imposes two strong restrictions on the functional form. First, it assumes a priori that the changes in income parameters occur at the specified knots. This may result in specification bias if the assumed points differ substantially from the true values. Second, the specification implies that within a given income quartile, the income parameter is constant. There are three alternatives for relaxing these restrictions. First one can estimate the knots along with the income parameters by specifying a nonlinear model. Second, one can use a high order polynomial of income [7]. These are the two approaches adopted by Cox et al. (2002). A third approach which I adopt is to use a partial linear specification where the function g is estimated non-parametrically after partialling out the effects of the other covariates (Robinson, 1988) [8]. The estimation proceeds in two steps as follows. First the parameter β is estimated by estimating separately the nonparametric relationships between T and I, and between X and I, by forming the

[7] Note that the first approach do not relax the second constraint since the income parameter is still maintained constant between any two points

[8] See for example Duflo (2000) and Duflo and Udry (2001) for applications using the estimator

residuals, and regressing the residuals of T on those of X. Second, the estimated $\hat{\beta}$ is used to estimate the function g. The nonparametric estimator used here is the Fan (1992) locally weighted least square estimator with a quartic kernel. The two steps are written as:

$$\hat{\beta} = \left[\sum_{i=1}^{N}(X_i - \hat{E}[X_i|I_i])(X_i - \hat{E}[X_i|I_i])'\right]^{-1}\left[\sum_{i=1}^{N}(X - \hat{E}[X_i|I_i])(T_i - \hat{E}[T_i|I_i])\right]' \tag{4}$$

$$\hat{g}(I_i) = \hat{E}[T_i/I_i] - E[X_i|I_i]\hat{\beta} \tag{5}$$

As noted previously, more than half of the surveyed households do not participate in transfer transactions. This suggests that transfers do not adjust smoothly to changes in income. Transactions costs associated with transfers as described by Honore, Kyriazidou and Udry (1997) or by Udry (1994), would imply that positive transfers are observed only when latent transfers exceed the transaction costs. Alternatively, this pattern may rise if transfers take place within networks, and there are fixed costs associated with network participation. Regardless of the theoretical explanations, ignoring the presence of the large number of zero values, will result in biased inference similar to what occurs with censoring. Following Udry (1994), I use Rosett's friction model (Rosett, 1959) to account for the presence non-participant households.

$$T = \begin{cases} T^* & \text{if } T^* > \tau; \\ 0, & \text{if } -\tau \leq T^* \leq \tau; \\ T^*, & \text{if } T^* < -\tau \end{cases} \tag{6}$$

Where T^* is latent net transfer, τ is unobserved positive transaction costs, and

T denotes the parametric transfer function as defined in (3) [9]. The transactions cost set thresholds that the latent transfers (positive or negative) must exceed in order for one to observed any transfer. This model is estimated by maximum likelihood methods using the likelihood function proposed by Maddala (Maddala, 1983, pages 163-164).

4.2 Identification

The main parameter of interest in this exercise is the one associated with pre-transfer income. However some variables such as household composition, head gender, age or education may determine both income and transfers, thus leading to simultaneity bias. To control for the potential simultaneity bias, the income equation is identified with respect to transfers following the approach used by Paxson (1992) to analyze household savings in Thailand. The technique merges long run regional rainfall data with the household level information. Assuming that current rainfall deviation from its long run mean is unpredictable, permanent household characteristics and annual decisions such as farm size and type of crops grown interacted with current deviations in rainfall provides a measure of the transitory income. In the context of this paper, the main identifying assumption is that rainfall deviations affect transfers only through its effect on income. Formally, denoting permanent by P and transitory by S, the income equation is written as:

$$I_{ir} = \beta_t + \beta_0 + \beta_1 X^P_{irt} + \beta_2 X^S_{irt} + \varepsilon_{irt} \tag{7}$$

Where X^P represent characteristics which are permanent to the household and X^S represent characteristics which determine transitory income. As determinant of permanent income I use the household demographic variables, the head education and gender, the livestock possessions (cattle, goat and sheep), the farm and other

[9] Recall that by convention, transfers given are negative and transfers received are positive

productive equipment. The transitory income determinants are rainfall deviations in the region, and the type of crops grown. The estimated parameters are used to fit separately permanent and transitory incomes. The residual is the "unexplained" part of income (Paxson, 1992).

