Social Security and Rural Poverty in Brazil*

Juliano J. Assunção **
Flávia Chein ***

Abstract

This paper investigates the effectiveness of the social security system as a rural anti-poverty policy. The source of econometric identification is a Brazilian legislative change implemented in 1991 that reduced the minimum eligibility age, increased the benefits, and extended the participation to non-head of the household members. Our findings indicate that the reform has reduced the incidence of poverty by 40% in eligible households.

Keywords: Social Security, Poverty.

JEL Codes: H55, J22, J24, J26.

*Submitted in April 2009. Revised in November 2010. This material is based upon work supported by a grant from the The United States Agency for International Development (AID), and a subcontract from Broadening Access and Strengthening Input Market Systems (BASIS)/ Collaborative Research Support Program (CRSP)/University of Wisconsin – Madison awarded to the Regents of the University of California, Riverside. The opinions, findings, conclusions, and recommendations are those of the author(s) and not necessarily those of the Regents of the University of California, BASIS/CRSP and/or AID. Financial support from CNPq is also gratefully acknowledged.

**Department of Economics, PUC-Rio. Address: Rua Marques de São Vicente, 225/F210 – Rio de Janeiro, Brazil, 22453-900. Phone: +55 21 3527-1078. E-mail: juliano@econ.puc-rio.br

***CEDEPLAR, UFMG. Address: Av. Antônio Carlos, 6627 – Belo Horizonte, Brazil, 31270-901. Phone: +55 31 3409-7100. E-mail: fchein@cedeplar.ufmg.br

1. Introduction

Social security is a topic of major economic interest. It is prevalent worldwide and is one of the most important types of social programs in many countries. In 1992, social security accounted for more than \$285 billion of the total social welfare expenditure of the U.S. (Hungerford, 1996). Notwithstanding, there is a recurrent debate in many countries on the different aspects of social security, especially on its long-run sustainability. On the other hand, a substantial portion of the literature on social security assesses behavioral responses such as: labor force transitions (Blau, 1994, Blau and Gilleskie, 2001), labor supply (Krueger and Pischke, 1992, Lee, 1998, Vanderhart, 2003), cost to the firm for shedding older workers (Hutchens, 1999), living arrangements (Engelhardt et al., 2005), poverty (Hungerford, 1996, Engelhardt and Gruber, 2004), child nutrition (Duflo, 2003), and mortality (Snyder and Evans, 2006), schooling and health (Ponczek, 2010).

According to Engelhardt and Gruber (2004), social security benefits are often cited as an important factor in elderly poverty reduction. This paper evaluates the anti-poverty effectiveness of the Brazilian rural social security program. The source of econometric identification is the social security reform implemented in 1991, which reduced the minimum age for eligibility, dropped the restrictions on the number of recipients per household, and increased the benefits. Based on five repeated cross-sections for the years of 1989, 1990, 1992, 1993, and 1995, we follow a difference-in-difference approach that compares the eligible and non-eligible households before (1989, 1990) and after the reform (1992, 1993, and 1995). Since we have data from two periods (1989 and 1990) before the reform, we use 1990 as a placebo for which the identification assumption required has no effect. Following Carvalho (2008) and Ponczek (2010), our full effect estimates are based on a comparison between just-made-eligible by the reform (males, 60 or more years old and females, 55 or more years old) and soon-to-be-eligible (males, 55-59 years old and females, 50-54 years old).

We show that the social security reform has had a substantial effect on poverty. There is a decrease ranging from 12.4 to 15.1 percentage points in poverty for the years of 1992 to 1995 that indicates a reduction of more than 40% in the poverty level among the eligible households; at least 300,000 households escaped from poverty because of the social security reform. We document the substantial impact of the social security reform in Brazil on rural poverty in addition to the effects it has on child labor and school enrollment found in Carvalho (2000), literacy estimated by Ponczek (2010) and the increase in retirement documented by Carvalho (2008).

The remainder of the paper is organized as follows: Section 1 briefly describes the main changes of the social security reform. Then, Section 2 presents the data. The empirical strategy is defined in Section 3. The results are shown in Section 4. Some robustness checks are made in Section 5. Section 6 concludes.

