NOTAS ECONÓMICAS

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Inter-Household Private Transfers and Underlying Motives: Evidence for Bulgaria

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resumo

Os efeitos da interacção entre transferências entre famílias e políticas de redistribuição de rendimentos dependem dos motivos subjacentes aquelas. Este artigo testa dois motivos potencialmente geradores de transferências entre famílias: puro altruísmo versus troca, na presença de imperfeições nos mercados de capitais. Usando inquéritos às famílias para a Bulgária, encontramos evidência microeconométrica que sugere que ambos os motivos são importantes. Encontramos, ainda, evidência que imperfeições nos mercados de capitais são importantes obstáculos à suavização do consumo ao longo do ciclo de vida e, por conseguinte, são uma importante causa de transferências entre famílias. Os resultados indicam que transferências públicas de segurança social diminuem o valor de transferências privadas mas não a incidência destas. Finalmente, as transferências privadas desempenham um importante papel na provisão de amparo social uma vez que as transferências privadas promovem uma diminuição das taxas de pobreza e de desigualdade na distribuição do rendimento.

Les effets de l'interaction des transferts entre des familles et des politiques de redistribution de revenus dépendent des motifs sous-jacents à ces mêmes transferts. Cet article teste deux motifs potentiellement générateurs de

résumé / abstract

transferts entre des familles: pur altruisme par opposition à échange, en présence d'imperfections sur les marchés de capitaux. A partir d'enquêtes auprès de familles pour la Bulgarie, nous constatons une évidence microéconométrique qui suggère que les deux motifs sont importants. Nous considérons également comme une évidence que des imperfections sur les marchés de capitaux sont des obstacles importants au ralentissement de la consommation au long du cycle de la vie et, par conséquent, sont une cause importante de transferts entre des familles. Les résultats indiquent que des transferts publics de sécurité sociale diminuent la valeur de transferts privés mais non l'incidence de ces derniers. Finalement, les transferts privés jouent un rôle important dans la provision de protection sociale dans la mesure où les transferts privés promeuvent une diminution des taux de pauvreté et d'inégalité dans la distribution du revenu.

The effects of interactions between private transfer behaviour and income redistribution policies depend on the motives underlying private income transfers. This paper tests for two different potential motives: pure altruism versus simple exchange, in the presence of capital market imperfections. Using household survey data for Bulgaria, microeconometric evidence is found that both motives are in effect. We also find evidence that capital market imperfections are likely to be binding for consumption smoothing, and hence are an important cause of private transfers. The results indicate that social security benefits "crowd out" the amount of private transfers received but not the incidence of private transfers. Finally, private transfers play an important role as a safety net as they significantly decrease poverty rates and the inequality of income distribution.

Classificação JEL: F43; O47; O57

1. Introduction

In the presence of operative inter-household private transfers, the effects of income redistribution policies become uncertain and dependent on the motives underlying inter-household private transfers. For instance, Becker (1974; 1993) shows that if inter-household private transfers are operative and are an outcome of altruistic feelings satisfaction, households can completely neutralize the effects of income redistribution policies, by adjusting the levels of their transfers (see also Altonji, Hayashi and Kotlikoff, 1997). However, if households are motivated by exchange, that is, if households give because they expect something in return, this result does not hold (Altonji, Hayashi and Kotlikoff, 2000; Bernheim, Shleifer and Summers, 1987; and Cox, 1987; 1990). Hence, if one is interested in anticipating the outcome of a given income redistribution policy, one must understand the motives behind inter-household private transfers. This paper does just that, looking at the case of Bulgaria.

In particular, this paper tests the empirical relevance of two hypotheses – the altruism hypothesis and the exchange hypothesis – which have been accepted in the literature as the main driving forces behind inter-household private transfers (see Cox *et al.*, 1998). As its name suggests, under the altruism hypothesis households give to satisfy their altruistic feelings. In turn, under the exchange hypothesis, households give because they expect something in return, namely a future repayment. While it is likely that both motives are at work, it is plausible that they may not work to the same extent. Therefore, it is important to test which motive dominates at an empirical level in order to anticipate the outcome of a given income redistribution policy. This empirical question has important implications for a number of policies. If the altruism hypothesis is the main driving force behind inter-household transfers, then households may neutralize not only income redistribution policies, but also tax and debt policies, as several authors in the macroeconomics and public finance literature have argued (see, for instance, Barro, 1974).

Inter-household private transfers are also important for reallocating resources. In fact, Cox and Jimenez (1990) document for a large sample of countries that more than half of the households engage in private transfers. In addition, and quite interestingly, Cox and Jimenez show that it is often the case that the amount of transfers received is large in the sense that it constitutes an economically important fraction of the household's overall income. Hence, studying inter-household transfer behaviour is important for a better understanding of not only how resources are allocated but also how safety nets work. Therefore, the empirical work in this paper also sheds light on important relationships that structural models of the household must rationalize.