Estimates of this equation are presented table (7) of the appendix along with the F test on the joint significance of the instruments. The F test statistic is equal to 25.95, suggesting that the instruments used have a relative strong power in explaining observed income variations across households. Furthermore, the variables included explain 34 percent of the variations of income, with an adjusted R^2 of 33 percent indicating that relative strong explanatory power of the model is not simply due to the number of variables included [10].

Another concern with respect to identification is household size and composition. Although there are a number of reasons why one may not treat the household composition as given, the concern is even more serious with respect to transfers. Indeed, if observed household structure [11] results from migration decisions and transfers received are correlated with the number of migrated members, then the coefficients of household composition are biased. More specifically, if one admits a positive relationship between transfers received and the number of household members who have migrated, then the direction of the bias depends how observed household composition is related with the numbers of migrant members [12]. I do not attempt to control for

[10] There are two main limitations of the identification strategy which have been discussed by Rosenzweig and Wolpin (2000). The dependant variable used is income and not profit, and farmers adjust their labor and input allocation over the season as the rainfall pattern is revealed– see Fafchamps (1991). Thus, proper identification requires farm profits, however information on inputs and labor is not available from the data

[11] for instance female headship, smaller size

[12] Using the transfer function, the bias can be characterized as follows:

$$E(T|x) = \beta_1 + \beta_2 x + \beta_3 E(m|x)$$

Where x is observed household members, and m is the number of household members who have migrated, which is unobserved in the survey (hence unavailable to the researcher). Let abstract from other explanatory variables and maintain that $\beta_3 > 0$. Then OLS lead to an upward bias if $\frac{\partial m}{\partial x} > 0$, to a downward bias if $\frac{\partial m}{\partial x} < 0$ and to unbiased estimates if $\frac{\partial m}{\partial x} = 0$. For instance, if I suppose that

the endogeneity of household structure with respect to transfers. Thus the coefficients associated with these variables should be interpreted as correlations, providing at best only some suggestive evidence on the directions of the causality relationships.

5 Results and discussion

Estimated transfers functions are reported in tables (4) and (5). Estimates shown in table (5) only consider observed and permanent incomes. The first and second rows report estimates using a linear specification of transfer functions, with the difference that income is instrumented in the second column. The two remaining columns parallel the first two, but use the Rosett model in an attempt to control for the non-participation constraint.

I focus on the income effects first. In the first column (i.e. using OLS and a linear specification), the results indicate that an increase by 1 CFA in recipient income induces a reduction of .249 CFA of transfers received in the lowest quartile. In the second and third quartiles, increase in recipient income induces more transfers, however the income effect is positive and large, but imprecisely estimated. The coefficients are smaller and less precisely estimated when income is instrumented (second column). However there is a positive sign now associated with income in the lowest quartile. The third and fourth columns present the Rosett model estimates. In the first quartile, transfers decrease by CFA .42 when income increases by one CFA. The estimated income effect is smaller when using predicted income (CFA .2) and not significant. For the second quartile, transfers received are reduced by CFA .37 when income increases by one CFA and when using predicted or observed incomes. The response is marginal but positive for the third quartile, and then become negative and precisely estimated for the fourth quartile: -.2 and -.28 for observed and predicted

small households are small because of out-migration, then the estimates are upward biased. On the other hand, it may be that only at certain size that households let members migrate, in this case the bias will be upward.

income respectively.

At the bottom of each column, an F test (for the linear specification) and a $\chi 2$ test for the friction model are reported. The null hypothesis under each of these tests is that income coefficients are equal across quartiles. Except when the friction model is estimated with predicted income (column 4), the constancy of the income coefficients is rejected at the one percent level. Taken together, the results suggest, income effects on transfers received are influenced by recipient pre-transfer income level. Also, pre-transfer income reduces transfers received and the effect is largest in the two first quartiles.