2. Social Security in Brazil

The Brazilian public social security system used to be decentralized until the 1960s; pension funds were structured by occupation. In 1966, all sectoral pension systems were centralized under the supervision of the federal government. The National Social Security Administration (INPS), established in 1967, incorporated all the revenues and expenditures from all sectors as well as their assets and liabilities (Queiroz, 2005).

By the time of centralization, the social security system considered the following eligibility rules: individuals aged at least 65 years (males) or 60 (females) that have contributed for at least five years into the system; or individuals with more than 35 years of contribution for males and 30 for females, without age limits (Queiroz, 2005, Leite, 1986).

From 1970 on, several changes were adopted in the social security system. Most of them increased the coverage and diversified the benefits offered by the system. Many categories of workers who were not previously covered by the system became eligible: the self-employed, house servants, and rural workers. For example, the Rural Worker Assistance Program (PRORURAL), which was created in 1972, aimed to support the Rural Worker Assistance Fund, FUNRURAL (Andrade, 1999). The PRORURAL was designed in order to incorporate rural workers into the official social security system. The program provided rural workers, who were the head of the household, with a maximum benefit equal to half of the minimum wage (Delgado and Cardoso Jr, 2004). It is also worth mentioning that eligibility for the rural workers' old age pension benefit was defined at 65 (as was the case for male urban workers), reserved solely for the head of the household (Beltrão et al., 2004).

The latest major change was proposed during the Constitutional Reform of the 1980s. The Brazilian Constitution of 1988 stated, among other measures, that there would be an implementation of new universal social policies and an expansion of the current ones. Also, it established the guidelines for the reform of the social security system by introducing Ordinary Law #8212/8213 (Carvalho, 2008, Queiroz, 2005, Beltrão et al., 2004).

The Ordinary Law was passed on July 24, 1991, bringing about a reduction in the minimum age required for rural workers from 65 to 60 for males and to 55 for females. Also, social security benefits were extended to rural workers who were not heads of households, and the size of the benefit increased from half to equal to the minimum wage.

Table 1 presents the evolution of eligible households and of benefits from 1989 to 1995. We define eligible households as those with at least one male older than 60 years or one female older than 55 years. The percentage of households that receive any sort of social security benefits increased from 14.3% in 1989 to 22.9% in 1995.

Although the coverage has improved over time, it was not yet universal in 1995.

About 26% of all eligible households were not receiving any benefits in September of 1995.

Table 1
Eligibility, income, and benefits

Year	Number of rural households	Eligible* households	Average household income Non-eligible	per capita income Eligible	% households with benefits	% eligible households with benefits
1989	8.037.697	27,7%	94,33	104,87	14,3%	51,8%
1990	8.179.297	28,6%	83,78	85,34	15,0%	52,6%
1992	7.209.661	31,1%	75,29	102,15	19,4%	62,4%
1993	7.212.561	29,9%	79,83	121,87	21,7%	72,4%
1995	7.416.673	31,0%	88,19	122,08	22,9%	73,8%

Source: PNAD/IBGE – Household Surveys.

Note: Eligible households are those with at least one male older than 60 years or one female older than 55 years.

Also, it is worth mentioning that retirement pension benefits seem to be an important source of income for the rural elderly in Brazil. The increase in the percentage of households with benefits was accomplished by an increase in the average eligible household per capita income.

Figure 1 compares the trends in the average per capita income for eligible and non-eligible households. From 1989 to 1990, we can observe a decline in the eligible household per capita income with a convergence to the non-eligible household per capita income level. Between 1990 and 1995, the average per capita income of eligible households increased from R\$ 85.34 to 122.08, while the average per capita income of non-eligible households increased less than R\$ 4.00 during the same period. This result seems to be an effect of the new rules for the social security system implemented in 1991.

Figure 1
Evolution of per capita income of rural households

3. Data

Our analysis is carried out based on microdata from the Brazilian National Household Survey (PNAD). This is a household survey that is conducted annually by the Brazilian Census Bureau (IBGE), with a sample size of about 300,000 individuals or 0.2% of the Brazilian population. The sample considered in our analysis consists of all individuals living in rural households, available in the PNAD surveys from 1989 to 1995. The four years of data represent repeated cross-sections, because it is not possible to track individuals across the surveys.

