The impact of conditional cash transfers on interhousehold transfer behavior among the elderly in Brazil

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Vitor Miranda
Ph.D. Candidate, Graduate Program in Demography, University of Pennsylvania

Eduardo Rios-Neto
Full Professor, Department of Demography and Cedeplar, UFMG, Brazil

Cássio M. Turra
Associate Professor, Department of Demography and Cedeplar, UFMG, Brazil

Abstract:
This study examines whereas an exogenous increase in the income of the poor elderly in Brazil, due to changes in the rules of a conditional cash transfer program, led to a decrease in inter-household transfers received by this population subgroup. To test this hypothesis, we use nationally representative data from periods before and after two major reductions in the age of eligibility to the program. We then estimate the impact of the program using a difference-in-difference approach. We find a decrease both in the probability of receiving interhousehold transfers and in the magnitude of transfers received by the age groups that became eligible after the change in the rules. We conclude that public income transfers may reduce the amount of financial resources Brazilian families allocate to support their old relatives.

Introduction

Income transfers provided by families to their elderly kin play an important role in society, particularly in developing countries, where public social insurance programs are usually deficient or absent, and social networks help support individuals. In this context, it is interesting to ask the question of how families that transfer income to an elderly relative respond when there is an increase in the elderly income.

This question is especially important for income redistribution policies, since family's responses can displace public income transfers, thus reducing the original policy effect. In other words, a public policy that aims to increase the poor elderly income may have its effect considerably reduced if young adults respond by reducing the financial support they previously provided to their low-income parents.

To address this issue, many studies have tried to explain the motives why individuals engage in transfer behavior (e.g. Cox 1987, Jensen 2003, Kazianga 2006). As a common aspect, they investigate whether transfers are motivated by altruistic reasons or by self-interest. This is a relevant question since under different motives the relationship between an individual's own income and the amount of financial support she receives from other family members can be different.

In altruistic income transfers, increases in the recipients' income allow donors to reduce the amount of income they need to donate (Becker 1974). Hence, this motivation predicts a negative correlation between own income and amount of transfers received. Conversely, if transfers are mostly an exchange for services, increases in the recipients' income can increase the amount transferred, due to an increase in the implicit price of services[1] (Cox 1987). In this

[1] Income transfers between an adult and her old relative can be a *quid pro quo* for the provision of services, such as cooking or childcare, for example. After an increase in own income, an individual is expected to demand a larger amount of money to provide the same amount of services.

case the correlation between own income and amount of transfers received can be positive.

However, measuring the effect of income on other outcomes is generally a problematic task in the social sciences. The difficult arises because income is likely to be correlated with unobserved characteristics that may affect at the same time the outcome of interest and the level of income. If this issue is not taken into account, the estimated impact of income is potentially biased.

For example, a simple regression of the amount of transfers received on own income will overestimate the effect of income if healthier individuals are more likely to have higher income and at the same time they receive lower amounts of transfer precisely because their healthier. One solution is to add variables related to health status to try to account for this effect. However, this solution does not rule out the possibility that there are still other unobserved variables adding bias to the estimates.

The solution we chose was to use a variation in income created by a source that is presumably unrelated to unobserved factors. In the previous example, a public program may raise the income of part of the population, such as a given age group. This exogenous variation in income can be used to study the impact of income on the amount of transfers received.

Such income shock took place in Brazil during the 1900s and 2000s. In 1996, the Brazilian government created a national cash transfer program directed to low income elderly (70 years old and older) called Continuous Cash Transfer Program[2], mostly known as BPC. Although the income eligibility criteria remained the same, the minimum age of eligibility was reduced to 67 in 1998 and to 65 in 2004. In this paper we use these exogenous variations in the income of certain age groups to study the impact of income on interhousehold transfers received by the elderly in Brazil.

[2] The original name of the program is *Benefício de Prestação Continuada* (BPC).

The rest of this study is organized as follows. First, we review some of the previous empirical findings. Following we describe the micro-economic model of interhousehold transfers we use, which consider altruistic and exchange motives in a single framework. Next we explain the empirical strategy employed, including the dataset used and details of the BPC program. We then present the results along with some final remarks.