In table (5), I use permanent and transitory income components separately. First consider the hypothesis that inter-household transfers are driven by risk sharing motives. If so, permanent income should not matter after controlling for transitory income. From columns (1) and (2) for the linear specification, and columns (4) and (4) for the friction model, permanent income still has a relatively large and significant effect. This suggests risk sharing motives do not completely explain transfers, rather the general pattern is that transfers flow from relatively wealthier households to the poor.

Turning to risk sharing, the estimates suggest that part of the transfers are intended to compensate transitory changes in income. However there are two features. First, the response is small. About 10 percent of transitory income losses are compensated in the form of private transfers. This suggests, that transfers less than compensate for transitory income changes, and is consistent with a stream of literature which finds significant although incomplete risk polling in developing rural areas (references). Columns (2) and (5), distinguish between positive and negative income shocks. The point estimates indicate the transfers a household receives when affected by a negative income shock are larger than those given when affected by positive income shocks (columns 2 and 5). These results remain robust to a spline

specification in permanent income. A potential explanation, is that transfers flow permanently from the rich to the poor – or from the city to the rural areas– but the level of transfers adjust to shocks affecting the recipient. This in turn suggests different types of public interventions might have distinct effects on transfers. For instance, public interventions intended to cope with transitory shocks (e.g. relief programs, unemployment insurance) might affect the part private transfers that respond to transitory income while interventions with more permanent characteristics (e.g. pension scheme) interact with permanent income.

The last set of results are presented in figures (1) and (2). These figures show non-parametric estimation of the response of net transfers to pre-transfer income, after controlling for the remaining covariates. In figure (1), I use observed income, while in figure (2) I use predicted permanent income. The figures confirm the strong non-linearity of the relationship between transfers and income. Second, the relationship is decreasing up to an income level of about CFA 250000 per household.

The non-linearity of the income effects on transfers is apparent from the figures, and appears to be consistent with the theoretical considerations discussed earlier. These partial linear estimations are consistent with the hypothesis that altruistic motives are important for low-income households, but become inoperative for higher income groups. Cox et al. (2002) reach to similar conclusions for the Philippines.

6 Conclusion

The goal of this paper was to explore the motives of private transfers in rural Burkina Faso. To this end, the paper used two national surveys, and estimated transfers functions based upon Cox's transfers models. Decomposing income into permanent and transitory components using the framework suggested by Paxson (1992), I also explore risk sharing motives. Three main conclusions emerge from this exercise, and

are summarized as follows.

First, the descriptive statistics suggest that a large proportion of rural households are involved in private transfer transactions. For those households involved, transfers represent a substantial share of their total income, thus indicating the importance of transfers in rural households' living standards. There is some suggestive evidence that private transfers are skewed towards poorer households, i.e. transfers flow from the relatively more affluent to the less affluent households.

Second, there is significant and negative relationship between transfers and income. However this relationship may not be tracked adequately by parametric analysis, as reflected in the difference between the parametric and semi-parametric analyzes. This suggests that future parametric analyis might explore alternative specifications of the spline's knots, or treat the knots as parameters to be estimated as in Cox et al. (2002).

Third, the paper provides evidence that transfers between households in Burkina have an insurance component. More specifically, transfers received increase when the recipient experiences a negative transitory income shock. However remittances represent only a small fraction of transitory income. Only about 10 percent of transitory income losses are compensated by transfers, and a smaller proportion of positive income shock is given away. This supports the partial risk sharing documented in a number of studies, but also suggests that ether current consumption, or saving or both might respond strongly to transitory incomes. Overall the results provide some evidence on the interactions between private and public transfers, which if ignored, may potentially limit the distributional effects of transfers programs.

