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Abstract: Public expenditures on non-contributory pensions are equivalent to at least 1 percent of GDP in several countries in Latin America and is expected to increase. We explore the effect of non-contributory pensions on the well-being of the beneficiary population by studying the *Pension 65* program in Peru, which uses a poverty eligibility threshold. We find that the program reduced the average score of beneficiaries on the Geriatric Depression Scale by nine percent and reduced the proportion of older adults doing paid work by four percentage points. Moreover, households with a beneficiary increased their level of consumption by 40 percent. All these effects are consistent with the findings of Galiani, Gertler and Bando (2016) in their study on a non-contributory pension scheme in Mexico. Thus, we conclude that the effects of non-contributory pensions on well-being in rural Mexico can be largely generalized to Peru.

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Keywords: Non-contributory pensions, poverty, mental health and well being.

JEL Codes: H4, H3, I1 and I3.

I. Introduction

While pensions are believed to be critical for protecting material well-being after retirement, only 20 percent of seniors worldwide receive pension benefits (Pallares-Miralles, Romero and Whitehouse, 2012). For those who have coverage, the benefits are often inadequate (ILO, 2014; Gasparini et al., 2007). Additionally, poverty rates among the elderly are substantially higher in countries where social security coverage is limited; the number of people who are 60 years of age or older is estimated to double by 2050 (United Nations, 2013); and the life expectancy of the elderly is also estimated to substantially increase by 2050 (Bosch, Melguizo and Pagés 2013). For these reasons, improving the effectiveness of pensions and expanding pension programs compel immediate attention.

A number of governments have responded to high poverty rates among the elderly with non-contributory pensions. In OECD countries, 59 percent of the income of individuals over age 65 comes from public pension transfers (OECD, 2015). In Latin America, at least 15 countries have implemented non-contributory pension programs covering about 20 percent of the region's population (Bosch, Melguizo and Pagés, 2013; Pallares-Miralles, Romero and Whitehouse, 2012). In Latin America, these programs constitute a large part of social safety nets. For example, in Mexico, the *Adultos Mayores* program is the second largest social program behind the conditional cash transfer program *Progresa* (formerly *Oportunidades*)*,* and in Peru, *Pension 65,* a non-contributory pension program for the elderly, is second only to the conditional cash transfer program *Juntos* (Rubio and Garfias, 2010; Aguila et al., 2013, MIDIS, 2012).

In this paper, we explore the effects of *Pension 65* in Peru. The program's main goal is to provide economic security to persons who are 65 years of age or older and living in poverty (Presidencia del Consejo de Ministros, 2011). At the time this study was conducted, the program provided beneficiaries with US$ 78 every two months. This study makes use of a strong identification strategy by exploiting an exogenous poverty cutoff to determine eligibility. As a result, we are able to analyze household survey data using a sharp regression discontinuity approach. We estimated effects for a sample of households that is within 0.3 standard deviations of the threshold. As a result, program participation was statistically ignorable in the neighborhood that we studied.

We find that households with a beneficiary increased their level of consumption by 40 percent and that the program reduced the proportion of older adults doing paid work by 4 percentage points. These effects contributed to their subjective welfare as indicated by a 9-percentage-point reduction in the Geriatric Depression Scale. However, we do not find impacts on the use of health services, physical health outcomes, enrollment of minors in school or household composition. However, we find that transfers to persons residing outside the household increased as the

proportion of households that reported expenditures on transfers rose from 46 percent to 61 percent.

Several studies have focused on the effects of non-contributory pension schemes on the health and material welfare of beneficiaries. Some examine the effects of such schemes on consumption (Fan, 2010; Blau, 2008; Case and Deaton, 1998), physical health (Kadir and Barret, 2014), and labor supply (de Carvalho, 2008; Bosch, Melguizo and Pagés, 2013; Grueber and Wise, 1998). Other studies have analyzed the effects of pensions on other family members. For example, Case and Deaton (1998), Duflo (2003), Hamoudi and Thomas (2014) and Fan (2010) explore program effects on children's school enrollment, household composition and private transfers. Our work is also related to the work of Finkelstein et al. (2012) and Baicker et al. (2013) who find access to Medicaid health insurance lowered self-reported depression in low-income adults. Indeed, the literature shows unemployment results in more depression because of the lack of work, but also in less depression as people can spend more time in pleasant activities (Knabe et al., 2010; Krueger and Muller, 2012; and Ruhm, 2001).

In contrast, in previous work, we took a comprehensive approach in examining the influence of Mexico's non-contributory pension schemes of *Adultos Mayores* on both material and subjective well-being (Galiani, Gertler and Bando, 2016). Indeed, pensions may allow older adults to reduce their time working and increase their time enjoying life. We found that beneficiaries used part of the transfer to finance an increase in household consumption and used the rest to offset reduction in labor earnings from beneficiaries reducing paid work. These changes resulted in an improvement in mental health as measured by the Geriatric Depression Scale.[1]

When we compare the results in this paper with the effects of the *Adultos Mayores* program in Mexico, we find that we can broadly generalize the estimates for Mexico to Peru. We find that the effects of the programs are not that different across the two countries. The depression score in Peru decreased by 8.68 percent, while it decreased in Mexico by 9.11 percent. Paid work decreased by 4 percentage points in both countries. In addition, consumption rose by 40 percent in Peru and by 14 percent in Mexico. For food consumption, households in Peru allocated 67 percent of the increase, while in Mexico, they allocated 54 percent.

This study is important in that it constructs external validity of the effects of non-contributory pensions, since in principle, the effects of any program are contingent on the context of the study (Angrist, J., 2004; Campbell, 1969; Fisher, 1935). Understanding program effects in multiple

[1] Mental health is a widely accepted indicator of quality of life among the elderly (Campbell et al., 1976; Walker, 2005).

economic and cultural contexts is necessary in order to construct external validity and inform policy. A number of studies use similar multi-country strategies to generalize cause-and-effect constructs. For example, Cruces and Galiani (2007) examine the effects of fertility on labor outcomes in three counties, Banerjee et al. (2015) study microcredit in six countries, Gertler et al. (2015) study health promotion in four countries, Dupas et al. (2016) examine the effects of opening savings accounts in 3 countries, and Galiani et al. (2016) investigate slum upgrading in three countries,.

This paper is organized as follows. Section II describes the *Pension 65* program. Section III describes the data, and section IV describes the identification strategy. Section V presents the empirical results. Section VI compares our findings with the results obtained in Mexico. Section VII concludes.

II. The *Pension 65* Non-Contributory Pension Program

The program provides beneficiaries with a pension of US$ 39 per month, which is paid out in bi-monthly transfers (Presidencia del Consejo de Ministros, 2011). In addition, beneficiaries receive care in public health facilities at no cost and are eligible for the Integral Health Insurance Program (*Seguro Integral de Salud* (SIS)) (MIDIS, 2016). The program significantly increased the number of pension beneficiaries in 2013 as coverage expanded from 40,700 to 247,700 beneficiaries between January and November of that year.

To be eligible, a person has to be at least 65 years old, possess a government-issued identification document that attests to his or her age and be certified as living in a household that is below the poverty line. Persons who receive benefits from other pension programs are not eligible.