Previous studies

Previous empirical studies do not document conclusively this matter. On the one hand, some have found that recipient's income and amount of transfer received have a positive or small negative correlation. For example, in the US, in 1979, one percent increase in own income was associated with a 0.53 percent increase in transfers received (Cox 1987). Along the same lines, in the US, in 1987, redistributing one dollar from the parent to his/her child is associated with less than a 13-cent reduction in the parent's transfer to the child (Altonji et al 1997). Kazianga (2006), in Burkina Faso – a very low-income country in West Africa – does not find substantial crowding-out effects among low income families. These studies conclude that the main motive for transfers is the provision of services by the transfer recipient. Therefore, they suggest that crowding-out or other substitutive effects are not an important issue for income redistribution policies.

On the other hand, other works have found evidence of public transfers that displaced interhousehold transfers. Such works include the studies of Albarran and Attanasio (2002), who measured the impact of the PROGRESA program in Mexico; Juarez (2006), who examined the impact of the *Pension Alimentaria para Adultos Mayores*, also in Mexico, and Jensen (2003), who investigated the impact of South African old age pensions in interhousehold transfers. All these studies find that public income transfers were associated with large declines in the amount of private transfers received.

If interhousehold transfers to the elderly are primarily a product of an exchange for services, crowding-out effect may not be a concern for policy makers in Brazil. However, if it is mostly a product of other relatives guaranteeing

the elderly well-being during less productive stages of his life course, increases in the elderly income must be associated with significant reductions in the amount of interhousehold transfers received.

Theoretical Framework

We consider a model with two individuals: the transfer donor and the transfer recipient. The utility if the donor (U_d) is a function of her own consumption (c_d), the amount of services she receives (s) and the recipient's utility (U_r):

$$U_d = U_d(c_d, s, U_r(c_r, s)) \qquad \textbf{(Eq. 1)}$$

The utility if the donor increases with her own consumption ($\partial U_d / \partial c_d > 0$), with the amount of services received ($\partial U_d / \partial s > 0$) and with the recipient's utility ($\partial U_d / \partial U_r > 0$). The recipient's utility increases with her own consumption ($\partial U_r / \partial c_r > 0$) and decreases with the amount of services she provides ($\partial U_r / \partial s < 0$). The constraints are:

$$c_d \leq I_d - T \qquad \textbf{(Eq. 2a)}$$

$$c_r \leq I_r + T \qquad \textbf{(Eq. 2b)}$$

$$U_r(c_r, s) \geq U_0(I_r, 0) \qquad \textbf{(Eq. 2c)}$$

$$U_r(c_r, s) = U_0(I_r, 0)$$

Equations (2a) and (2b) are the budget constraints: I_d and I_r are respectively the donor's and recipient's incomes before transfer (T). Equation (2c) is the participation constraint. It states that the recipient will only enter the relationship if the level of utility received is at least equal to the utility level she achieves by consuming only her income I_r and providing no service.

Altruism prevails at the margin when Eq. (2c) is not binding ($U_r > U_0$) (Cox 1987). In this situation, the recipient is more than compensated by the services provided. On the other hand, exchange for services is the dominant motive when Eq. (2c) is binding. In this regime, transfers are pictured as a function of the amount of services offered and its implicit price: $T = ps$. For example, an adult's main reason for transferring money to her elderly mother may be an exchange

for taking care of her grandchildren. Thus, an increase in the mother's income leads to an increase in the value of the mother's time. The final result on the transfer flow will depend on the magnitude of the change in relative prices and how elastic the adult's demand for that service is. When the mother provides a service that does not have close substitutes in the market (i.e., the adult's demand for the service is inelastic) an increase in p leads to an increase in T.