We use microeconometric data to carry out our empirical work, for Bulgaria, collected by the World Bank, which allows us to control for a number of interesting household economic and demographic characteristics. We follow Altonji, Hayashi and Kotlikoff (2000), Cox, Jimenez and Okrasa (1997), Cox, Jimenez and Eser (1998), Cox, Hansen and Jimenez (2004), among others, and estimate a microeconometric model of the determinants of the incidence of transfers and of the amount of transfers received. Our contribution is, thus, empirical.

The paper is organized as follows. Section 2 presents a simple model that guides the econometric work. Section 3 describes the data. Section 4 documents the empirical work. Finally, Section 5 concludes with policy implications.

2. Theory on Motives for Inter-Households Private Transfers

This section presents a simple model of the decision to transfer income between households in order to motivate and guide the empirical work. To test which motive – altruism vs. exchange – is the most important driving force underlying inter-household transfers one must look at the relationship between the recipient's pre-transfer income and the transfer amounts received. Under the pure altruism hypothesis this relationship is always negative. The exchange hypothesis, in turn, is not inconsistent with either a positive or a negative relationship between

these two variables. Moreover, and still under the exchange hypothesis, and in the presence of capital market imperfections, transfers received should rise with low levels of pre-transfer income and decline for high levels of pre-transfer income. That is, transfer amounts received is non-linear and concave in pre-transfer income, and hence non-monotonic.

Capital market imperfections are likely to be a strong cause of private transfers. If we consider households who wish to smooth their real consumption levels over their life-cycle, then if capital market imperfections bind, they will be unable to achieve their first-best real consumption path (Cox, 1990). This fact may prompt households to engage in private transfers with other households. This observation becomes clear if we assume for simplicity that capital markets are "perfectly imperfect". In particular, young households whose actual income is lower than their permanent income cannot borrow against their potentially higher income that they will receive while middle aged. What actions can these households take to ease the restrictions that they face? To answer to this question, we present below simple models of both the altruism hypothesis and of the exchange hypothesis that help us in setting up the empirical work. Admittedly, we do not fully develop the models as they are developed elsewhere. Our goal here is to provide enough intuition to develop our empirical tests.

2.1. Altruism

Consider first altruistically motivated private transfers. The model presented to illustrate this hypothesis features utility interdependence and is due to Becker (1974). Suppose that parents care about their children, so that when children's income is low enough, as it would be early in the life-cycle, parents transfer income to their children. In addition, children care about their parents' well being, so that when the parents' earning power is low – i.e. retirement years – children transfer income to their parents. Formally, this utility interdependence setting can be expressed by the following set of equations:

$$U = U(c_p, V) \tag{1}$$

U denotes parental utility, a positive function of parental consumption c_p and children's utility V. Since we assume that altruism is mutual, there is an analogous expression for the children's well being:

$$V = V(c_k, U) \tag{2}$$

where c_k denotes children's consumption. The following budget constraints capture capital market imperfections:

$$c_j = I_j + T_j \quad j = p, k \tag{3}$$

T_j denotes transfers received net of transfers given by person j, and I_j denotes person j's pre-transfer income.

Assume that parents and children overlap for 2 periods, 1 and 2. Period 1 is youth period for children and middle age for parents and period 2 is middle age for children and retirement for parents. In terms of pre-transfer income configuration, we have the following pattern:

$I_{k,1}$: *low;* $I_{k,2}$: *high*

$I_{p,1}$: *high;* $I_{p,2}$: *low*

The main insight of altruistically motivated private transfers is very simple: Private transfers can help overcome capital market imperfections, as parents transfer income to children in the first period and children transfer income to parents in the second period. A key prediction of this model is that an increase in pre-transfer income is always associated with a decline in transfers. Children with higher $I_{k,1}$ require smaller T_k to attain the level of consumption that is optimal from the parents' perspective. This result holds for T_p in the second period. In terms of derivatives, we have $\partial T_k / \partial I_{k,1} < 0$ and $\partial T_p / \partial I_{p,1} < 0$ regardless of income levels.

Note that transfer behaviour has two dimensions. The first is to transfer or not and the second, contingent on deciding to transfer, is the amount to transfer. An increase in $I_{k,1}$ reduces the parents' marginal utility of transferring income to the children and thus we expect a negative relationship between the incidence of transfers (likelihood of being a net receiver) and the recipient's pre-transfer income under the altruism hypothesis.