The government defines poverty based on its Household Targeting System (*Sistema de Focalización de Hogares* (SISFOH)) index. A person's SISFOH index score is a weighted average of a number of household characteristics.[2] A household is classified as poor if its score falls below a set threshold value. Government-defined poverty thresholds are set for geographic areas known as "conglomerates" (*conglomerados*). The SISFOH index is used universally for targeting all government programs, including the *Pension 65* program, and the data used to construct the SISFOH index were collected long before the *Pension 65* program established the

[2] These characteristics include the type of fuel used for cooking; electricity; water and sewerage access; the materials that the floor, walls and roof are made of; health insurance and assets. Assets include refrigerators, washing machines, laptops, and cable and Internet connections. They also include the level of education of the head of household and the extent of overcrowding.

eligibility threshold. The Ministry of Economic Affairs and Finance (MEF, 2010) provides details on the estimation of the SISFOH scores and poverty thresholds.

III. Data Sources

The data used in this study come from two surveys carried out by the National Institute of Statistics and Informatics (*Instituto Nacional de Estadística e Informática* or INEI). The sampling frame was restricted to the 12 out of 24 departments in Peru in which 70 percent of program beneficiaries resided as based on administrative records.[3] Households were then randomly sampled based on the following eligibility criteria: having at least one adult between the ages of 65 and 80, whose available SISFOH information could determine household poverty status and whose SISFOH score(s) were 0.3 standard deviations above and below the SISFOH eligibility threshold.[4]

There were two rounds of data collection. The first round was conducted in November and December of 2012, and the second round, in the period from July to October of 2015. In the first round, data were collected on 4,031 individuals in 3,031 households. INEI excluded 58 households that had errors in their eligibility score in the SISFOH system from the second round. Of the 2,973 remaining households, 234 were not found and therefore lost to attrition. We further excluded another 155 households from the analysis whose SISFOH scores at baseline were more than .3 standard deviations from the eligibility cutoff. Excluding these observations allows us to reduce the average distance of the SISFOH score from the eligibility threshold by 52 percent.[5] All in all, excluding all of these households did not likely affect our results as treatment status is uncorrelated with exclusion status (p-value = 0.559), and the baseline characteristics of the excluded households are not statistically different from those included in the sample (Table A1 in Appendix A). In summary, the analysis sample used in this study consists of 3,342 individuals living in 2,584 households.

The survey questions were designed to collect detailed information on the older adults and their households, as well as basic information on all other household members. More specifically, the survey collected labor information for persons 14 years of age or older. This information included labor market participation, hours worked and monetary compensation. Anthropometric

[3] Amazonas, Ancash, Cajamarca, Cusco, Hunuco, Junin, La Libertad, the provinces of the Lima Region (Cajatambo, Canta, Huarochiri, Oyón and Yauyos), Loreto, Pasco, Piura and Puno.
[4] For a detailed description of the selection of the sample, see the Ministry of Development and Social Inclusion (MIDIS y MEF, 2013). The INEI monitored actual transfers from January 2012 to June 2015, and the data can therefore be used to check for actual transfer reception.
[5] The score distance from the eligibility threshold in the final sample is between -0.32 and 0.31. If we were to include the 155 observations that were located in the tail of the distribution, the score would take on values of between -0.46 and 0.86.

measurements for the older adults in the sample (hypertension, waist circumference and body mass index (BMI)) were also taken. In addition, the survey included a series of questions designed to assess the cognitive health of these older adults. We then used these data to build a health status index based on a weighted average of standardized indicators. Standardization is relative to the distribution in the control group for the corresponding year.

The survey also collected data on perceptions about life related to the well-being of older adults, including life satisfaction, empowerment, contribution to household expenditures and self worth. We summarize the information on these indicators in an index. The method used for the construction of this index was analogous to the one used to construct the health index summary indicator.

Finally, the survey collected information on food and non-food expenditure. Appendix B includes definitions for all the variables used in this study. All variables have non-missing values for at least 96 percent of the observations, with three exceptions. The share of missing values for labor income is 13 percent. For household expenditures, the share of missing values is 7 percent, and for the welfare index, the share of missing values is 8 percent. However, the missing data are not related to treatment in any of these cases (*p*-value = 0.587 for labor earnings, *p*-value = 0.230 for the contribution index and *p*-value = 0.784 for expenditures).

IV. Identification Strategy

To identify the impact of the program on the outcomes of interest, we rely on a regression discontinuity design (RD) approach with SISFOH score as the running variable. Since the thresholds vary across the 15 conglomerates in the sample, we estimate the RD model also conditioning on conglomerate fixed effects. Specifically, we estimate the following empirical model:

$$y_{ic} = \eta_c + \beta_1 T_{ic} + \beta_2 x_{ic} + \beta_3 x_{ic} T_{ic} + \varepsilon_{ic} \quad (1)$$

where y_{ic} is the outcome for individual *i* living in conglomerate *c*, T_{ic} denotes treatment status and varies at the household level, x_{ic} denotes the distance from the conglomerate threshold, and ε_{ic} denotes an error term. The term η_c denotes a conglomerate fixed effect. We cluster errors at the conglomerate level.

Note that we control for distance from the threshold using a linear specification rather than polynomials because we restricted our survey sample to being very close to the thresholds. We provide evidence supporting the validity of this model specification in the baseline balance section below.

It is important to note that households could not manipulate the SISFOH score as the data used to estimate the SISFOH score were collected before *Pension 65* had established the eligibility threshold. While compliance with treatment assignment was high, it was not perfect. After implementation, monitoring data revealed that 260 individuals who were receiving transfers were not eligible; 20 individuals in the control group were also receiving transfers; and 177 eligible individuals never received a transfer. Thus, our estimates are interpreted as intention-to-treat effects.

V. Descriptive Statistics and Baseline Balance

In this section, we provide descriptive statistics of the study population and investigate baseline balance in the context of our estimation strategy. Table 1 reports the baseline means of individual characteristics for the control group and differences in the baseline means of the treatment and control groups. Table 2 reports the same for household characteristics. In both tables, column (1) reports the baseline means for the control group; column (2) reports the difference of the treatment and control group baseline means; and column (3) reports the standard error of the difference in (2). Columns (4), (5) and (6) show p-values for tests of balance estimated using RD with conglomerate fixed effects, simple RD, and simple differences, respectively.

The individual and household characteristics reflect the targeting criteria. The individuals are older than 65, live in poor households and are mostly physically and mentally healthy. As shown in Table 1, Column (1), Panels A and B, 68 percent of the respondents reported working in the previous week with 58 percent reporting having done so for pay. Panel C shows statistics on the physical health of these older adults. The prevalence of hypertension in the sample was 32 per cent. To put this number in context, we note the prevalence of hypertension worldwide in adults aged 25 and over was 40% in 2008 (WHO, 2016). The average waist circumference was 88 centimeters, and the average BMI was 24. This average BMI is in the normal range, and the average waist circumference is below the threshold for a greater risk of metabolic complications according to the standards set by the World Health Organization (WHO) (2008).

The well-being indicator reflects the extent of an individual's overall satisfaction with life. Higher values indicate higher values in any of the other well-being indicators. The indicator is standardized to the distribution of the control group. According to our findings, the average older adult feels content or very content with respect to six (75 percent) of the eight aspects of their lives covered in the survey (contentment with health, self, ability to carry out daily activities, interpersonal relations, place where the adult lives, relationship with children, relationship with other family members and life in general). The average score was 0.89 on a scale from 0 to 1 for empowerment, and 81 percent of the respondents said that they contribute to household

expenditures. In addition, the support that these older adults feel that they provide to the household results in a self-worth score of 0.60 on a scale from 0 to 1.