In order to investigate the effects of social security reform on poverty, we integrate two types of information: household and individual-level data. Although our unit of analysis is the household, we use individual information to classify households as eligible and non-eligible. We also consider the individual characteristics of the head of the household. Our dependent variable, the poverty status, is built upon household *per capita* income. It is a binary variable that indicates whether the household per capita income is below the poverty line, as defined by Rocha (2003).¹

¹Rocha (2003) computes poverty lines from information about food expenditures available

Table 2 presents a detailed description of all variables considered in the analysis.

Table 2
Description of variables

Dependent variables	Description
Poverty Poverty	The dummy variable is equal to 1 if the household per capita income is below the poverty line, and 0 otherwise
Independent Variables and Controls	
Head of the household's characteristics	
Gender	The dummy variable is equal to 1 for males; 0 otherwise
Race	A set of dummy variables indicating the individual's race (white, black/brown, yellow, not declared)
Age	Age
Literacy	The dummy variable is equal to 1 if the head of household is literate and 0 otherwise
Years of schooling	Total years of schooling ranging from 0 to 10
Monthly earnings	Monthly earnings (measured in reais of 1995)
Worked in the reference week	The dummy variable is equal to 1 if the spouse worked in the reference week, and 0 otherwise
Hours of work per week	A set of 6 dummy variables indicating the groups of work hours per week (not working; less than 14 hours; from 15 to 39 hours; from 40 to 44 hours; from 45 to 48 hours, 49 hours or more)
Activities dummies	A set of 12 dummy variables indicating the sector of activity
Occupational position	A set of 4 dummy variables indicating the occupational position: employee, employer, self-employed and unpaid
Household infrastructure and durable goods	
Number of household members	Total number of people living in the household
Household income	Total household income (measured in reais of 1995)
Wall material	A set of dummy variables indicating the kind of wall material
Roofing material	A set of dummy variables indicating the kind of roofing material
Water supply	A set of dummy variables indicating the kind of water supply
Sewage system	A set of dummy variables indicating the kind of sewage system
Electricity	The dummy variable is equal to 1 if there is electric lighting in the house, and 0 otherwise
Number of rooms	Number of rooms in the house
Water filter	The dummy variable is equal to 1 if there is a water filter in the house, and 0 otherwise
Stove	The dummy variable is equal to 1 if there is a stove in the house, and 0 otherwise
Refrigerator	The dummy variable is equal to 1 if there is a refrigerator in the house, and 0 otherwise
Radio	The dummy variable is equal to 1 if there is a radio in the house, and 0 otherwise
Television set	The dummy variable is equal to 1 if there is a television set in the house, and 0 otherwise
State dummies	A set of dummy variables indicating the 20 Brazilian states included in IBGE's Household Survey (Rural areas in North Region are not included)

There are also two sets of control variables that regard the head of the household's characteristics, the household infrastructure, and its durable goods. Summary statistics of all considered variables are depicted in Table 3.

in the National Survey on Family Budget/ENDEF (1974-75) and on new household expenditure surveys – POF (Pesquisa de Orçamentos Familiares), both conducted by IBGE.