2.2 Exchange

This section presents a simple model of the exchange hypothesis taken from Cox *et al.* (1998). Suppose that parents and children realize the potential to engage in mutually beneficial income transfers. Parents transfer to children in the first period and are paid back in the second period. Assume Nash bargaining. The parent's and children's lifetime utilities are defined as follows:

$$U = U_1(I_{p,1} - T) + \frac{U_2(I_{p,2} + R)}{1 + \rho} + \beta V \tag{4}$$

$$V = V_1(I_{k,1} + T) + \frac{V_2(I_{k,2} - R)}{1 + \rho} + \gamma U \tag{5}$$

Note that ρ is the subjective rate of time preference, which for simplicity is assumed to be the same for parents and children. The parental loan is denoted by T and the repayment is denoted by R. Altruism is not dispensed in this particular bargaining framework. But this depiction of altruism differs from the altruism hypothesis above, in which one agent implicitly dominates the bargaining arrangement. The levels of utility that parents and children can obtain on their own – the threat points – are given by:

$$U^0 = U_1^0(I_{p,1}) + \frac{U_2^0(I_{p,2})}{1 + \rho} + \beta V^0 \tag{6}$$

$$V^0 = V_1^0(I_{k,1}) + \frac{V_2^0(I_{k,2})}{1 + \rho} + \beta U^0 \tag{7}$$

As usual, the solution to the Nash bargaining problem is given by:

$$\max_{T,R} N = (U - U^0) \times (V - V^0) \tag{8}$$

The implications of the bargaining solution are easiest to see with a simulation exercise. Consider logarithmic functional forms for equations (4)-(7) and suppose that $I_{k,2} = 150$, $I_{p,1} = 150$, $I_{p,1} = 20$, $\rho = 0.25$ and $\beta = \gamma = 0.30$. Figure 1 displays the results of varying $I_{k,1}$ from 1 to 30 on the value of first period transfers T. Transfers initially rise with $I_{k,1}$, which contradicts the results from the altruism model.

Figure 1 – Simulation Results
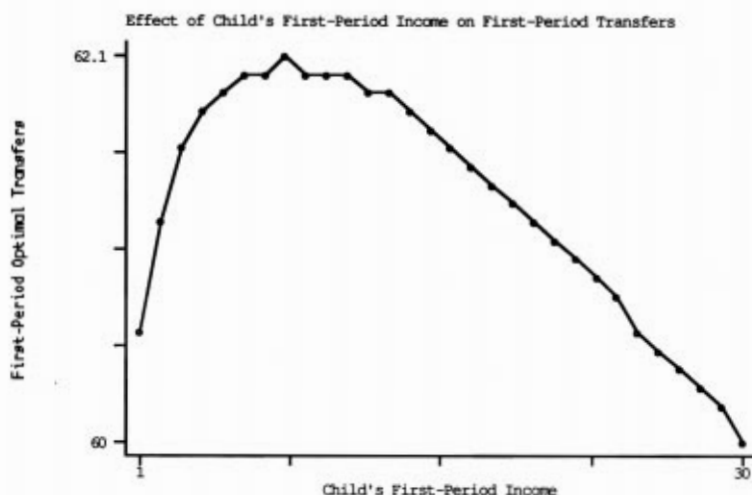
When $I_{k,1}$ increases two effects take place. The first effect is that the children's liquidity constraint is eased, which reduces the first period transfer. The second effect is that the children's threat point utility rises. This second effect causes an increase in transfers, because the terms on which the children can borrow improve: The implicit interest rate for intergenerational loans, $(R-T)/T$, declines as $I_{k,1}$ rises. If the second effect dominates the first effect, $\partial T_k / \partial I_{k,1} < 0$ is positive. Furthermore, since the second effect is stronger at lower levels of $I_{k,1}$, $\partial^2 T_k / \partial I_{k,1}^2 < 0$ is negative under the exchange hypothesis.

Under the exchange hypothesis, an increase in the recipient's pre-transfer income reduces the chances that intergenerational lending is mutually beneficial. Thus, the incidence of transfers is inversely related to own pre-transfer income, just as under the altruism hypothesis. However, while the exchange hypothesis implies that an increase in the income of potential recipients should decrease the likelihood of receiving transfers it can increase the amounts transferred.

3. Data

The data set used in the empirical work is the Bulgarian Living Standards Measurement Survey (BLSMS), conducted by the World Bank and Gallup International Sofia. The BLSMS collected socioeconomic information for a sample of 2468 households and 7199 individuals. The interviews took place in May 1995. Households constitute the unit of analysis. Households with missing information for age, education, and gender of the head of the household, and households with no residents were deleted from the sample. The final sample has 2427 observations. Income variables are presented and analyzed on a yearly basis.