Column (1) of Table 2 shows that the average household has three individuals. The average age of the head of household is 68 years; 66 percent of the heads of household are married, and 75 percent are male. The average education level is 7.5 years (equivalent to a completed elementary education). The average level of labor income and of household expenditure per adult equivalent are both equal to US$ 51, which indicates that many of these households are indeed poor, have elderly members and obtain resources for expenditure on consumption from sources other than the formal labor market.

Overall, there are no statistically significant differences between the treatment and control groups for RD with conglomerate fixed effects (Column 4), our preferred model, that are consistent with the assumption behind our identification strategy. However, the simple RD (column 5) is next best with 4 out of 31 characteristics being statistically different at conventional levels of significance. Finally, as expected, the simple difference in means (column 6) produces the most violations of baseline balance with 10 out of 31 characteristics being significantly different.

V. Empirical Results

In this section we present estimates of the impact of non-contributory pensions on labor supply, health, well being and consumption. We start out by discussing our preferred specification. More specifically, we focus on the intention-to-treat estimates arrived at using the RD model with conglomerate fixed effects. We then discuss how our results vary under alternative specifications in the previous to last subsection.

a. Labor Supply

Table 3 reports the results for labor market participation. Column (2) shows estimation without controls. Column (3) shows results with controls. Column (4) shows p-values adjusted for the family-wise error rate from multiple hypothesis testing following the procedure presented in Anderson (2008). The adjusted *p*-values control for the probability of false rejection for the family of outcomes listed in each table.

Table 1. **Baseline means and balance of individual variables**

	Mean control group (1)	Difference (Treatment mean - control mean) (2)	Standard error of the difference (3)	*p*-value for test of equality		
				RD with conglomerate fixed effects (4)	RD (5)	Simple difference (6)
Panel A. Worked last week						
Worked	0.68	-0.04	0.03	0.318	0.502	0.883
Hours worked	20.31	-1.02	1.64	0.546	0.247	0.837
Panel B. Paid work last week						
Worked for pay	0.58	-0.04	0.04	0.257	0.476	0.686
Hours worked for pay	17.42	-1.51	1.73	0.400	0.315	0.587
Labor earnings	42.68	-3.19	5.25	0.555	0.431	0.108
Panel C. Physical health						
Hypertension	0.32	0.00	0.04	0.917	0.094	0.655
Waist circumference	88.06	0.69	1.10	0.543	0.261	0.105
BMI	23.54	0.05	0.71	0.944	0.362	0.138
Memory	11.61	-0.12	0.16	0.479	0.096	0.574
Panel D. Well-being						
Satisfaction	0.75	-0.02	0.02	0.273	0.149	0.738
Empowerment	0.89	-0.01	0.02	0.442	0.613	0.220
Contribution	0.81	-0.01	0.04	0.882	0.622	0.109
Self-worth	0.60	0.00	0.02	0.835	0.299	0.619
Panel E. Individual beneficiary characteristics						
Age	71.00	0.21	0.53	0.693	0.969	0.606
Male	0.50	0.02	0.02	0.153	0.446	0.002
Married	0.70	0.05	0.05	0.380	0.476	0.478
Years of schooling	4.46	0.39	0.41	0.356	0.457	0.003

Source: Authors' calculations.
Note: Based on 3,342 individuals, out of which 2,151 were allocated to treatment and 1,191 to control.

Table 2. **Baseline means and balance of household variables**

	Mean control Group (1)	Difference (Treatment mean - control mean) (2)	Standard error of the difference (3)	*p*-value for test of equality		
				RD with conglomerate fixed effects (4)	RD (5)	Simple difference (6)
Income	51.46	-0.51	9.52	0.958	0.852	0.003
Income excluding older adults	31.51	4.30	8.04	0.603	0.946	0.030
Total expenditures	51.36	13.38	8.71	0.151	0.194	0.218
Food expenditures	37.13	11.41	7.14	0.136	0.304	0.484
Non-food expenditure	14.23	1.97	1.77	0.287	0.027	0.008
Received transfer in last 6 months	0.60	0.00	0.07	0.956	0.289	0.818
Received transfer excluding those to older adults	0.28	0.03	0.06	0.593	0.131	0.312
Sent transfer in the last 3 months	0.42	0.01	0.03	0.866	0.872	0.274
% age 3 to 15 years in school	0.74	0.01	0.07	0.894	0.970	0.568
Adult equivalent household size	3.15	0.28	0.34	0.426	0.648	0.231
Age head of households	67.82	1.31	1.10	0.255	0.322	0.009
Head of household married	0.66	0.06	0.05	0.292	0.356	0.778
Male head of household	0.75	0.04	0.04	0.363	0.049	0.093
Head of household school years	7.49	0.09	0.60	0.885	0.572	0.028

Source: Authors' calculations.

Note: Based on 2,584 observations, out of which 1,659 had at least one individual in treatment (treatment) and 925 did not (control)

These results indicate that the program did not affect labor supply or hours worked. The share of individuals who were working remained at 59 percent. The number of hours worked in the previous week remained at 15.55. However, the receipt of pensions decreased the level of work for pay by 8.85 percent (from 0.51 to 0.47). And, indeed, labor income fell by 20.34 percent (from US$ 22.93 to US$ 18.27). The number of hours worked for pay in the previous week remained at 13.45, and there are thus no statistically significant differences in that variable.

Table 3. **Impact on individual labor supply**

	Mean in control group	RD with conglomerate fixed effects	RD with conglomerate fixed effects and controls	Adjusted p-values
	(1)	(2)	(3)	(4)
Panel A. Work last week				
Worked	0.59	-0.02 (0.03) [-3.92%]	-0.03 (0.03) [-5.35%]	0.533
Hours worked	15.55	-0.73 (0.8) [-4.69%]	-1.39 (0.51)** [-8.93%]	0.533
Panel B. Paid work last week				
Worked	0.51	-0.04 (0.01)*** [-8.85%]	-0.06 (0.02)*** [-11.57%]	0.053
Hours worked	13.45	-0.31 (0.89) [-2.31%]	-1.08 (0.76) [-8.01%]	0.784
Labor Earning	22.93	-4.67 (1.97)** [-20.34%]	-5.73 (1.76)*** [-24.99%]	0.077

Source: Authors' calculations.
Note: Based on 3,342 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include each individual's age, sex, marital status and years of schooling. *p*-values adjusted according to Anderson (2008) for the family of outcomes listed in the table.

b. Health and Well-Being

Table 4 shows the results for health and well-being. The values of program estimates given in Column (2) for Panel A show that physical health was not affected. More specifically, hypertension, waist circumference, BMI and memory scores were not altered by the program. Consistent with this, older adults did not feel that their health had improved or that they were having less difficulty than before in performing daily activities. The physical health scores confirm this.

Table 4 Panel B, which focuses on subjective well being, shows a different story. The program reduced the older adults' score on the Geriatric Depression Scale by 8.68 percent (from 0.43 to 0.39). In addition, the contribution-to-household expenditures score increased by 12.92 percent (from 0.83 to 0.94), and the self-worth score rose by 6.54 percent (from 0.57 to 0.61). However, the program did not affect the satisfaction score, which remained at 0.74, or the empowerment score, which remained at 0.88. The overall well-being score, shown in the last row of Panel B, indicates that the program led to an increase in well-being equivalent to 0.17 standard deviations.