Table 3
Descriptive statistics

Variable	Non-eligible household					Eligible household				
	1989	1990	1992	1993	1995	1989	1990	1992	1993	1995
Income p.capita	94,33	83,78	75,29	79,83	88,19	104,87	85,34	102,15	121,87	122,08
Number of household members	4,91	4,85	4,68	4,65	4,51	3,83	3,91	3,80	3,83	3,69
Water supply(%)	16,58	18,31	12,99	15,09	17,76	12,40	12,44	10,80	13,07	14,20
Sewage system(%)	5,33	6,16	3,43	3,63	3,64	2,77	2,72	1,74	2,00	2,32
Electricity(%)	55,52	58,19	56,64	59,4	64,93	46,41	47,75	49,52	52,26	59,04
Number of rooms	5,1	5,2	5,2	5,2	5,2	5,4	5,5	5,5	5,6	5,7
Water filter(%)	40,53	41,17	39,45	40,66	41,22	38,46	37,47	38,32	38,66	40,74
Stove(%)	89,13	90,38	92,25	95,16	95,41	86,68	88,77	93,26	94,72	95,02
Refrigerator(%)	37,35	38,93	36,38	36,28	40,27	29,88	31,21	30,38	30,34	35,62
Radio(%)	74,60	74,61	75,10	74,80	80,58	75,07	76,29	76,07	75,91	79,90
Television set(%)	39,74	42,09	39,69	42,36	50,74	31,61	31,79	32,79	34,19	42,76

Source: PNAD/IBGE – Household Surveys.

The comparative analysis of household characteristics between eligible and non-eligible households shows that the per capita income is higher in the eligible households although the access to public infrastructure and durable goods is lower. It points out that the elderly live in the worst equipped houses. There is no evidence that the non-labor income or social security benefits and wealth are closely related.

4. Empirical Strategy

The empirical strategy is based on the social security reform as a means of building counterfactuals in a *difference-in-difference* approach. Our data are comprised of two cross-section household surveys before (1989 and 1990) and three cross-section surveys after (1992, 1993, and 1995) the reform. We consider the following general linear specification for the pooled data:

$$y_i = \alpha + \gamma^G I_i^{\{\text{treatment}\}} + \sum_{\tau \in \mathcal{T}_{-1989}} \gamma_\tau^T I_i^{\{\text{year}=\tau\}} + \quad (1)$$

$$+ \sum_{\tau \in \mathcal{T}_{-1989}} \gamma_\tau^{TG} I_i^{\{\text{treatment}\}} I_i^{\{\text{year}=\tau\}} + \beta' X_i + \varepsilon_i,$$

where y_i is the outcome variable; $I_i^{\{\text{treatment}\}}$ denotes whether observation i is in the treatment group or in the comparison group; $I_i^{\{\text{year}=\tau\}}$ indicates whether observation i is related to year $\tau \in \mathcal{T}_{-1989} \equiv \{1990, 1992, 1993, 1995\}$. The parameters of interest are γ_τ^{TG} , $\tau \in \mathcal{T}_{-1989}$. Manipulating (1), we can show that:

$$\gamma_\tau^{TG} = E(y|\text{treatment}, \tau, X) - E(y|\text{treatment}, 1989, X) - \quad (2)$$

$$- [E(y|\text{comparison}, \tau, X) - E(y|\text{comparison}, 1989, X)],$$

under the identification assumption that

$$E(\varepsilon|\text{treatment}, \tau, X) - E(\varepsilon|\text{comparison}, \tau, X) = \quad (3)$$

$$= E(\varepsilon|\text{treatment}, 1989, X) - E(\varepsilon|\text{comparison}, 1989, X).$$

Condition (3) assumes that the non-observed difference between the treatment and comparison groups is constant across years. Under (3) and considering that the social security reform was implemented in 1991, we expect that $\gamma_{1990}^{TG} = 0$ in all specifications. Then, parameters γ_{1992}^{TG} , γ_{1993}^{TG} and γ_{1995}^{TG} reflect the effect of the social security reform on the outcome variable in the respective years.

There were different dimensions in the Brazilian social security reform. As presented in the previous section, there was an income increase coming from the establishment of minimum wage floor for the benefits. But also, there was an increase in the number of recipients due to the reduction of the minimum age for eligibility and the drop of the one person per household restriction. In order to distinguish among different aspects of the Brazilian social security reform, we consider three alternative treatment-comparison groups.

1. Full effect:

- *Treatment group*: rural households with at least one member at the after-reform eligible age range (more than 60 for males and more than 55 for females).
- *Comparison group*: rural households with at least one member at the soon-to-be after-reform eligible range (55-59 for males and 50-54 for females).

2. Reduced age eligibility

- *Treatment group*: rural households with at least one member at the changed eligible age range (60-64 for males and 55-64 for females).
- *Comparison group*: rural households with at least one member at the soon-to-be after-reform eligible range (55-59 for males and 50-54 for females).