Almost 20% of the sample engaged in private transfers[1], or about 480 households. Of these,

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1 Net private transfers are defined on a yearly basis, taking into account only transfers in cash. Households declaring to receive or to send an amount of money for private transfers equal to zero, or having a difference in received and sent amounts equal to zero are not taken into account.

about 9.5% received a private transfer, while 10.3% gave private transfers. Only 15 households both donated and received transfers. For the sub-sample of households that received a transfer, private transfers averaged 18550 leva, or roughly 15% of this same group average pre-transfer income. Social security benefits per household averaged 2194 leva for all sample.

From these descriptive statistics, and looking at paragraph 4.3 one can see that private transfers may play a role, even if rather small, in poverty alleviation, income redistribution and their interaction with public policies is, thus, potentially intense.[2]

Households were asked to specify the sources of transfers received and destinations of transfers given. Table 1 summarizes the relative frequency of sources of transfers. Perhaps as expected (Altonji, Hayashi and Kotlikoff, 1996), the bulk of transfers occurred between parents and children. The main source of transfers was from parents to children (68%). The second most important source of transfers was from children to parents (17%). Transfers among non-relatives occurred only in 2% of the cases.

Table 1 – Source of Transfer	
Relationship	**Source of Transfer (%)**
Parents	68.35
Children	17.17
Other Relatives	5.39
Brother/Sister	5.39
Spouse	1.68
Non-relatives	2.02
Total	100.00

Our covariates include income, education and household demographic characteristics. Table 2 contains variables' definitions and reports descriptive statistics.

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2 To preserve on space, we refer to Hassan and Peters (1995) for an extensive discussion of social safety nets in Bulgaria.

Table 2 – Descriptive Statistics

Variables	Description	Mean	Std.Err.
Income	pre-transfer yearly income	124625.80	259434.10
Soc. Sec. Beneficiary	1 if the HH has received a public transfer	0.660	0.474
No education	1 if HH head has no education	0.021	0.143
Primary	1 if HH head has elementary education	0.133	0.339
Midschool	1 if HH head has mid-school education	0.298	0.458
Secondary	1 if HH head has secondary education	0.369	0.483
University	1 if HH head has university education	0.179	0.383
Age	age of the HH head	55.037	15.366
Non-married Head	1 if the HH head	0.304	0.460
Female Head	1 if the HH head is female	0.212	0.409
Ill last 4 weeks	1 if the HH head was ill in the last 4 weeks	0.120	0.325
No Workers Head	1 if the HH head is not employed	0.424	0.494
Total Workers	number of workers in HH	0.985	1.008
Kids in HH	number of kids in HH	0.466	0.793
Dependent Adults in HH	number of dependent adults in HH	1.463	1.052
HH lives in Urban Area	1 if HH lives in urban area	0.667	0.472

The sample mean of pre-transfer income is about 125000 leva per year. Two thirds of the households in the sample receive social security benefits. Rather unfortunately, there is no information in the data set about donors' incomes. With respect to the education of the household head, we note that only 2% of the household heads have no-school education (our base category dummy), about 13% of them have primary school educational level, 30% have a mid-school educational level, 37% present secondary educational level and, finally, 18% of the household heads have university educational level. With respect to household demographic characteristics, the average age of the household heads is 55 years old, about 30% of the household heads are not-married and 21% of the household heads are female. About 12% of the household heads experienced an illness in the last four weeks before the interview. An extremely large fraction of the household heads – 42% – is not employed. On average each household has one worker. The presence of children in the household is rather low (0.46 per household), while on average there are 1.46 dependent adults per household. Finally, two thirds of the households in the sample live in an urban area.

4. Empirical Work

4.1. Empirical Model

In order to learn about the determinants of inter-household private transfers behaviour – incidence and volume – we follow the literature (see Cox, Hansen and Jimenez, 2004; Cox, Eser and Jimenez, 1998; and Cox, Jimenez and Okrasa, 1997, among others) and estimate an ordered probit model and a Heckman selection model (see Greene, 2003 for details on both models). We estimate an ordered probit model to learn about the incidence of transfers, encompassing not only net-receivers but also net-givers and households who do not engage in private transfers. More formally:

$$o_h = \alpha_o + \alpha_1 I_h + \alpha_2 I_h^2 + \alpha_3 X_{1h} + \tau_h$$

$r_h = 0$ (net giver), if $o_h \leq \text{cut}_1$

$r_h = 1$ (non participant), if $\text{cut}_1 < o_h \leq \text{cut}_2$ (9)

$r_h = 2$ (net receive), if $o_h > \text{cut}_2$

where h indexes households, I_h is pre-transfer income, X_{1h} is a vector containing the covariates, τ_h is a normally distributed disturbance, and cut_1 and cut_2 are ancillary parameters.