As the program made beneficiaries eligible for the public Integral Health Insurance Program (*Seguro Integral de Salud* (SIS)), we find that the share of older adults affiliated with this insurance program increased by 12 percent (from 79 percent to 89 percent). However, we find no effects on the use of health services. Table 5 reports estimates of program effects on health perception, insurance and health services.

c. Household Income and Consumption

Table 6 reports impact estimates for household labor income and consumption expenditures, with income and expenditures being presented in US dollars (US$) and in terms of adult equivalents. Column (2) shows that the program did not affect total household labor income. Indeed, total labor income remained at US$ 38.46. The program did not affect the labor income of older adults either, which remained constant at US$ 25.94. However, the program increased household expenditure by 39.73 percent (from US$ 45.16 to US$ 63.11). Older adults allocated 67 percent of their expenditure to food consumption and 33 percent to non-food consumption.

Table 4. Impact on health and well-being

	Mean in control group	RD with conglomerate fixed effects	RD with conglomerate fixed effects and controls	Adjusted *p*-values
	(1)	(2)	(3)	(4)
Panel A. Physical health				
Hypertension	0.44	-0.07 (0.03)*	-0.07 (0.03)*	0.124
Waist circumference	89.01	-0.52 (1.29)	-0.79 (1.38)	0.654
BMI	23.31	-0.10 (0.14)	-0.06 (0.13)	0.527
Memory	11.25	-0.07 (0.25)	-0.11 (0.24)	0.661
Physical Health Index	0.00	-0.03 (0.05)	-0.03 (0.05)	
Panel B. Subjective Well-being				
Depression symptoms index	0.43	-0.04 (0.02)*	-0.04 (0.02)*	0.124
Satisfaction with quality of life	0.74	0.00 (0.02)	0.00 (0.02)	0.767
Empowerment	0.88	0.03 (0.02)	0.03 (0.02)	0.196
Contribution	0.83	0.11 (0.02)***	0.11 (0.02)***	0.003
Self-worth	0.57	0.04 (0.02)**	0.04 (0.01)***	0.101
Subjective well-being index	0.00	0.17 (0.04)***	0.17 (0.03)***	

Source: Authors' calculations.
Note: Based on 3,342 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include each individual's age, sex, marital status and years of schooling. P-values adjusted according to Anderson (2008) for the family of outcomes listed in the table.

Table 5. Impact on individuals' health perceptions, health insurance and use of health services

	Mean for control group	RD with conglomerate fixed effects	RD with conglomerate fixed effects and controls	Adjusted *p*-values
	(1)	(2)	(3)	(4)
Panel A. Health perception				
Perception of good or very good health (1 if yes, 0 otherwise)	0.58	0.01 (0.04) [1.35%]	0.00 (0.04) [-0.06%]	0.571
Perception of difficulty performing daily activities (1 if yes, 0 otherwise)	0.44	-0.04 (0.04) [-9.59%]	-0.04 (0.04) [-9.41%]	0.440
Panel B. Health insurance				
Health insurance (1 if insured, 0 otherwise)	0.79	0.10 (0.04)** [12.31%]	0.09 (0.04)** [11.95%]	0.191
Panel C. Use of health services				
In the previous month had primary care visit	0.32	0.05 (0.03) [15.83%]	0.05 (0.03)* [16.26%]	0.355
In the previous month had visit, medication or exam	0.52	0.08 (0.05) [14.55%]	0.08 (0.05) [14.66%]	0.381
In the previous 3 months had dental, ophthalmological or optometric care or vaccination	0.23	0.06 (0.04) [27.45%]	0.06 (0.04) [23.77%]	0.355
In the previous 12 months was hospitalized or had surgery	0.06	0.01 (0.02) [21.42%]	0.01 (0.02) [21.26%]	0.475

Source: Authors' calculations.
Note: Based on 3,342 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include an individual's age, sex, marital status and years of schooling. P-values adjusted for type I error in multiple hypothesis testing by Anderson (2008).

To get a sense of how these changes relate to the pension transfers, consider the following. The program transferred US$ 39 (125 Peruvian Soles (S$)) per month per person. Considering that the average household size is 2.84, and additionally that, on average, the sample includes 1.29 older adults per household. Therefore, the average transfer per adult equivalent to each household was US$ 39*1.29/2.84 = US$ 17.71. This amount is not statistically different from the increase in consumption (p=0.948). Consistent with this, we find household consumption changes in line with the total transfer. In other words, households with two older adults increase consumption twice as much as households with one older adult. Appendix C shows estimates by the number of older adults in the household.

Table 6. **Impact on household income and expenditures**

	Mean in control group	RD with conglomerate fixed effects	RD with conglomerate fixed effects and controls	Adjusted *p*-values
	(1)	(2)	(3)	(4)
Labor income per adult equivalent (AE)	38.46	4.24 (6.37) [11.02%]	4.99 (6.73) [12.97%]	0.262
Labor income per AE excluding older adult	25.94	4.87 (6.62) [18.77%]	6.16 (6.46) [23.75%]	0.262
Household expenditure per AE	45.16	17.94 (4.63)*** [39.73%]	18.05 (3.94)*** [39.97%]	0.012
Household food expenditure per AE	31.68	12.03 (3.68)*** [37.99%]	12.16 (3.21)*** [38.38%]	0.012
Household non-food expenditure per AE	13.49	5.91 (1.77)*** [43.81%]	5.89 (1.97)** [43.71%]	0.012

Source: Authors' calculations.
Note: Based on 2,584 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include age, marital status, sex and education of the head of household. P-values adjusted according to Anderson (2008) for the family of outcomes listed in the table.

d. Benefits to Other Family Members and Transfers

Increases in household consumption may benefit other household members, in addition to the older adults. Thus, we seek to determine if pension transfers affected school enrollment, where we define enrollment as the percentage of household members who are 3 to 15 years old and enrolled in an educational institution. Table 7 in Panel A shows the results of this analysis. No effects were found.

We then look at whether pensions influence living arrangements. As may be seen from the same panel, we do not find any effects on household size. Next, we try to determine if transfers at the older-adult and/or household-level change. Panel B shows impact estimates for current transfers at the household level. The share of households with individuals who reported having received a transfer in the previous six months decreases from 51 percent to 43 percent. However, column (4) shows this effect is not statistically significant when adjusting for multiple testing. We find no impact when transfers to older adults are excluded. We also find the share of private transfers sent increased from 46 to 62 percent.

We therefore conclude that the receipt of non-contributory pensions did not affect children's school enrollment or household composition. These results differ from those of Duflo (2003) and Hamoudi and Thomas (2014), who find that the receipt of pensions did influence these two variables. We do not find evidence that the receipt of these pensions leads to a decrease in transfers either. Our results for this variable therefore differ from those of Fan (2010), who finds that pension transfers translate into decreases in private transfers to the elderly equivalent to 39 cents for every pension dollar. In contrast, the receipt of a pension is likely to benefit family members who reside elsewhere.

d. Robustness Tests

In this section, we discuss the sensitivity of our results to alternative specifications. In summary, our findings are robust. First, we compare the results just discussed with those obtained with the inclusion of controls. In the empirical section, we also report estimates while also conditioning on a set of observable control variables. Nevertheless, we expect local estimation to replicate the conditions of a local experiment. If so, the introduction of controls should not affect our point estimates previously reported. However, their introduction may increase the efficiency of the estimator of the parameter of interest.