3. Additional members:

- *Treatment group*: rural households with two or more members at the after-reform eligible age range (more than 60 for males and more than 55 for females).
- *Comparison group*: rural households with exactly one member at the after-reform eligible age range (more than 60 for males and more than 55 for females).

5. Effects on Poverty

In essence, social security reform has determined important changes in the income of eligible rural households, as shown in Figure 1. Thus, we investigate whether there is an impact on the poverty rate or not.

The first step is to classify households according to their economic status. There is a large body of literature that discusses how and where to set the poverty threshold Atkinson (see, e.g. 1987). We do not address those issues and our results are based on the poverty lines computed by Rocha (2003), and are presented in Table 4. Because we use a difference-in-difference approach, our results are presumably not affected by (minor) methodological changes in the definition of poverty, which are eliminated in the time difference.

Table 4
Poverty lines

	Poverty Line				
	1989 NCz\$	1990 Cr\$	1992 Cr\$	1993 CR\$	1995 R\$
Northeast	96,46	2.885,20	170.333,75	3.387,28	37,34
Minas Gerais/ Espírito Santo	86,41	2.584,53	148.460,71	2.942,89	32,68
Rio de Janeiro	113,38	3.391,31	204.272,06	4.149,03	45,06
São Paulo	112,47	3.364,25	209.025,77	4.168,47	48,06
South	97,70	2.922,29	166.749,90	3.393,20	36,19
Central-West	138,41	4.140,10	211.931,05	4.309,36	46,74

Source: ROCHA, Sonia. *Pobreza no Brasil: Afinal do que se Trata*. Rio de Janeiro: Editora FGV, 2003.

The evolution of poverty in eligible and non-eligible households is presented in Table 5. The first column shows a clear reduction in the percentage of poor households from 40.8% in 1990 to 35.5% in 1992. Considering the indices for each group, it is clear that this reduction is restricted to eligible households in which poverty was reduced from 35.6% to 19.8%. Also, the absolute number of poor eligible households was reduced from 830,557 in 1990 to 444,034 in 1992.

Table 5
Household poverty

Year	Poverty			Distribution of poor households	
	Total	Non-eligible	Eligible	Non-eligible	Eligible
1989	42,9%	45,7%	35,9%	2,653,829 (76.9%)	797,653 (23.1%)
1990	40,8%	42,9%	35,6%	2,507,166 (75.1%)	830,557 (24.9%)
1992	35,5%	42,6%	19,8%	2,113,610 (82.6%)	444,034 (17.4%)
1993	35,8%	44,0%	18,4%	2,183,757 (84.6%)	397,447 (15.4%)
1995	35,8%	43,7%	17,7%	2,250,670 (84.7%)	407,648 (15.3%)

Source: PNAD/IBGE – Household Surveys.

Note: Eligible households are those with at least one male older than 65 years or one female older than 55 years.

Although the results in Table 5 indicate the substantial effect of social security reform on eligible households, this conclusion is limited by potential changes in individual and household characteristics. In order to take observable variables into account, Table 6 shows the estimation of the specification (1), which considers poverty as the dependent variable. Each column presents one different regression that considers additional control variables about household wealth or durable goods and the head of the household's characteristics.