We also estimate a regression model of the amount of transfers received. As usual, and since there is scope for a potential selection problem, we estimate a Heckman selection model (see Heckman, 1979 for more details). The selection equation reads:

$s_h = \alpha_0 + \alpha_1 I_h + \alpha_2 I_h^2 + \alpha_3 X_{2h} + \varepsilon_h$

$S_h = 1$ iff $s_h > 0$ (10)

$S_h = 0$ otherwise

s_h is the latent variable, S_h is the actual amount of transfers received, X_{2h} is a collection of socioeconomic variables, including age, education and other demographic variables and ε_h is an error term. The structural equation reads

$t_h = b_0 + b_1 I_h + b_2 I_h^2 + b_3 X_{3h} + \sigma_u$ (11)

where σ_u is an error term randomly distributed and X_{3h} is a subset of X_{2h}. Therefore the sample selection model we estimate reads:

$E[t_h \mid I_h, X_{3h}, S_h > 0] = b_0 + b_1 I_h + b_2 I_h^2 + b_3 X_{3h} + \rho \sigma_u \lambda (-(\alpha_0 + \alpha_1 I_h + \alpha_2 I_h^2 + \alpha_3 X_{2h}))$ (12)

Recall that the exchange model is not inconsistent with either a positive or a negative relationship between these transfers received and pre-transfer income variables. The altruism model, in turn, predicts a monotonically decreasing relationship between these variables. Hence, pre-transfer income enters in quadratic form in the selection equation because, although neither model predicts a definite sign for α_2, they do not imply a linear relationship between pre-transfer income and the incidence of transfers. This way, hence, less structure is imposed. The model is estimated by MLE, with STATA, using as starting values the values obtained from Heckman's 2-step procedure. Identification of the model is guaranteed by the fact that the relevant X_{2h} is a subset of X_{3h} (see Cox, Eser and Jimenez, 1998 for more on the identification strategy). Finally, we note that we estimate the ordered probit model – in addition to the feeder probit model – in order to learn about the determinants of the incidence of not only being a net-receiver, but also of being a net-giver or not engaging at all in inter-household private transfers, which, arguably, enriches the depth of the analysis of how likely it is that capital market imperfections are at place, as discussed in the next section.

4.2. Model Estimation

Since both the altruism model and the exchange model are derived under the assumption of capital market imperfections, before proceeding we investigate if capital market imperfections are likely at place. One way to analyze this issue is to consider the case of perfect capital markets. If

capital market imperfections do not matter, the position of the household over her life-cycle should not matter for the probability of receiving a transfer. Only the present value of lifetime wealth would matter. This contradicts the results illustrated in Figure 2, constructed from the ordered probit analysis presented on Table 3.

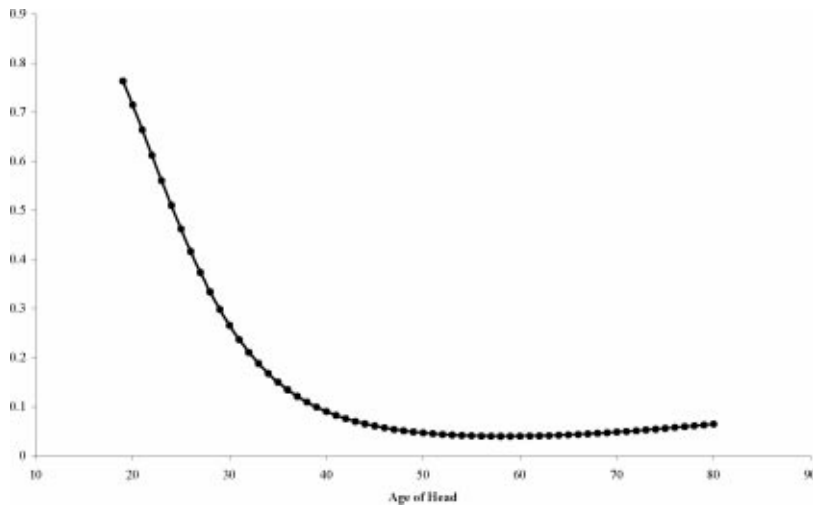**Figure 2 – Transfers Incidence and the Life Cycle**

Table 3 – Ordered Proibit Estimates			
Variable	Coefficient	Std.Err.	
Income			
Income	-5.58E-07	2.50E-07	**
Income^2	9.27E-14	3.95E-14	**
Soc. Sec. Beneficiary	0.011	0.078	
Education			
Primary	-0.225	0.212	
Midschool	-0.152	0.208	
Secondary	-0.238	0.212	
University	-0.132	0.218	
Household (HH) Demographics			
Age	-0.285	0.053	***
Age^2	0.004	0.001	***
Age^3	0.000	0.000	***
Non-married Head	0.130	0.094	
Female	0.299	0.098	***
Ill last 4 weeks	0.080	0.087	
No Workers Head	0.345	0.109	***
Total Workers	0.075	0.056	
kids in HH	0.194	0.041	***
Dependent Adults in HH	-0.051	0.032	
HH lives in Urban Area	0.298	0.067	***
cut1	-7.411	0.907	***
cut2	-4.512	0.901	***
Dependent variable:		Observed	Predicted
HH is net-givers (oprob=0)	251	10.34%	7.93%
HH has no transfers (oprob=1)	1946	80.18%	85.26%
HH is net-receiver (oprob=2)	230	9.48%	6.81%
Observations	2427		
Log-likelihood	-1357.996		