Table 7. Impact on benefits to other household members and transfers

	Mean in control group	RD with conglomerate fixed effects	RD with conglomerate fixed effects and controls	Adjusted *p*-values
	(1)	(2)	(3)	(4)
Panel A. Benefits for other household members				
% HH members age 3 to 15 enrolled in school†	0.81	-0.05 (0.06)	-0.02 (0.06)	0.951
Household size per adult equivalent	2.84	0.04 (0.24)	0.74 (0.2)	1.000
Panel B. Transfer to and from household				
Received private transfer in last 6 months	0.51	-0.08 (0.04)*	-0.09 (0.03)**	0.249
Received private transfer excluding older adult	0.39	-0.04 (0.07)	-0.06 (0.07)	0.951
Sent private transfer in last 3 months	0.46	0.15 (0.05)***	0.16 (0.05)***	0.010
Panel C. Transfer to and from older adult				
Transfers received (US$)	15.81	-0.25 (5.4)	-2.18 (4.53)	1.000
Transfers sent (US$)	2.98	-2.00 (2.07)	-1.76 (2.1)	0.924
Received transfer	0.44	-0.07 (0.06)	-0.08 (0.05)	0.735
Sent transfer	0.06	0.03 (0.02)	0.03 (0.02)	0.596

Source: Authors' calculations.
Note: Panels A and B based on 2,584 observations. Panel C based on 3,342 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include each individual's age, sex, marital status and years of schooling. P-values adjusted according to Anderson (2008) for the family of outcomes listed in the table.
† The proportion of households with no minors between the ages of 3 and 15 is 42 percent. This share is the same for beneficiary and non-beneficiary households (p=0.248).

For individual outcomes, controls include each individual's age, sex, marital status and years of schooling. For household outcomes, controls include age, marital status, sex and education of the head of household. We compare the results shown in Column (2) with those given in Column (3) in Tables 3 to 7. We find that, for all variables in Tables 3 through 7, the estimates are both similar in magnitude and statistical significance. This evidence is consistent with the assumption that eligibility thresholds successfully provide local exogenous variation in treatment assignment.

Next, we use monitoring information to incorporate differences between planned and actual treatment. We estimate program effects excluding the 260 non-eligible households that were identified ex-post. We also estimate local average treatment effects using eligibility as an instrument for the receipt of transfers. We find that these alternative specifications yield estimates that do not differ from our intent-to-treat estimates in our preferred specification. However, instrumental variable estimates are less efficient than ordinary least squares. We conclude that our average local treatment effects are within the margin of error of the intent-to-treat estimates. Tables that compare these estimates with our intent-to-treat estimates may be found in Appendix D. We conclude our results are robust to alternative specifications.

VI. Generalizing the Results

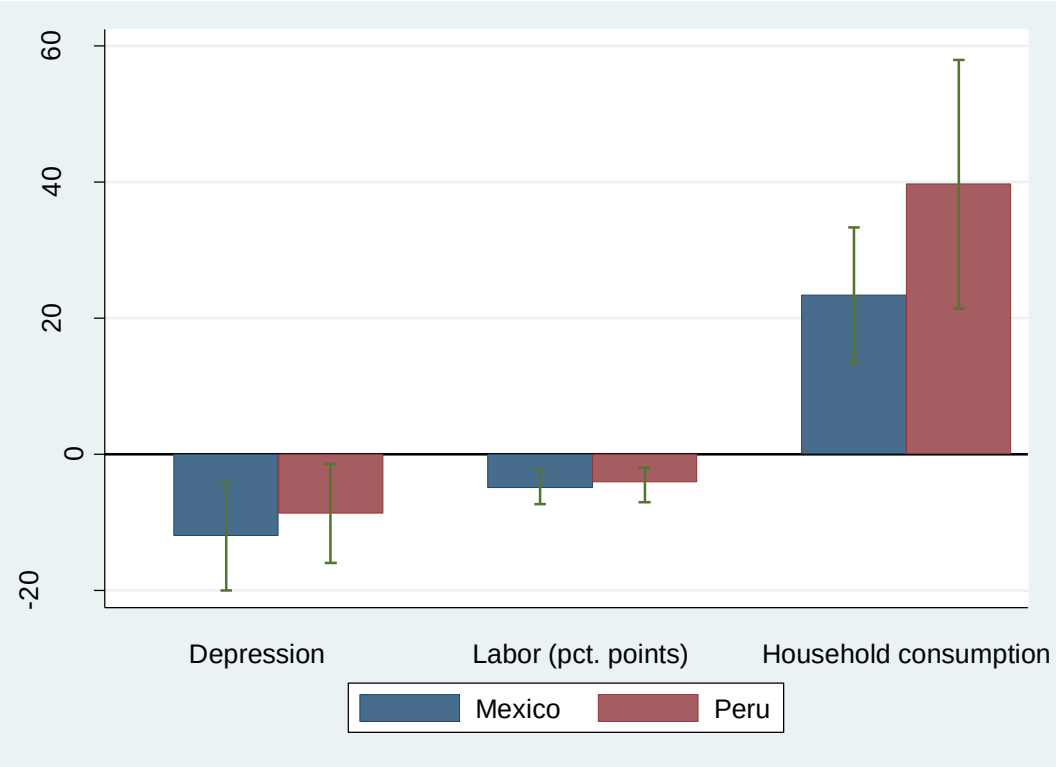
In this section, we compare our findings with those of Galiani, Gertler and Bando (2016). The *Pension 65* program in Peru and the *Adultos Mayores* program in Mexico have three main features in common. First, both are federal programs intended to provide social security coverage to the elderly in poor areas. Second, both programs provide bi-monthly transfers of similar amounts (at the time these studies were conducted, the bi-monthly transfer in Mexico was equivalent to US$ 95, while it was equivalent to US$ 78 in Peru). Third, both programs have minimum eligibility requirements, since they both target persons above a set age threshold who are living in poverty.

However, the two programs differ in two important ways as well. First, the Mexican government originally implemented the *Adultos Mayores* program only in rural areas (see Galiani, Gertler and Bando (2016) for a rigorous evaluation of the program's implementation in rural localities with fewer than 2,500 habitants). Over time, however, *Adultos Mayores* was expanded to urban areas. The Peruvian government, on the other hand, did not introduce any geographic restrictions based on population size. Second, until the 2013 fiscal year, persons in Mexico did not become eligible for the *Adultos Mayores* program until they reached 70 years of age; whereas, in Peru, people have been eligible at age 65 for the *Pension* 65 program ever since its inception.

In summary, we find that the results in the two countries are similar: the Geriatric Depression Scale scores in Peru decreased by 8.68 percent, while in Mexico they decreased by 9.11 percent;

paid work decreased by 4 percentage points in both countries; and consumption rose by 40 percent in Peru and by 14 percent in Mexico. In Peru, 67 percent of the increase in consumption was allocated to food, while in Mexico the corresponding figure was 54 percent. The magnitude of program effects thus does not differ to a statistically significant extent across the two countries. Figure 1 illustrates the comparison of the consumption, depression and labor variables in Mexico and Peru.

Figure 1. The effects of non-contributory pensions on mental health, labor performed by older adults and household consumption



Source: Authors' calculations.

Note: The results for Mexico correspond to the effects of the *Adultos Mayores* program in that country. These effects are reported in Galiani, Gertler and Bando (2016). The results for Peru correspond to the effects of the *Pension 65* program.