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Table 1: Household participation in transfers, 1994 and 1998

	1994	1998
Non participants	61.72	57.40
As recipients only	23.01	27.59
As donors only	8.35	9.02
As Both	6.92	5.99
Number households	5001	5523

Table 2: Transfer impact on household income

	Income		Net Transfer	Perc. income
	Pre-transfer	Post-transfer		
1994				
Non Participants	46899	46899	0	0.0
Recipients	43363	57895	14532	33.5
Donors	111859	88195	-23664	-21.2
Both recipients and donors	95751	95182	-569	-0.6
Low tercile	37031	39409	2379	6.4
Middle tercile	47375	50296	2921	6.2
Upper tercile	80259	78940	-1319	-1.6
1998				
Non Participants	90152	90152	0	0.0
Recipients	64635	76733	12098	18.7
Donors	176434	153733	-22701	-12.9
Both recipients and donors	133303	132465	-838	-0.6
Low tercile	56686.89	60390.47	3704	6.5
Middle tercile	80561.59	83297.7	2736	3.4
Upper tercile	143182.1	140465.9	-2716	-1.9

Table 3: Transfers effects on income and expenditure distribution

	Gini		Theil	
	Point estimate	Sd. Error	Point estimate	Sd. Error
Pre-transfer income				
1994	0.571	0.011	0.621	0.029
1998	0.497	0.009	0.449	0.021
Post-transfer income				
1994	0.555	0.011	0.585	0.030
1998	0.474	0.009	0.408	0.019
Pre-transfer expenditure				
1994	0.396	0.009	0.294	0.020
1998	0.383	0.011	0.279	0.021
Post-transfer expenditure				
1994	0.374	0.009	0.258	0.017
1998	0.362	0.010	0.245	0.018

Table 4: Transfer response to permanent income

	(1)	(2)	(3)	(4)
	Spline with no friction		Spline with friction	
	OLS	2SLS	Obs. income	Pred. income
Income, 1^{st} quartile	-0.249	0.018	-0.422	-0.197
	[2.73]***	[0.34]	[1.79]*	[1.39]
Income, 2^{nd} quartile	0.0445	-0.056	-0.369	-0.366
	[1.02]	[0.96]	[3.34]***	[2.51]**
Income, 3^{rd} quartile	0.258	0.171	0.002	-0.145
	[9.71]***	[4.15]***	[0.03]	[1.41]
Income, 4^{th} quartile	-0.199	-0.166	-0.211	-0.287
	[44.81]***	[13.50]***	[20.03]***	[9.83]***
Year (1998=1)	7973.389	-2015.477	63937.676	34883.490
	[1.55]	[0.61]	[4.81]***	[4.20]***
Children 0-5	1065.287	13.415	-2386.593	-3075.690
	[1.04]	[0.01]	[0.92]	[1.10]
Children males 6-11	2504.119	1160.008	3854.033	1220.069
	[1.71]*	[0.73]	[1.05]	[0.31]
Children females 6-11	709.493	848.270	-1043.432	165.334
	[0.45]	[0.50]	[0.26]	[0.04]
Children males 12-15	-18458.272	-18714.431	-14189.676	103.956
	[7.49]***	[6.67]***	[2.28]**	[0.01]
Children females 12-15	4990.522	6076.933	2597.045	1258.856
	[1.92]*	[2.16]**	[0.40]	[0.18]
Adult males 16-64	-4789.407	-6540.362	-8238.473	-91.334
	[3.87]***	[4.34]***	[2.60]***	[0.02]
Adult females 16-66	7806.462	6465.857	17417.637	16127.149
	[6.20]***	[4.75]***	[5.46]***	[4.73]***
Adult males 65 +	-1531.395	-1045.357	-5966.140	-6952.740
	[0.31]	[0.19]	[0.47]	[0.51]
Adult females 65 +	4973.416	4208.298	6882.592	5177.994
	[1.44]	[1.13]	[0.79]	[0.55]
Children 0-15/Adult 16+	-462.127	-288.842	-1123.711	-1311.146
	[0.81]	[0.47]	[0.79]	[0.86]
Age household head	667.487	492.906	2670.643	2991.641
	[1.15]	[0.78]	[1.84]*	[1.92]*
Age household head squared	22221.568	25045.924	131955.184	139019.380
	[4.43]***	[4.59]***	[10.25]***	[10.01]***
Education in years	-18214.831	-15716.087	-77771.003	-86601.548
	[2.46]**	[1.93]*	[4.17]***	[4.27]***
Education in years			-330.506	-393.243
			[0.54]	[0.60]
Gender			-100988.167	-109900.851
			[5.80]***	[5.58]***
Constant	6417.291	-123.375	119375.076	369927.945
	[0.47]	[0.01]	[3.16]***	[3.41]***
Friction coefficient	6417.291	-123.375	347305.138	139483.794
			[50.17]***	[60.82]***
Observations	10519	10519	10519	10519
R-squared	0.180	0.040		
Constant income parameters	128.670	37.120	9.910	1.720