The probability of being a net-receiver for a household with average characteristics in all aspects other than age first declines and then increases with household age (proxied by the age of the household head). Middle aged households (with higher earning power) are the less likely to receive a transfer, where the youngest are the most likely. Capital market imperfections are, hence, very likely to bind.

With respect to educational and demographic household characteristics, overall we find that the schooling level of the household level does not explain private transfer behaviour in a statistically significant sense. Female headed households are more likely to be net receivers. Using the ordered probit analysis, one can quantify this gender effect at 4.5 percentage points (at sample means). By the same token, having no working people in the household also increases the probability of being a net receiver by 4.7 percentage points (at sample means). Presence of

children in the household increases the probability of being a net receiver by 2.5 percentage points per child. Finally, households who live in urban areas are also more likely to be net receivers by 3.6 percentage points more than their rural counterparts (at sample means).

Table 4 summarizes the results from joint estimation of (10) and (11). The reason for joint estimation as an MLE problem is to correct the amounts equation coefficients for a possible selection problem. As Table 4 documents, there is significant selection problem. The point estimate for ρ (the coefficient associated with the Inverse Mill's Ratio) is -0.54, which is statistically significant at 5% (p-value of LR-test is equal to 0.013).

Two versions of Hausman tests were run to test the existence of significant differences between ML estimates and Heckman model estimates. The first version consists in the usual Hausman test, whose chi square assumes a negative value (chi2 = -81.11) meaning that the model fitted on our data fails to meet the asymptotic assumptions of the Hausman test. This problem was solved running a generalized version of the Hausman test that overcomes the previous mentioned problem. However, we do note that a generalized Hausman test[3] rejects the null hypothesis (chi2 = 90.75) of no systematic differences in the coefficients in the Heckman selection model.

However, and rather reassuringly, the qualitative results do not vary significantly across models, so economic implications arising from both models point in the same direction.

| Table 4 – Heckman Selection Model Estimates					
	Selection Equation		Structural Equation		
Variable	Coefficient	Std.Err.	Coefficient	Std.Err.	
Income					
Income	3.85E-07	3.03E-07	0.031	0.018	*
Income^2	-5.69E-15	3.52E-14	-3.25E-09	1.79E-09	*
Soc. Sec. Beneficiary	-0.063	0.106	-6184.59	3560.01	*
Education					
Primary	0.102	0.330	–	–	
Midschool	0.041	0.326	–	–	
Secondary	0.218	0.329	–	–	
University	0.426	0.332	–	–	
Household (HH) Demographics					
Age	-0.234	0.066	***	-33.19	173.35
Age^2	0.003	0.001	**	–	–
Age^3	0.000	0.000		–	–
Non-married Head	0.117	0.137		-4011.58	4940.84
Female Head	0.464	0.132	***	1543.22	4783.74
Ill last 4 weeks	0.310	0.117	***	–	–

(cont.)

3 A Hausman test was also ran to test the existence of significant differences between Heckman model estimates and its initial values (probit model). As in the previous case, with a chi square of Hausman test taking a negative value (-16.11), and, hence, we ran a generalized Hausman test. Chi square value is 9.92 and p-value is equal to 90.71. Therefore, the null hypothesis of stability of parameters between Heckman estimates and its initial values is not rejected.

Variable	Selection Equation			Structural Equation		
	Coefficient	Std.Err.		Coefficient	Std.Err.	
Income						
No Workers Head	0.154	0.157		-185.59	5870.75	
Total Workers in HH	0.030	0.081		-5815.04	3286.47	*
kids in HH	0.037	0.055		-29.81	2103.45	
Dependent Adults in HH	-0.042	0.049		3543.73	2016.89	*
HH lives in Urban Area	0.406	0.105	***	–	–	
Constant	3.328	1.112	***	37445.30	7705.82	***
Rho	-0.541	0.164				
LR test (Rho=)	chi(1)=6.11		***			
Recipients	230					
Observations	2427					
Log-likelihood	-3326.576					

For the structural amounts equation, pre-transfer income has a positive sign and pre-transfer income squared has a negative sign. Moreover, both the coefficient on pre-transfer income and the coefficient on pre-transfer income squared are statistically significant at the 10% confidence level. For the selection equation (feeder probit), the signs of these variables are confirmed but the coefficients are not significant. Hence, the results from the Heckman model seem to indicate that a non-constant transfer derivative takes place, as Figure 3 illustrates. This result is consistent with the case in which the two motives, altruism and exchange, may coexist (Cox, Hansen and Jimenez, 2004), according to the income of the recipient. So, if the recipient's resources rise to a certain threshold, the transfer motive switches from altruism to exchange.