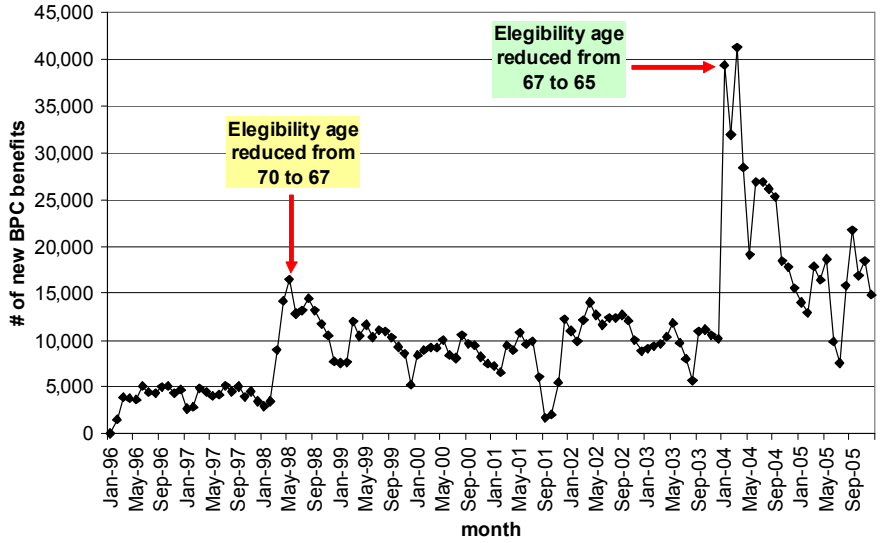
The BPC program and Empirical Strategy

Those enrolled in BPC receive the monthly minimum wage[3]. The program's eligibility criteria states that elderly individuals who are not employed, not retired by the official pension system, and whose per capita family income is lower than one quarter of the monthly minimum wage are entitle to receive the benefit from the government. Federal legislation establishes that eligibility must be checked every two years[4].

Due to reductions in the minimum age eligibility criteria, starting in 1998 and 2004 two age groups (67-69 and 65-66 years old, respectively) became eligible to receive the cash transfer. Administrative data presented in Figure 1 shows a large increase in the number of new benefits paid (BPC) after the first eligibility age reduction in January 1998, and an even larger increase after the second eligibility age reduction in January 2004.

[3] On September 2005, the Brazilian minimum monthly wage was 300 reais, which was about 140 USD. In this study all amounts are expressed in 2005 reais.
[4] For more details of the legal aspects of BPC see *Departamento de Benefícios Assistenciais* (2005).

Figure 1 – Number of new benefits (BPC), by month and type Jan-1996 to Dec-2005



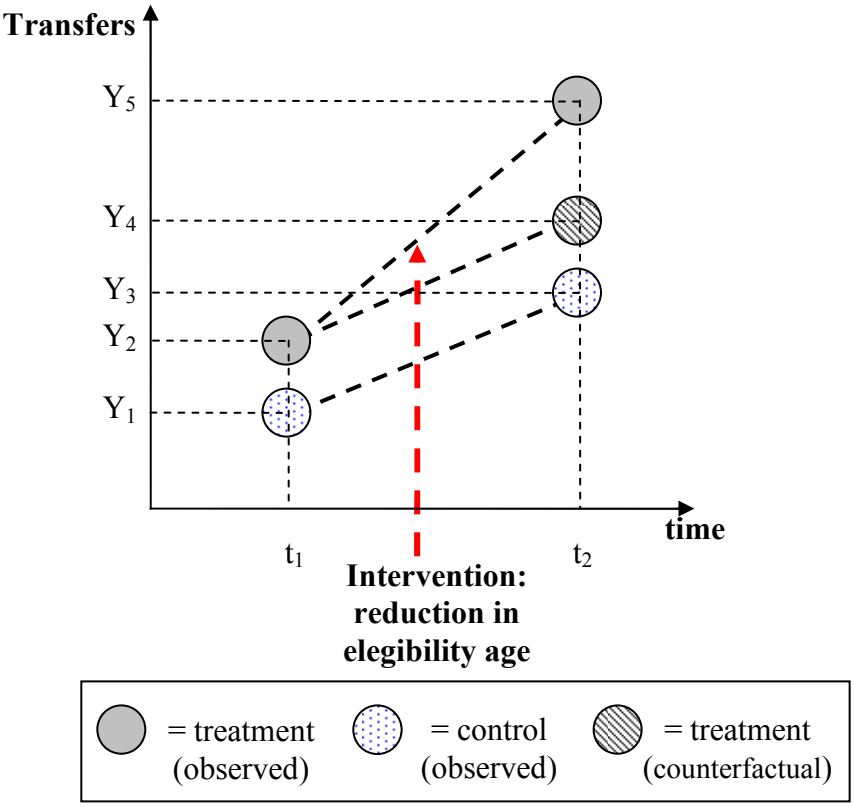
Source: Brazilian Ministry of Social Security and Assistance (2006).