The two populations have many similarities. The average age of the beneficiaries is around 71.5 years in both countries, and approximately half of the population is male. Household consumption per adult is equivalent to US$ 45 for Peru and US$ 40 for Mexico. There were some significant differences between these sample populations, however. The program in Mexico targeted rural populations, while the program in Peru did not. As a result, the households in the sample for the

Mexican study were larger, and the education level of the older adults was lower than in the Peruvian sample population. Another difference was that 59 percent of older adults work in Peru, while the corresponding figure was 36 percent in Mexico. Because of these differences, the labor impact of non-contributory pension systems is similar in magnitude in the two countries but is smaller as a percentage of initial outcomes in Peru than it is in Mexico.

The two surveyed populations are similar in terms of the age and gender of older adults, as well as household consumption levels. However, there are some significant differences between the two populations that need to be identified, as they allow us to learn how the effects of non-contributory pensions vary in different contexts. We identify two main differences. First, the percentage of older adults who are working is higher in Peru. (A full 51 percent of the older adults reported having worked in the previous week for pay in Peru, while in Mexico the corresponding figure was 23 percent.) Accordingly, older adults' labor earnings amount to US$ 23 in Peru but to only US$ 16 in Mexico. Both programs triggered a decrease of four percentage points in paid work. This change represents a 20 percent decrease (from 23 percent to 18 percent) in Mexico, but a decrease of only nine percent in Peru (from 51 percent to 46 percent).

In addition, the household size in terms of adult equivalents is larger in Mexico, where an average household has 5.6 adult equivalents, while a household in Peru has 3.2. In addition, the average older adult in Peru has almost eight years of education, while the average older adult in Mexico has only two. These differences may, in part, be a result of the difference in targeting criteria, since the *Adultos Mayores* program in Mexico targets rural populations, while *Pension 65* in Peru does not.

We conclude that the results for Peru contribute to our knowledge about the effects of non-contributory pensions and allow us to apply that knowledge to a different context. The evidence suggests that the findings of Galiani, Gertler and Bando (2016) in rural Mexico can be reasonably well generalized to Peru in qualitative terms and, in many cases, in quantitative terms as well.

VII. Conclusions.

In order to study the effects of non-contributory pensions in Peru, we exploit a regression discontinuity design around the poverty score threshold for eligibility. Since we focus on a sample of households within 0.3 standard deviations from the threshold, this study provides a stronger identification strategy than that of previous studies.

We find that the receipt of non-contributory pensions in Peru benefited older adults in several ways. For instance, it led to improvements in mental health, as evidenced by a reduction of nine percentage points in the overall Geriatric Depression Scale score. We do not find impacts on the

use of health services or health, but the receipt of those pensions did decrease the amount of paid work performed by older adults by 4 percentage points. The bulk of the cash transfer was used to finance an increase in consumption of 40 percent. In addition, recipient households are more likely to support members who reside elsewhere, as the share of households that made transfers to other individuals or households increased from 46 percent to 61 percent. More importantly, we find that our results are qualitatively similar to those of Galiani, Gertler and Bando (2016) in Mexico and hence both sets of results help us to construct external validity.

Our findings should be viewed in the light of a number of caveats that point to directions for future research. First, we have observed these program effects after only one year, at most, since beneficiaries started receiving these program transfer payments, and it is possible that households may adjust their behavior in the long run. For example, Zhu and Xiaobo (2015) find that retirement leads to an immediate increase in life satisfaction, but they also find that the level of satisfaction decreases with time (see also Galiani, Gertler and Undurraga, 2016). A second caveat is that the data do not allow us to study how the receipt of non-contributory pensions may affect persons of working age near retirement age. Galiani, Gertler and Bando (2016), however, do not find anticipation effects in Mexico.

The number of people in need of non-contributory pensions is likely to increase significantly in the coming years, and government expenditure on non-contributory pension schemes will probably climb. The findings of this study suggest that public expenditure on such pension systems results in welfare improvements among beneficiaries. Moreover, these pensions benefit not only older adults but also other household members. Therefore, non-contributory pensions appear to be an effective means of enhancing welfare among the older population and of reducing poverty.

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Appendices

Appendix A. Comparison of households included and those excluded from analysis

In Table A1 of this appendix, we show a comparison of households included in and excluded from the analysis. The share of households excluded from the analysis amounts to 14 percent of the sample. Columns (A) and (B) give the means for each group. The different rows in the table indicate the factors used in the comparison. We include household-level outcomes, such as labor income and expenditure. In addition, we include treatment status, distance from the threshold value and household head characteristics. Column (C) shows differences and column (D) shows p-values for a test of equality in means. We find that the excluded households do not differ from included households in most areas. We do, however, find differences in distance from the threshold value with households that have been excluded from the analysis having lower SISFOH scores, which indicates that more of the poorer households have been excluded from the study. We also find differences in the marriage status of the head of household. However, these differences are not likely to bias our results. Indeed, our results hold true even when controls for these dimensions are included.

Table A1. **Baseline means of households included in and excluded from the analysis**

	Excluded	Included	Difference	
	(A)	(B)	(C)=(A)-(B)	*p*-value for test of equality (D)
Treatment	0.69 (0.06)	0.64 (0.02)	0.05 (0.06)	0.44
Income per adult equivalent (AE)	46.02 (8.65)	43.78 (2.11)	2.24 (8.91)	0.802
Income per AE excluding older adults	24.04 (8.82)	23.82 (2.15)	0.23 (9.07)	0.98
Household expenditure per AE	50.61 (8.52)	49.09 (2.06)	1.52 (8.76)	0.863
Household food expenditure per AE	39.12 (6.84)	36.07 (1.65)	3.05 (7.04)	0.666
Household non-food expenditure per AE	11.5 (2.13)	13.02 (0.52)	-1.53 (2.19)	0.488
Distance from threshold	-0.12 (0.03)	-0.07 (0.01)	-0.05 (0.03)	0.059
Household size per adult equivalent	2.89 (0.17)	2.9 (0.07)	-0.01 (0.19)	0.978
Age of head of household	68.68 (0.93)	68.78 (0.36)	-0.1 (1)	0.917
Married (Head of household)	0.61 (0.03)	0.67 (0.01)	-0.06 (0.04)	0.092
Male (Head of household)	0.77 (0.04)	0.78 (0.01)	0 (0.04)	0.932
Education of head of household in years	6.31 (0.43)	6.5 (0.17)	-0.2 (0.46)	0.674
Observations	389	2584		

Source: Authors' calculations. Note: Standard errors are clustered at the province level and shown in parenthesis. We exclude 58 households from the estimates in this table because their eligibility and treatment status could not be verified.