Figure 3 – Predicted Receipts and Pre-Transfer Income
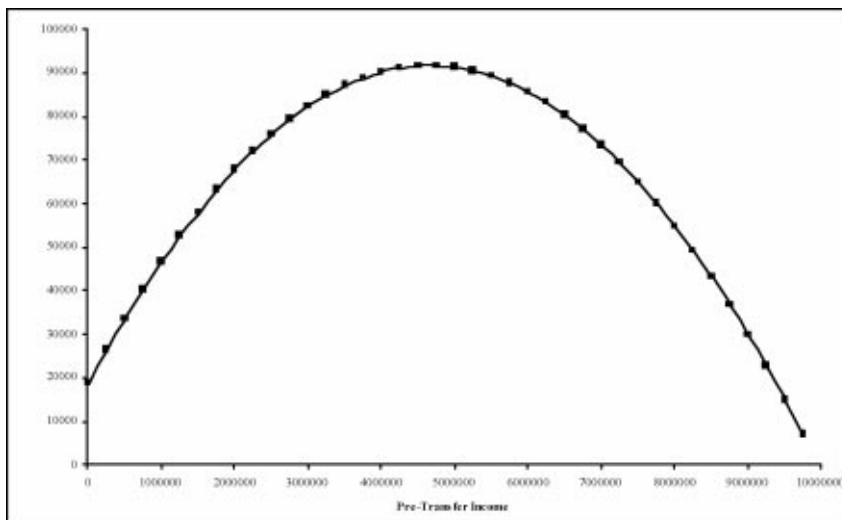
The results from the ordered probit model show that pre-transfer income takes a negative value, while a reversed sign is found for the pre-transfer income squared variable.

The results from the Heckman model suggest that there is a negative effect of being a recipient of social security benefits on the likelihood of being a net receiver of private transfers, albeit with no statistical significance. However, and quite interestingly, there is a strong negative, highly statistically significant effect of being a social security beneficiary on the amount of transfers received. In this sense, our results indicate that social security benefits crowd-out private transfers. It is also important to highlight that this finding is not confirmed looking at the estimate obtained from ordered probit model, that show a not significant effect of the social security benefit variable.

Estimates obtained using the Heckman selection model seem to confirm the evidence about the negative relationship between being a net-receiver and the age variable and a not significant effect with respect the educational household characteristics. Moreover, structural equation estimates highlight that the probability of being a net-receiver decreases as increases the number of total workers in the household and increases with the number of dependent adults. Both findings seem to indicate that the probability of being a net-receiver increases as the potential household income decreases. This result is consistent, at least indirectly, with the poverty analysis that we describe in the next paragraph.

4.3. Poverty Analysis

Private transfers may play an interesting role as a way to alleviate poverty and, concomitantly, inequality. In order to investigate the empirical relevance of private transfers with respect to poverty and inequality, Table 5 reports poverty rates and Gini concentration coefficients before and after private transfers (see Atkinson, 1970 for more on inequality measurement). The poverty indicator is defined with respect to a poverty line calculated on the basis of equivalent income, obtained, in turn, applying the OECD modified equivalence scale[4], which transforms nominal incomes in equivalent incomes. The poverty line is equal to 25075 leva per year in the pre-transfer state, and it is equal to 25048 leva per year in the post-transfer state. In particular, the poverty rate is defined as the ratio between the number of poor households and the number of total households in the sample. The Gini coefficient (see Gini, 1912) is a measure of inequality for a given distribution of incomes and lies between 0 – maximum equality – and 1 – extreme inequality[5]. Quite interestingly, we find that the poverty rate significantly decreases (at the 5% level) after the private transfers take place from 15.9% to 15.3%, implying the existence of a significant, even if slight, redistribution effect caused by private transfers.

Table 5 – Poverty Rates and Gini Coefficients				
		Pre-Transfer	Post-Transfer	t-stat
Poverty Rate	estimate	15.90%	15.33%	1.066
	std.dev.	0.0074	0.0073	
Gini Index	estimate	0.4599	0.4571	4.742
	std.dev.	0.0197	0.0214	

4 The OECD modified equivalence scale (see OECD (1982)) attributes different weights to the household head, other adults, and children. Nominal incomes are transformed into equivalent incomes applying the following transformation: AE=1+(adult-1)*0.5+children*0.3.
5 The numerator is the area between the Lorenz curve of the distribution and the uniform (perfect) distribution line, the denominator is the area under the uniform distribution line.