Table 6
The effect of the social security reform on poverty

Variables	Full effect			Reduced age eligibility			Additional members		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
$1\{\text{treatment}\} \times 1\{\text{year}=1990\}$	0.013 (0.022)	0.005 (0.020)	0.008 (0.020)	0.01 (0.023)	-0.002 (0.022)	0.004 (0.022)	0.002 (0.021)	0.006 (0.021)	
$1\{\text{treatment}\} \times 1\{\text{year}=1992\}$	-0.135*** (0.022)	-0.139*** (0.021)	-0.124*** (0.021)	-0.056** (0.023)	-0.065*** (0.022)	-0.062*** (0.022)	-0.082*** (0.020)	-0.086*** (0.019)	-0.079*** (0.019)
$1\{\text{treatment}\} \times 1\{\text{year}=1993\}$	-0.142*** (0.022)	-0.151*** (0.020)	-0.137*** (0.020)	-0.109*** (0.023)	-0.127*** (0.021)	-0.120*** (0.021)	-0.118*** (0.020)	-0.120*** (0.019)	-0.113*** (0.019)
$1\{\text{treatment}\} \times 1\{\text{year}=1995\}$	-0.153*** (0.022)	-0.164*** (0.021)	-0.151*** (0.021)	-0.099*** (0.023)	-0.119*** (0.022)	-0.113*** (0.022)	-0.090*** (0.020)	-0.100*** (0.019)	-0.096*** (0.019)
$1\{\text{treatment}\}$	-0.037** (0.016)	0.017 (0.015)	0.026* (0.015)	-0.022 (0.017)	0.024 (0.016)	0.035** (0.016)	-0.001 (0.016)	0.016 (0.015)	0.019 (0.016)
$1\{\text{year}=1990\}$	-0.014 (0.019)	-0.007 (0.018)	-0.007 (0.018)	-0.003 (0.018)	0.008 (0.017)	0.008 (0.016)	-0.003 (0.014)	-0.004 (0.013)	-0.003 (0.013)
$1\{\text{year}=1992\}$	-0.03 (0.020)	-0.018 (0.019)	-0.041** (0.019)	-0.062*** (0.018)	-0.050*** (0.017)	-0.066*** (0.017)	-0.130*** (0.013)	-0.124*** (0.012)	-0.135*** (0.012)
$1\{\text{year}=1993\}$	-0.037* (0.019)	-0.017 (0.018)	-0.039** (0.018)	-0.052*** (0.018)	-0.032* (0.017)	-0.052*** (0.017)	-0.129*** (0.013)	-0.121*** (0.012)	-0.134*** (0.013)
$1\{\text{year}=1995\}$	-0.031 (0.020)	0.012 (0.019)	-0.01 (0.019)	-0.057*** (0.018)	-0.01 (0.017)	-0.029* (0.018)	-0.148*** (0.013)	-0.115*** (0.012)	-0.126*** (0.012)
Constant and State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Household infrastructure and durable goods									
Head of the household's characteristics									
Observations	26650	26573	26562	17495	17449	17448	20753	20696	20685
R-squared	0.10	0.21	0.22	0.10	0.20	0.22	0.09	0.20	0.22

Source: PNAD/IBGE – Household Surveys.
 Note: The set of controls for household infrastructure and durable goods is composed of: household total income, number of household members; a set of dummy variables indicating wall material, roofing material, water supply, and sewage system; number of rooms; dummies indicating the existence of water filter; stove, refrigerator, radio and television set. The set of variables for the head of the household includes sex, race, age, literacy, years of schooling, monthly earnings, employment status, total hours of work per week, sector of activity, and occupational position.
 Robust standard errors in parentheses = * significant at 10%; ** significant at 5%; *** significant at 1%.

As presented above, parameters associated with the interaction between the treatment dummy and the time dummy indicate how the difference between treatment and comparison groups evolved in relation to the year of 1989. Thus, since there was no significant change in social security rules from 1989 to 1990, our identification requires that the estimated parameter related to the year 1990 be zero.

The effect of the program on the reduction of poverty ranges from 12.4 to 15.1 percentage points in the 1992-1995 years when compared to the baseline of 1990. Considering the pre-reform poverty level, this result implies a reduction of more than 40% in the poverty level – at least 300,000 households escaped from poverty because of the social security reform. It is worthwhile to emphasize that we found no significant difference in poverty levels between eligible and non-eligible groups in the years 1989 to 1990 as required by our identification assumption. Results are similar in all three pairs of treatment-comparison groups, indicating that all dimensions of the reform contributed to poverty reduction

6. Additional Checks: effects on family composition

Once more, it is worth mentioning that our measure of poverty is defined based on household per capita income, as discussed in Section 2. Changes in poverty status mean significant changes in household per capita income. Thus, there are two mechanisms that could explain an increase or decrease in poverty rate:

- a) household per capita income could change due to changes in household income;
- b) household size could change as a result of a new family composition.