Absolute value of t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Transfer response to permanent and transitory income

	(1)	(2)	(3)	(4)	(5)	(6)
	No frictions			Friction model		
Permanent income	-0.112	-0.117		-0.293	-0.303	
	[11.76]***	[11.82]***		[12.11]***	[12.11]***	
Income, 1^{st} quartile			-0.057			-0.269
			[1.14]			[2.00]**
Income, 2^{nd} quartile			-0.121			-0.423
			[2.19]**			[3.04]***
Income, 3^{rd} quartile			0.120			-0.178
			[3.09]***			[1.83]*
Income, 4^{th} quartile			-0.206			-0.322
			[15.14]***			[9.53]***
Positive transitory income		-0.095	-0.055		-0.052	-0.049
		[4.25]***	[2.39]**		[0.92]	[0.86]
Negative transitory income		-0.135	-0.206		-0.188	-0.199
		[6.40]***	[9.13]***		[3.60]***	[3.55]***
Transitory income	-0.105			-0.124		
	[7.57]***			[3.57]***		
Unexplained income	-0.161	-0.161	-0.156	-0.169	-0.168	-0.168
	[37.08]***	[37.14]***	[35.86]***	[16.30]***	[16.24]***	[16.03]***
Year (1998=1)	10298.627	10579.181	8600.299	44318.309	42509.363	43425.203
	[3.22]***	[3.16]***	[2.54]**	[5.31]***	[5.05]***	[5.07]***
Children 0-5	1257.943	841.046	801.875	-2018.044	-1993.661	-2030.405
	[1.20]	[0.80]	[0.77]	[0.76]	[0.75]	[0.77]
Children males 6-11	2087.480	2111.588	2126.852	2483.978	2036.844	2093.199
	[1.39]	[1.41]	[1.42]	[0.66]	[0.54]	[0.56]
Children females 6-11	1268.754	746.949	950.825	136.843	224.544	240.792
	[0.79]	[0.47]	[0.60]	[0.03]	[0.06]	[0.06]
Children males 12-15	-18852.573	-19078.667	-22861.047	-4113.949	-3661.945	-4597.556
	[7.06]***	[7.14]***	[8.50]***	[0.62]	[0.55]	[0.68]
Children females 12-15	6739.776	6268.851	6598.357	2021.229	1691.104	1809.182
	[2.54]**	[2.37]**	[2.50]**	[0.30]	[0.25]	[0.27]
Adult males 16-64	-5666.450	-5462.555	-7331.894	-1061.771	-434.160	-956.047
	[4.00]***	[3.84]***	[5.12]***	[0.30]	[0.12]	[0.26]
Adult females 16-66	8299.397	8005.799	8012.623	17531.920	17339.634	17314.827
	[6.39]***	[6.17]***	[6.20]***	[5.37]***	[5.31]***	[5.31]***
Adult males 65 +	-52.259	483.357	-202.666	-5973.916	-6207.560	-6227.243
	[0.01]	[0.10]	[0.04]	[0.46]	[0.48]	[0.48]
Adult females 65 +	4941.971	4019.618	4477.476	5757.755	5442.584	5463.946
	[1.40]	[1.14]	[1.28]	[0.65]	[0.61]	[0.62]
Children 0-15/Adult 16+	-199.516	-121.584	-312.035	-1264.113	-1240.146	-1230.792
	[0.34]	[0.21]	[0.54]	[0.87]	[0.86]	[0.85]
Head age	-199.516	-121.584	-312.035	-1264.113	-1240.146	-1230.792
	[0.34]	[0.21]	[0.54]	[0.87]	[0.86]	[0.85]
Head age squared	461.619	327.140	512.987	2895.124	2867.262	2852.712
	[0.78]	[0.55]	[0.87]	[1.96]**	[1.94]*	[1.93]*
grad				-312.950	-300.213	-318.718
				[0.51]	[0.49]	[0.52]
Gender				-106322.567	-103950.451	-104160.755
				[6.19]***	[6.03]***	[5.59]***
Constant	20344.169	14849.731	3814.673	144461.221	267584.509	135679.483
	[1.49]	[1.07]	[0.26]	[3.78]***	[3.57]***	[3.47]***
Friction coefficient	20344.169	14849.731	3814.673	352572.391	137459.682	267354.503
				[50.66]***	[61.07]***	[60.98]***
Observations	10519	10519	10519	10519	10519	10519
R-squared	0.140	0.150	0.150			
Symmetric shock effects		1.480	17.920		2.720	1.750