Appendix B. Definition of variables used in the tables

Table B1. Definition of variables used in the tables

Variable	Definition
Panel A. Work last week	
Worked	Equals 1 if the older adult worked at least one hour during the previous week. Equals 0 otherwise.
Hours worked	Hours worked the previous week in the person's main occupation.
Panel B. Paid work last week	
Worked for pay	Equals 1 if the older adult worked and reported a positive monetary income. Equals 0 otherwise.
Hours worked for pay	Hours worked the previous week in the main occupation for which the older adult reported a positive monetary income.
Labor earnings	Monthly monetary income, by main and secondary occupations, expressed in US dollars. The older adult may be either employed or self-employed.[1]
Panel C. Physical health	
Hypertension	Equals 1 if systolic blood pressure is greater than or equal to 140 (mm Hg) or if diastolic blood pressure is greater than or equal to 90 (mm Hg). Equals 0 otherwise.
Waist circumference	Waist circumference of the older adult in centimeters.
BMI	Body mass index of the older adult in kg/m^2.
Memory	Older adults were asked to perform five tasks: state the date, repeat three words, follow a three-step instruction, repeat the three words and copy the drawing (two intersecting circles). The score is the number of total tasks performed correctly over five. The survey respondents were requested to perform these tasks only in the 2015 round of data collection.
Physical health	Average of standardized hypertension, waist circumference, BMI and memory indicators. We standardized each indicator according to the distribution in the control group for the corresponding year. All indicators had equal weights.
Perception of good or very good health (1 if yes, 0 otherwise)	Older adults' assessment of their health at the present time when given the options of very good, good, bad or very bad. Equals 1 if the response is very good or good. Equals 0 otherwise.
Perception of difficulty with daily activities	Older adults reporting difficulty with at least one of the following: walking from room to room, eating, bathing or showering, using the toilet, getting in or out of bed, or dressing. Variable equals 1 if yes and 0 if no.

Continued

Table B1. Definition of variables used in the tables (continued)

Variable	Definition
Panel D. Well-being	
Satisfaction	To construct this variable we used the following questions: "*How content are you…* *With your health status?* *With yourself?* *With your ability to carry out daily activities?* *With your interpersonal relations (neighbors, friends)?* *With the place where you live?* *With your relationship with your children?* *With your relationship with other family members?* *With your life in general?*" The points for each question for the possible response options were as follows: *Very content=1; Content=1; Not very content=0 ; Not content=0*. The score is the sum of the points for each question, divided by eight.
Empowerment	To construct this variable we used the following questions: *"Do you think…* *That your family takes you into account when making decisions on household expenditures?* *That your family takes you into account when making important decisions for the household?* *That you support household expenditure?* *That you decide freely about what to spend your money on?* *That your family treats you with respect?* *That your family respects your wishes, opinions and other interests?"* The points for each question for the possible response options were as follows: *Always=1; Yes, most of the time=1; Sometimes=0; Rarely=0; Never=0* The score is the sum of the points for each question, divided by six.

Continued

Table B1. Definition of variables used in the tables (continued)

Variable	Definition
Contribution	To construct this variable, we used the following question: *"How much of your income do you contribute to household expenditure in the household where you live?"* The values for this variable for the possible response options were as follows: *All=1; Almost everything=1; More than half=1; Half=1; Less than half=1; Not very much=1; No contribution=0; Has no income=0.*
Self-worth	To construct this variable, we used the following questions: *"Do you consider that you: Provide economic support for the household? Provide support by doing household chores (cleaning, cooking, etc.)? Provide support in the form of childcare? Support others with your advice and experience? Represent a burden for the household?"* (coding order reversed) The points for each question for the possible response options were as follows: *Always=1, Sometimes=1, Rarely=0, Never=0* The score is the sum of the points for each question, divided by five.
Well-being	The average of standardized scores for satisfaction, empowerment, contribution and self-worth. We standardized each indicator according to the distribution in the control group for the corresponding year. All indicators had equal weights.

Continued

Table B1. Definition of variables used in the tables (continued)

Variable	Definition
Panel E. Household characteristics	
Income per adult equivalent	Sum of labor income in the previous 4 weeks of all household members per adult equivalent in US dollars.[1] See household size for the definition of adult equivalent.
Income per adult equivalent excluding older adults	Sum of labor income in the previous 4 weeks of all household members, excluding those aged 65 years or over, per adult equivalent in US dollars.[1] See household size for the definition of adult equivalent.
Household expenditure per adult equivalent	Expenditure in the previous 4 weeks on food and on non-food items in the household in US dollars. [1]
Household food expenditure per adult equivalent	Expenditure in the previous 4 weeks on food and drink in or out of the household in US dollars. [1]
Household non-food expenditure per adult equivalent	Expenditure in the previous 4 weeks in US dollars for household maintenance, transportation and communications, domestic services, entertainment and cultural activities, personal care, clothes and shoes, health, transfers, furniture and electronics, and other goods and services (funeral services, marriage services, etc.). [1]
Household size per adult equivalent	Weighted sum of the number of household members. A weighting of 1 is given for persons older than 12 years and of 0.5 for persons 12 years old or younger.
Age of head of household	Age of the head of household in years.
Married head of household	Equals 1 if the head of household is married or living with a partner. Equals 0 if the head of household is widowed, divorced, separated or single.
Male head of household	Equals 1 if the sex of the head of household head is male. Equals 0 if the sex of the head of household is female.
Education of head of household in years	Education of the head of household. Assigns the following values to the last year completed: initial education: 2 years, elementary education: 8 years, secondary or advanced non-university education: 13 years, university education: 17 years, graduate studies: 18 years. The years of education are calculated on the basis of the last education level successfully completed.

Note: The exchange rate used to convert Nuevos soles (S$) to US dollars (US$) was S$ 3.21 per US$ 1 in 2015 and S$ 2.58 per US$ 1 for 2012.

Continued

Table B1. Definition of variables used in the tables (continued)

Variable	Definition
Panel F. Enrollment	
Percentage of household members from 3 to 15 years old enrolled in an educational institution	Number of household members from 3 to 15 years old enrolled in an educational institution, divided by the total number of household members between the ages of 3 and 15. This value is missing for households without members in that age group.
Panel G. Current transfers to and from the household	
Receipt of current transfers in the previous six months (1 if yes, 0 otherwise)	Transfers received in the previous six months in the form of alimony, pension transfers for food, remittances, survivor's pensions, JUNTOS program transfers and other transfers from public or private institutions. *Pension 65* transfers are listed separately and are not included in the calculation of this variable. Only transfers to older adults are considered.
Receipt of current transfers in the previous six months excluding those to older adults (1 if yes, 0 otherwise)	Transfers received in the previous six months in the form of alimony, pension transfers for food, remittances, survivor's pensions, JUNTOS program transfers and other transfers from public or private institutions. *Pension 65* transfers are listed separately and are not included in the calculation of this variable. Only transfers to household members other than older adults are included.
Transfer expenditure in the previous 3 months (1 if any, 0 if none)	Expenditures in the previous three months on tips to household members aged 14 or under, tips to non-household members, transfers, donations or gifts to family members not currently living in the household, periodic remittances to household members who live elsewhere, other expenditures, such as donations to institutions, church, charities, etc.
Panel H. Social network transfers to and from older adults	
Social network transfer receipt (US$)	Receipt of economic assistance in the previous six months by members of the social network of the older adult.
Social network transfer provision (US$)	Transfer of economic assistance in the previous six months to members of the social network of the older adult.
Transfer receipt (1 if yes, 0 if no)	Equals 1 if social network transfer receipt is non-negative.
Transfer provision (1 if yes, 0 if no)	Equals 1 if social network transfer provision is non-negative.

Source: Authors' calculations.