We use the two expansions in benefit coverage shown in Figure 1 as exogenous income increases directed to new eligible age groups. The impact of income increases is analyzed using a difference-in-difference (DD) approach. The DD technique has been widely used in the social sciences literature. The intuition is illustrated in Figure 2. When measuring the impact of the reduction in eligibility age we are interested in the effect of the treatment on the treated (Y_5-Y_4). Since Y_4 is not observed, the distance Y_2-Y_1 is used to estimate Y_4-Y_3. Subtracting Y_2-Y_1 from Y_5-Y_3 gives an estimate of the effect of the treatment on the treated[5].

In sum, the DD technique uses the temporal trend in the control group to estimate the counterfactual situation. The main assumption necessary for the DD is that the trend in the dependent variable would be parallel in the absence of the intervention. Although this parallelism cannot be verified empirically, it is possible to use data for a prior period with no change in the policy and estimate an additional DD. If the trend was linear before the intervention, the impact estimated in this additional DD is expected to be zero. This type of test was done for the current data and is presented in the results section.

[5] For a formal presentation of the technique see Meyer (1995) and Cameron and Trivedi (2005). Bertrand et al (2004) address some of the possible weak points of this technique.

Figure 2 – Schematic illustration of the impact of the reduction in eligibility age in transfers received by treatment and control groups



Using age groups (Table 1) to indicate treatment and control groups, we specify the DD model in (Eq. 3) to estimate the effect of each reduction in the age of eligibility on two dependent variables: the probability of receiving transfer and the amount of transfers received. In both cases we use OLS regressions models.

$$Y = \beta_0 + \beta_1 T + \beta_2 A + \beta_3 TA + \delta X + \varepsilon \qquad \textbf{(Eq. 3)}$$

where *X* is a vector of socio-economic variables that includes information on sex, education, race, household size and urban/rural status and the dummy variables *T* and *A* are as follows:

Table 1 - Dummy variables values for Equation 1

	T		A	
Model:	**Control (0)**	**Treatment (1)**	**Before (0)**	**After (1)**
1998 age reduction	64-66	67-69	1995, 96, 97	1998, 1999, 2001
2004 age reduction	63-64	65-66	2002, 2003	2004, 2005

Data

We use data from the 1996-2005 PNADs (*Pesquisa Nacional por Amostra de Domicílios*) surveys. PNAD is a nationally representative repeated cross-section household surveys collected annually by the Brazilian Institute of Geography and Statistics (IBGE)[6]. During the 1990s and 2000s, its sample size was around 350,000 individuals.

As the BPC is available only to unemployed elderly with per capita family income below one quarter of the minimum wage, we restricted our sample to capture this population. Since our approach estimates the average impact on the treated, having a treatment group that includes individuals not affected by the BPC expansion (*e.g.,* high income elderly) may underestimate the average impact. Therefore our sample is restricted to the elderly who live in families with per capita income below half of the minimum wage and that are not employed. One half of minimum wage value instead of one quarter was employed to allow for the fact that some families may intentionally underreport their income when applying for BPC. For example, individuals that work in the informal economy are sampled in the PNADs, but may not report their income for BPC eligibility purposes.

Since BPC is available only to those not retired by the public pension system, it is necessary to add a third restriction when defining the sample. All individuals retired by the public pension system were excluded from the sample, with the exception of those who reported receiving exactly the minimum wage

[6] There is no PNAD in Census years. Therefore, 2000 is the only year not included in the 1996-2005 interval.

value. Since the minimum wage is a very common value of retirement payments in the Brazilian public pension system, many BPC beneficiaries may have misreported BPC as retirement income in the PNAD survey (Saywer and Carvalho 2006). Thus, instead of dropping from the sample all individuals that reported to receive retirement income equal to the minimum wage, we chose to keep those individuals in the sample and discount this value from the family income when calculating the eligibility income. One consequence of this strategy is that our results may underestimate the impact of the BPC on the transfers received.