Absolute value of t statistics in brackets

Figure 1: Net transfers response to pre-transfer income

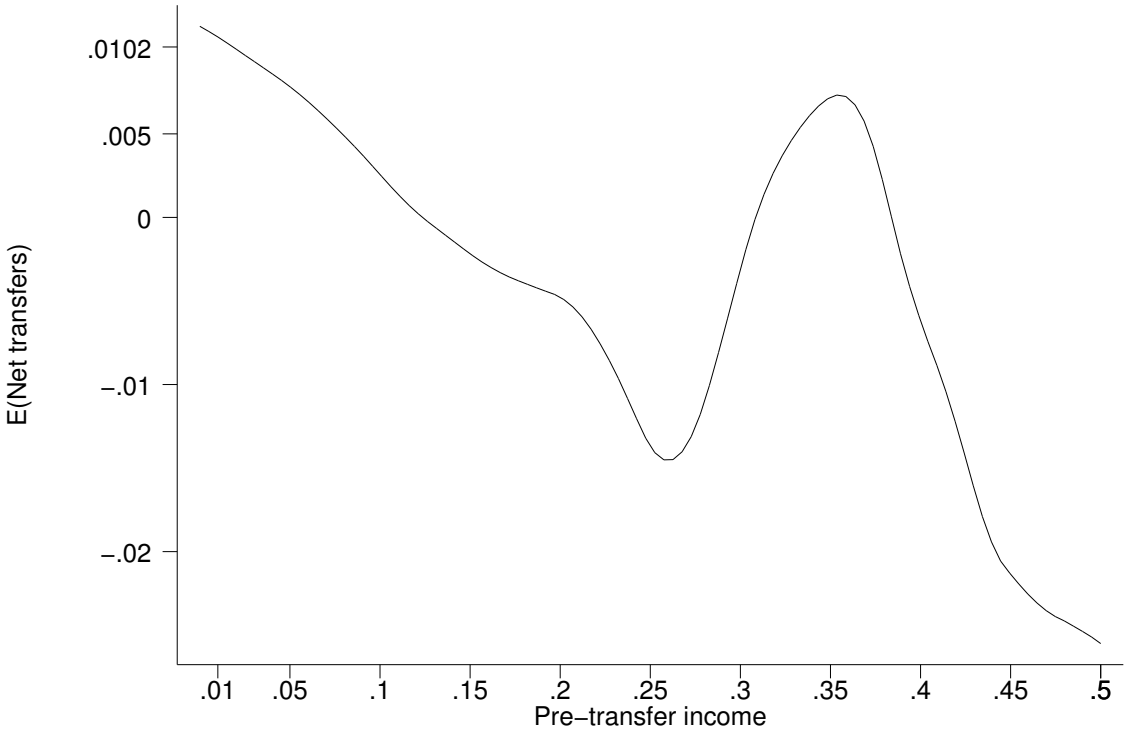
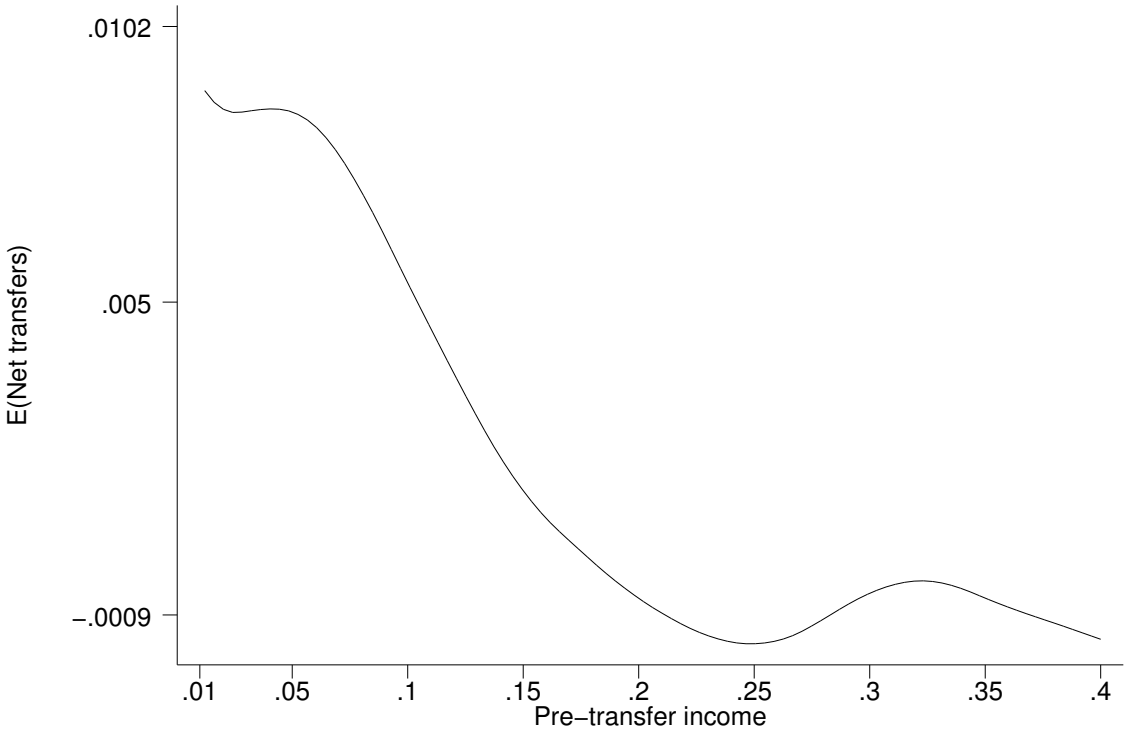


Figure 2: Net transfers response to pre-transfer permanent income



Appendix

Table 6: Summary of variables used in estimations

Variables	mean	sd	min	max
Pre-transfer income	75137.360	100444.900	1025.000	1521608.000
Children,0-5	1.798	1.796	0.000	20.000
6-11				
Males	0.895	1.106	0.000	10.000
Females	0.815	1.027	0.000	13.000
12-15				
Males	0.338	0.615	0.000	6.000
Females	0.305	0.581	0.000	8.000
16-64				
Males	1.845	1.419	0.000	18.000
Females	2.210	1.658	0.000	21.000
¿64				
Males	0.173	0.401	0.000	6.000
Females	0.159	0.427	0.000	7.000
Head				
Age	48.223	15.171	15.000	99.000
Age squared/100	25.556	15.659	2.250	98.010
Education (years)	0.664	5.786	0.000	7.000
Instruments				
Cattle (numbers)	3.119	9.210	0.000	250.000
Goat and sheep (number)	8.896	12.629	0.000	280.000
Other asset	0.205	0.421	0.000	2.000
Farm instruments	2.559	1.394	0.000	7.000
Rain deviation	-42.870	97.977	-288.913	296.502
Positive deviation	23.456	43.918	0.000	296.502
Negative deviation	-66.326	67.521	-288.913	0.000