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In addition, we found a rather heterogeneous distribution of poverty rates across age classes in the pre-transfer state, and a more homogeneous distribution in the post transfers state, as Table 6 documents. In fact, households characterized by younger heads present the highest poverty rates before private transfers (32.14%), followed by households characterized by older heads (20.79%). The lowest poverty rates are found for age classes 51-60 and 61-70. We find a strong and statistically significant decrease in the poverty rate for young households after private transfers take place, namely a decrease from 32.14% to 17.14%. This finding is consistent with the evidence as shown in Figure 2, which shows that the probability of being a net-receiver is higher for households with younger heads. So, private net-transfers may be seen as an instrument used by households to reduce inequal distribution of incomes and, probably, to replace the lack of public policies by government to alleviate poverty problems.

Table 7 illustrates the relevance of the net-transfers on the final income of households receiving private transfers (column a), distinguishing between households receiveing also public transfers (column b) and households not receiving public transfers (column c). About 30% of the final income (post-transfer income) of the households with younger heads consists in a private transfer. A lower contribution at the final income (about 10%) from private transfers is found for other households, and a very low value (about 1%) is found for households with head aged 51-60. We also find that the percentage of younger households receiving a private transfer increases to 35% if they do not receive a public transfer and goes down to 22% if they also receive a public transfer[6]. With reference to other households, in which the role of private transfers is less important, differences between household receiving public transfers and not receiving public transfers are negligible.

Finally, inspection of the Gini coefficients confirms the redistribution effect associated with private transfers. In particular, the Gini coefficient significantly decreases, in a statistical sense, even if only slightly, from 0.46 to 0.45 due to the occurrence of private transfers.

Table 6 – Poverty Rates across Age Classes				
Age Class		**Pre-Transfer**	**Post-Transfer**	**t-stat**
19-30	estimate	32.14%	17.14%	4.953
	std.dev.	0.0396	0.0319	
41-40	estimate	15.54%	14.37%	2.009
	std.dev.	0.0196	0.019	
41-50	estimate	14.12%	15.68%	-2.543
	std.dev.	0.0154	0.0161	
51-60	estimate	12.89%	13.53%	-1.736
	std.dev.	0.0154	0.0157	
61-70	estimate	12.34%	12.34%	0.000
	std.dev.	0.0142	0.0142	
71-80	estimate	20.79%	20.49%	0.000
	std.dev.	0.0196	0.0196	

6 It would have been interesting to compare the relative importance of private and public transfers in the composition of the post-transfer income. However, we only have available a dummy variable indicating households who receive public transfers, but no information whatsoever on the amount of public transfers.

Table 7 – Private Transfer Contribution to Post-Transfer Income			
Age Class	a	b	c
19-30	30.09%	22.13%	34.83%
31-40	10.14%	10.01%	10.20%
41-50	9.40%	9.54%	9.34%
51-60	0.85%	0.61%	5.26%
61-70	14.16%	13.97%	–
71-80	12.23%	12.26%	11.23%

5. Conclusions

The motives underlying inter-household private transfers are important for a number of important phenomena, including, among others, the anticipation of the effects of income redistribution, tax and debt policies, the allocation of resources, our understanding of how safety nets work and shed light on the questions that structural models of the households ought to rationalize. We provide microeconometric evidence on inter-household private transfers for Bulgaria and use our results to evaluate the empirical relevance of the altruism model and of the exchange model of inter-household private transfer behaviour. Our results suggest that capital market imperfections bind for consumption smoothing, in the sense that households experience a likelihood of being net receivers according to a U-shaped pattern over their life cycle. Household demographic characteristics matter to predict the incidence and volume of inter-household private transfers, and, hence, income redistribution policies should take into account such household demographic characteristics. We find evidence that both neither the altruism model nor the exchange model is strongly rejected by the data and that both motives are likely to be at work to some extent. In fact, we find an inverted U-shaped relationship between pre-transfer incomes and transfers received, a result in line with Cox, Hansen and Jimenez (2004), who argue that such behaviour might owe to the fact that if the recipient's resources rise above a certain threshold, the operative transfer motive may switch from altruism to exchange. We find that inter-household private transfers play an important role as a safety net, given their incidence and volume. In particular, inter-household private transfers promote a statistically significant decrease in poverty rates, even if the absolute magnitude of the reduction is quite small. This result is particularly acute for households with young heads, the age group that would experience the highest poverty rate in the absence of private transfers. In addition, private transfers decrease in a statistically significant sense the overall inequality in the distribution of income. Finally, and as in Cox, Hansen and Jimenez (2004), our results show that receiving a social security benefit significantly decreases the amount of transfers received. In this sense, our results suggest the presence of an empirically important crowd-out effect of social security benefits on private transfers that social policy practitioners must consider.

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