Results

Table 2 summarizes the main results of the impact of the BPC on the interhousehold transfers received by the elderly, based on Equation 3. The values of most interest are the coefficients of the interaction term (*treat x after*). Our model predicts that the percentage of the 67-69 age group (i.e. the new BPC beneficiaries) receiving interhousehold transfers after the 1998 age reduction was 3 percentage points lower than it would be in the absence of BPC for that age group (Panel A). Instead of the observed 0.6% of the 67-69 age group receiving interhousehold transfers, the models predicts that the value would be 3.6%.

In a similar way, the model predicts that the value of the interhousehold transfer received by those 67-69 after 1998 would be, on average, 2.78 reais higher than it in fact was. This would increase the average value of transfers received from the observed 0.74 reais to 3.52 reais. It should be noted that a large proportion of the elderly do not receive transfers, what causes the average amount transferred for the whole sample to be small[7].

In Panel B we present estimates for the 2004 age reduction. The proportion of 65-66 years old (i.e. the new BPC beneficiaries) receiving transfers would be 2.9 percentage points higher, increasing from the observed 1.7% to

[7] To deal with this left-censoring issue, a tobit model was estimated and will be included in the next version of this paper.

4.6%. A crowding-out effect is also observed in the value of transfers received. According to our model, the average amount of transfers received by those 65-66 in 2004 and 2005 would have been 3.99 reais higher. Instead of the observed average value of 1.91 reais, the average transfer would be 5.90 reais.

Table 2 – Model Estimates

A) 1998 age reduction (from 70 to 67)

	Prob. of receiving interhousehold transfer		Value of interhousehold transfer received	
	Coef.	**P>t**	**Coef.**	**P>t**
treatment	0.009	0.04	0.74	0.17
after	0.015	0.00	1.35	0.01
treat x after	-0.030	0.00	-2.78	0.00
female	0.001	0.66	-0.32	0.33
years of schooling	-0.001	0.01	-0.08	0.21
race_white	-0.005	0.08	-0.75	0.02
other_65up	-0.016	0.00	-1.36	0.00
# members of household	-0.004	0.00	-0.33	0.00
urban	0.005	0.17	0.40	0.36
constant	0.032	0.00	3.53	0.00
[N]	8,462		8,462	
Prob > F	0.000		0.000	
R-squared	0.015		0.008	

B) 2004 age reduction (from 67 to 65)

	Prob. of receiving interhousehold transfer		Value of interhousehold transfer received	
	Coef.	**P>t**	**Coef.**	**P>t**
treatment	0.009	0.27	1.06	0.33
after	0.004	0.53	1.62	0.10
treat x after	-0.029	0.00	-3.99	0.00
female	-0.007	0.14	-2.01	0.00
years of schooling	-0.001	0.07	-0.03	0.77
race_white	-0.009	0.05	-0.49	0.45
other_65up	-0.025	0.00	-2.40	0.00
# members of household	-0.007	0.00	-0.72	0.00
urban	0.015	0.04	0.06	0.95
constant	0.066	0.00	8.14	0.00
[N]	5,435		5,435	
Prob > F	0.000		0.000	
R-squared	0.018		0.011	

Source: PNADs 1995-2005. Notes: OLS estimates. In panel A, treatment group is age group 67-69, control group is 64-66, after the age reduction is 1998, 1999 and 2001, and before the age reduction is 1995, 96 and 97. In panel B, treatment group is age group 65-66, control group is 63-64, after the age reduction is 2004 and 2005, and before the age reduction is 2002 and 2003.

As mentioned in an earlier section, the validity of the DD strategy is closed linked to the parallelism in the temporal trend of the dependent variable in the counterfactual scenario of no intervention. In this sense, Table 2 presents a placebo estimate as a test for the validity of the DD approach. The placebo

estimate re-estimates the model for periods prior to the age reductions in the BPC program, using the same age groups for treatment and control group. The variable *treat x after* is not statistically different from zero for both the probability of receiving transfer and or the value of transfer received. This evidence provides support in favor of the use of the DD technique in the particular case of BPC expansion.