Our identification assumption made in Section 3 advocates that Brazilian Social Security Reform represents an exogenous income shock to eligible households. In this context, the previous econometric results are based on the first mechanism (changes in household income) and do not take into account the second one. But, social security reform could also have direct effects on family/household composition. If such effects occur, our estimates of poverty effects will be biased.

In this section, we investigate the effect of Brazilian social security reform on two variables of family/household composition: household size and number of children in the household.

Table 7 reports the estimation of the specification (1) with household size and number of children in the household as the dependent variables. There is no evidence that Brazilian social security reform has affected either family size or the number of children in the household. These results reinforce our previous estimates of poverty effects since they seem to have no bias due to changes in family/household composition.

Table 7
The effect of the social security reform on family composition

Variables	Household size			Number of children per household		
	(1)	(2)	(3)	(1)	(2)	(3)
$1\{\text{treatment}\} \times 1\{\text{year}=1990\}$	0.016 (0.117)	0.049 (0.114)	0.016 (0.111)	0.010 (0.083)	0.009 (0.083)	0.002 (0.083)
$1\{\text{treatment}\} \times 1\{\text{year}=1992\}$	0.117 (0.119)	0.100 (0.115)	0.146 (0.114)	0.055 (0.069)	0.061 (0.069)	0.074 (0.069)
$1\{\text{treatment}\} \times 1\{\text{year}=1993\}$	0.182 (0.118)	0.180 (0.114)	0.171 (0.112)	0.088 (0.068)	0.090 (0.067)	0.101 (0.067)
$1\{\text{treatment}\} \times 1\{\text{year}=1995\}$	0.148 (0.116)	0.147 (0.113)	0.177 (0.111)	0.032 (0.067)	0.031 (0.067)	0.043 (0.067)
$1\{\text{treatment}\}$	-1.096*** (0.082)	-1.052*** (0.079)	-0.435*** (0.080)	-0.240*** (0.058)	-0.245*** (0.058)	-0.01 (0.059)
$1\{\text{year}=1990\}$	0.064 (0.103)	0.008 (0.101)	0.062 (0.100)	0.018 (0.074)	0.024 (0.074)	0.037 (0.074)
$1\{\text{year}=1992\}$	-0.159 (0.107)	-0.160 (0.104)	-0.197* (0.104)	-1.046*** (0.061)	-1.038*** (0.061)	-1.043*** (0.062)
$1\{\text{year}=1993\}$	-0.200* (0.105)	-0.230*** (0.102)	-0.235** (0.103)	-1.063*** (0.060)	-1.054*** (0.060)	-1.058*** (0.061)
$1\{\text{year}=1995\}$	-0.298*** (0.104)	-0.370*** (0.101)	-0.336*** (0.102)	-1.070*** (0.060)	-1.050*** (0.060)	-1.033*** (0.061)
Constant and state dummies	Yes	Yes	Yes	Yes	Yes	Yes
Household infrastructure and durable goods						
Head of the household's characteristics						
Observations	26650	26573	26562	26650	26573	26562
R-squared	0.04	0.11	0.21	0.15	0.15	0.19

Source: PNAD/HBGE – Household Surveys.

Note: The set of controls for household infrastructure and durable goods is composed of: household total income, a set of dummy variables indicating wall material, roofing material, water supply, and sewage system; number of rooms; dummies indicating the existence of water filter; stove, refrigerator, radio and television set. The set of variables for the head of the household includes sex, race, age, literacy, years of schooling, monthly earnings, employment status, total hours of work per week, sector of activity, and occupational position.

Robust standard errors in parentheses – * significant at 10%; ** significant at 5%; *** significant at 1%.

7. Conclusion

This paper evaluates the effectiveness of the Brazilian social security system as an anti-poverty policy in rural areas. Using the new social security rules implemented in 1991 to identify the causal relationship between social security benefits and poverty, we find a significant effect of the reform on poverty reduction. Our best estimates suggest that the reform pushed more than 300,000 households out of poverty. The reduction in poverty was as high as 40% in the pre-reform eligible households.

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