Appendix C. Impact on household income and expenditure by number of older adults in the household

Table C1. Impact on household income and expenditure, by number of older adults in the household

	Full sample		Households with one older adult		Households with two older adults	
	Mean in control group	Effect	Mean in control group	Effect	Mean in control group	Effect
	(1)	(2)	(3)	(4)	(5)	(6)
Labor income per adult equivalent	38.46	4.24	41.31	5.27	31.62	1.52
		(6.37)		(6.4)		(8.09)
		[11.02%]		[12.76%]		[4.81%]
Labor income per adult equivalent excluding older adults	25.94	4.87	29.16	5.17	18.13	4.57
		(6.62)		(6.57)		(7.11)
		[18.77%]		[17.72%]		[25.2%]
Household expenditure per adult equivalent	45.16	17.94	48.36	13.40	37.82	28.86
		(4.63)***		(5.15)**		(3.84)***
		[39.73%]		[27.7%]		[76.32%]
Household food expenditure per adult equivalent	31.68	12.03	33.66	8.65	27.12	20.32
		(3.68)***		(3.91)**		(3.31)***
		[37.99%]		[25.69%]		[74.91%]
Household non-food expenditure per adult equivalent	13.49	5.91	14.71	4.75	10.70	8.54
		(1.77)***		(1.99)**		(1.86)***
		[43.81%]		[32.31%]		[79.87%]
Observations	2,584		1,829		752	

Source: Authors' calculations.
Note: Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. All estimates correspond to the RD with conglomerate fixed effects specification.

Appendix D. Comparison of intent-to-treat estimates with local average treatment effects

Table E1 shows the number of households according to their eligibility status and receipt of transfers. Monitoring data are available for all the households except for 176 out of the 2,584 in the sample. Missing data do not differ across households above or below the eligibility threshold (p=0.612). Of those 2,408 households for which information is available, 260 received at least one pension transfer but transfers were later discontinued. Of these 260 households, 247 were households that had been deemed eligible when the program started (treatment). Thus, we estimate the program effects excluding these 260 households on the assumption that their exclusion improves data quality.

Among the 2,148 households that were deemed eligible, 1,302 were in the treatment group. However, 177 never received a transfer. Out of the 846 eligible households in the control group, 20 received at least one transfer. Thus, we instrument actual treatment with treatment status before the program started.

Tables D2, D3 and **D4** show estimates for three specifications. The first column shows estimates with the RD model with conglomerate fixed effects and controls based on all 2,584 households and 3,342 individuals. This column shows the same estimates that are listed in Column (5) in Tables 3, 4 and 5. The second column shows estimates for the same model as in Column (1) but focuses on the 2,148 eligible households and 2,772 eligible individuals. The third column shows estimates for the same sample as the second column, but uses SISFOH score eligibility as an instrument for actual treatment. In summary, Columns (1) and (2) show intention-to-treat estimates and Column (3) shows local average treatment effects. Column (1) is based on the full sample, and Columns (2) and (3) are based on households whose treatment status was verified with monitoring data.

Table D2 shows estimates of pension transfer effects on individual labor supply. Table D3 shows estimates of pension effects on health and well-being. Table D4 shows effects on household income and expenditure. In all three tables, the results do not differ to a statistically significant extent across models. Differences are larger for labor income in Table D2 between the RD model with controls (Column 1) and the local average treatment effect (Column 3). The average labor income in the control group for the full sample is US$ 22.93. Thus, the effect of these pensions varies from a reduction of 25 percent to a decrease of 56 percent in labor income. However, these two results do not differ to a statistically significant extent at the 10 percent level. As expected, local average treatment effects are larger than intention-to-treat estimates but are estimated less efficiently.

We conclude that any errors related to eligibility classification are unlikely to explain differences between treatment and control groups. In addition, average local effects are larger and are consistent with intent-to-treat effects.

Table D1. Number of households, by eligibility and transfer receipt

		Control	Treatment	Total
Eligible	Never received a transfer	826	177	1,003
	Received at least one transfer	20	1,125	1,145
Non-eligible		13	247	260
With no monitoring information		66	110	176
Total		925	1659	2584

Source: Authors' calculations.

Table D2. Impact on individual labor supply

	RD with conglomerate fixed effects and controls	RD with conglomerate fixed effects and controls excluding non-eligible households	Local average treatment effect
	(1)	(2)	(3)
Panel A. Work			
Worked during the previous week	-0.03	-0.05	-0.06
	(0.03)	(0.04)	(0.06)
Hours worked during the previous week	-1.39	-1.65	-1.97
	(0.51)**	(1.01)	(2.06)
Panel B. Paid work			
Worked during the previous week for pay	-0.06	-0.11	-0.13
	(0.02)***	(0.03)***	(0.05)**
Hours worked during the previous week for pay	-1.08	-2.44	-2.89
	(0.76)	(1.19)*	(1.99)
Labor income	-5.73	-10.72	-12.79
	(1.76)***	(2.62)***	(4.46)***

Source: Authors' calculations.
Note: Estimates for Column (1) are based on 3,342 observations. Estimates for Columns (2) and (3) are based on 2,772 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Coefficients as percentages of the mean in the control group are shown in brackets. Controls include each individual's age, sex, marital status and years of schooling.

Table D3. Impact on health and well-being

	RD with conglomerate fixed effects and controls	RD with conglomerate fixed effects and controls excluding non-eligible households	Local average treatment effect
	(1)	(2)	(3)
Panel A. Physical health			
Hypertension	-0.07	-0.09	-0.11
	(0.03)*	(0.03)**	(0.06)*
Waist circumference	-0.79	-1.69	-2.02
	(1.38)	(1.48)	(1.34)
BMI	-0.06	-0.35	-0.42
	(0.13)	(0.3)	(0.52)
Memory	-0.11	-0.07	-0.08
	(0.24)	(0.25)	(0.23)
Physical health	-0.03	-0.09	-0.11
	(0.06)	(0.06)	(0.07)
Panel B. Well-being			
Depression	-0.04	-0.04	-0.05
	(0.02)*	(0.03)	(0.03)*
Satisfaction	0.00	0.01	0.02
	(0.02)	(0.02)	(0.03)
Empowerment	0.03	0.04	0.05
	(0.02)	(0.03)	(0.02)**
Contribution	0.11	0.12	0.14
	(0.02)***	(0.02)***	(0.03)***
Self-worth	0.04	0.05	0.06
	(0.01)***	(0.01)***	(0.02)***
Well-being	0.17	0.20	0.24
	(0.03)***	(0.05)***	(0.07)***

Source: Authors' calculations.

Note: Estimates for Column (1) are based on 3,342 observations. Estimates for Columns (2) and (3) are based on 2,772 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Controls include each individual's age, sex, marital status and years of schooling.

Table D4. Impact on household income and expenditure

	RD with conglomerate fixed effects and controls	RD with conglomerate fixed effects and controls excluding non-eligible households	Local average treatment effect
	(1)	(2)	(3)
Labor income per AE	4.99	1.21	1.45
	(6.73)	(8.06)	(5.86)
Labor income per AE excluding older adults	6.16	6.49	7.78
	(6.46)	(7.42)	(5.32)
Household expenditure per AE	18.05	14.01	16.76
	(3.94)***	(4.3)***	(4.72)***
Household food expenditure per AE	12.16	9.38	11.22
	(3.21)***	(3.83)**	(3.92)***
Household non-food expenditure per AE	5.89	4.63	5.54
	(1.97)**	(1.73)**	(1.61)***

Source: Authors' calculations.
Note: Estimates for Column (1) are based on 2,584 observations. Estimates for Columns (2) and (3) are based on 2,148 observations. Standard errors, clustered at the conglomerate level, are shown in parentheses. Controls include age, marital status, sex and education of the head of household.