Table 2 – Placebo Model Estimates

A) Placebo estimation (age reduction from 70 to 67)

	Prob. of receiving interhousehold transfer		Value of interhousehold transfer received	
	Coef.	**P>t**	**Coef.**	**P>t**
treatment	0.007	0.26	0.44	0.54
after	-0.001	0.90	-0.48	0.54
treat x after	0.007	0.46	0.98	0.38
female	0.008	0.09	0.38	0.52
years of schooling	-0.002	0.04	-0.17	0.12
race white	-0.003	0.52	-0.42	0.46
other_65up	-0.019	0.00	-1.94	0.00
# members of household	-0.004	0.00	-0.37	0.00
urban	0.004	0.52	0.68	0.39
constant	0.031	0.00	3.35	0.00
[N]	2,896		2,896	
Prob > F	0.000		0.005	
R-squared	0.013		0.008	

B) Placebo estimation (age reduction from 67 to 65)

	Prob. of receiving interhousehold transfer		Value of interhousehold transfer received	
	Coef.	**P>t**	**Coef.**	**P>t**
treatment	0.025	0.01	2.40	0.03
after	-0.001	0.91	-0.16	0.87
treat x after	0.002	0.87	0.42	0.76
female	-0.006	0.33	-1.82	0.02
years of schooling	-0.004	0.00	-0.27	0.03
race_white	-0.017	0.00	-2.25	0.00
other_65up	-0.061	0.00	-5.79	0.00
# members of household	-0.011	0.00	-1.11	0.00
urban	0.014	0.12	-0.14	0.90
constant	0.092	0.00	11.21	0.00
[N]	3,965		3,965	
Prob > F	0.000		0.000	
R-squared	0.035		0.025	

Source: PNADs 1995-2003. Note: In panel A, treatment group is age group 67-69, control group is 64-66, after the intervention is 1997, and before the intervention is 1995 and 1996. In panel B, treatment group is age group 65-66, control group is 63-64, after the intervention is 2002 and 2003, and before the intervention is 1999 and 2001.

Final Remarks

In summary, our study shows that the two reductions in the eligibility age were associated with reductions both in the probability of receiving interhousehold transfers and in the magnitude of transfers received by those in the age groups that became eligible. This indicates that public income transfers

may reduce the amount of financial support the elderly receive from other families in Brazil. In other words, it suggests that part of the amount spent by the government in the BPC program did not become part of the elderly income. Part of the resources spent by the government ended up being absorbed by the families that previously supported them.

Some next steps already in progress in the development of this paper include the examination of alternative econometric models. The OLS estimation technique employed may not be the most suitable technique for the two types of response variables: the probability of receiving transfer (a binary response variable) and the value of transfer received (although a continuous variable, most observations receive zero transfer). Regarding the probability of receiving transfer, the next version of the paper will include a logit model – a nonlinear model that deals better with dichotomous response variables.

Concerning the value of transfer received, a tobit model is considered. A tobit model would deal with problem of left-censoring – i.e. the fact that a large proportion of the elderly do not receive transfer, what causes the average amount transferred for the whole sample to be very small. Our preliminary tobit estimates show that if the BPC program was not made available for the 67-69 age group in 1998, those elderly who receive family support would be receiving on average 112.4 reais, instead of 91.8 reais. For the 65-66 age group, in 2004, these values are 110.4 and 96.7 reais, respectively.

Because it is probable that an increase in the elderly income may affect the interhousehold transfers directed to other household members, another important step is to estimate the impact of the BPC on the transfers received by the elderly co-residents. For instance, in 2004 about 1.9% of the elderly 64-69 years old in our sample received interhousehold transfers, while 4.0% of them lived in households that received transfers that year. Analyzing the impact of the BPC expansions on other members' transfer behavior may show larger consequences of the BPC program on interhousehold transfers than the ones estimated so far in this study.

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