Table 7: First stage regression

Kid 0-5	6937.0718
	[2.07]**
Kid male 6-11	6972.2961
	[1.45]
Kid females 6-11	2450.0562
	[0.48]
Kid males 12-15	-7590.1680
	[0.96]
Kid females 12-15	-4110.0777
	[0.50]
Adult males 16-64	30882.4234
	[7.38]***
Adult females 16-64	27532.0906
	[6.60]***
Adult males ¿64	20039.3883
	[1.35]
Adult females ¿64	6300.0480
	[0.58]
Head age	-344.7215
	[0.24]
Head age squared	-143.5218
	[0.10]
Head education	1790.1636
	[2.93]***
Head gender	-64179.1929
	[2.68]***
Year 1998	80865.5287
	[8.95]***
Instruments	
Cattle	6379.2946
	[9.21]***
Goat	1041.2255
	[2.30]**
Farm asset	66212.2621
	[13.99]***
Other asset	-248.7068
	[0.02]
Millet	9479.9132
	[0.71]

Maize	17491.1582
	[1.56]
Sorghum	-63899.0111
	[4.09]***
Rice	141422.6646
	[9.71]***
Cowpea	13120.5130
	[1.15]
Peanut	12491.9618
	[1.11]
Cotton	146760.4082
	[8.20]***
Rainfall deviation	-762.6972
	[3.09]***
Rainfall deviation squared	-550.5590
	[2.64]***
Rainfall deviation interacted with	
Kid 0-5	-42.1143
	[1.34]
Kid male 6-11	39.0585
	[0.75]
Kid females 6-11	-5.8072
	[0.10]
Kid males 12-15	10.9577
	[0.13]
Kid females 12-15	-85.9240
	[0.96]
Adult males 16-64	57.0785
	[1.43]
Adult females 16-64	27.7003
	[0.69]
Adult males ¿64	178.8658
	[1.46]
Adult females ¿64	-217.1563
	[1.88]*
kid 0-15/adult 16+	125.2086
	[0.91]
Cattle	1.1111
	[0.22]
Goat	-13.1910

	[3.06]***
Farm asset	208.4821
	[4.88]***
Other asset	-16.2586
	[0.15]
Millet	134.7759
	[1.30]
Maize	4.3466
	[0.04]
Sorghum	99.5762
	[0.91]
Rice	-66.0008
	[0.72]
Cowpea	-55.4482
	[0.60]
Peanut	-295.1448
	[2.23]**
Cotton	-25.1050
	[0.12]
Rainfall deviation squared interacted with	
Kid 0-5	-23.8959
	[1.05]
Kid male 6-11	21.2653
	[0.58]
Kid females 6-11	19.0929
	[0.50]
Kid males 12-15	86.4710
	[1.56]
Kid females 12-15	30.5111
	[0.50]
Adult males 16-64	-35.2222
	[1.17]
Adult females 16-64	-9.5597
	[0.34]
Adult males ¿64	-67.5837
	[0.78]
Adult females ¿64	-76.0840
	[1.04]
kid 0-15/adult 16+	-38.3829
	[0.43]
Cattle	2.0899

	[0.41]
Goat	1.2816
	[0.39]
Farm asset	74.6264
	[2.78]***
Other asset	13.2176
	[0.16]
Millet	66.5096
	[0.93]
Maize	247.5845
	[2.12]**
Sorghum	-279.7720
	[3.03]***
Rice	-48.5013
	[0.68]
Cowpea	19.4697
	[0.27]
Peanut	-252.4720
	[2.01]**
Cotton	229.8916
	[1.37]
Constant	-118668.6936
	[1.83]*
Observations	10514.00
R-squared	0.34
Ad. R-squared	0.33
F (54,10400) test instruments	24.95

Absolute value of t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

Regression includes also province dummies not shown.