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## Working Paper

# The wellbeing effects of an old age pension: Experimental evidence for Ekiti State in Nigeria

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# The Wellbeing Effects of an Old Age Pension: Experimental Evidence for Ekiti State in Nigeria\*

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**Abstract**

Many countries in the developing world have implemented old-age pensions. Evidence of the impact of such policies on the elderly in sub-Saharan Africa, however, is scarce. We provide evidence from a randomized evaluation of an unconditional old-age pension targeted at the elderly in Ekiti State, Nigeria. Our findings show that treated beneficiaries self-report better quality of life and a more stable mental health. We also provide evidence of spillover effects on the labor outcomes of other household members and of household savings patterns as well as support for interventions aimed at improving the welfare of elderly poor citizens and other household members.

**Keywords:** randomized controlled trials; aging; old-age pensions; health; developing countries.

**JEL Classification:** C21, C93, H31, H55, H75 I38

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# 1 Introduction

In most developed countries, pensions for old age are based on contributory systems, which depend on formal employment history (Walton & Levy, 2009). In the context of developing countries with large informal sectors and dependence on informal old-age support, such contributory programs tend to protect only a few individuals and exclude the most vulnerable (Dethier, Pestieau, and Ali, 2010 and Abels and Guven, 2016). Thus, social-protection programs have expanded considerably in recent decades (Hanna and Karlan, 2017; Baird, De Hoop, and Özler, 2013; Blattman, Fiala, and Martinez, 2013; & Handa et al., 2018). Many countries -especially in Latin America- have implemented conditional cash transfers to protect vulnerable children and, to a lesser extent, pensions to protect individuals against poverty in old age (Levy & Schady, 2013).

This paper presents experimental evidence of the effects of an old age pension on wellbeing in Africa and among the first in a developing country. We utilize a pilot program implemented by the local government of Ekiti state, Nigeria and conduct a randomized evaluation to test how an increase in income affects the wellbeing and the labor force participation of beneficiaries of the pension program.<sup>1</sup> The program, which was randomized at district level, provided pensions for citizens aged 65 and above who were receiving no other financial assistance from the government and whose income fell below the NGN 3,000 (\$19 USD) monthly threshold. Over a 12-month period, the local government of Ekiti State provided eligible elderly with an unconditional monthly cash transfer of NGN 5,000 (approximately \$32 USD), one-fourth of the average monthly cost of living in Nigeria (NGN 22,094).

Our findings indicate that the unconditional monthly cash transfer resulted in a statistically significant decrease in the depression levels of the elderly six months after the program's introduction. We also find an increase in self-reported satisfaction and a decrease in the consumption of alcohol and tobacco with life six and twelve months after its start. In contrast, we detect no changes in the morbidity, nor do we find statistically significant effects on labor-market participation among elderly beneficiaries or the other household members as a consequence of the pension. We also find that households in treated districts have greater savings than the control group. Intriguingly, treated households reduced their size by roughly half a member.<sup>2</sup>

The pension program analyzed in this study represents a large and plausibly exogenous change in the individual income of the elderly. The effects of this expansion on outcomes related to their own wellbeing or of their family members are unclear. Individual preferences as well as household and context-specific characteristics will de-

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<sup>1</sup>Nigeria has over 200 million inhabitants. Poverty headcount (as measured by \$1.90 USD a day) is over 50% (Atamanov et al., 2019). Ekiti State is a small, rural state located in southwest Nigeria. Its population is estimated at 2.4 million and 3.6% are 65 or older.

<sup>2</sup>Unfortunately, we do not have information about why household members left the households, so we can only speculate.

termine how the pension is spent and who is in control of the finances. The extra income may allow the elderly more control over their finance, thus increasing their wellbeing and lowering their depression. It may also lead to a change in their decision choice sets in terms of consumption, increasing the utilization of goods and services that correlate positively on the targeted population's wellbeing. For example, the elderly may choose to engage in more social activities, utilize health services or increase the total savings. In contrast, the additional income may be utilized to engage in activities that limit their wellbeing, such as increasing their consumption of tobacco. Similarly, the pension program may drive the rest of the household members' labor supply down and change their migration decisions.

In practice, there are several pathways through which the increase in income may affect the wellbeing. On the one hand, the extra income may allow its elderly recipients to allocate more time for leisure activities (Pfütze and Rodríguez-Castelán, 2015; Banerjee et al., 2015; Krueger and Mueller, 2012; Knabe, Rätzl, Schöb, and Weimann, 2010; Hamad, Fernald, Karlan, and Zinman, 2008 & Fernald, Hamad, Karlan, Ozer, and Zinman, 2008). Higher income has also been causally linked to increases in access to health care (Ettner, 1996; Fang, Keane, and Silverman, 2008). Among the elderly, access to detection and treatment will slow or delay progression of cognitive issues, which are closely related to mental health (Ayyagari and Frisvold, 2016; Daviglius et al., 2010). Alternatively, the expansion of the budget set caused by the pension may lead to changes in utility maximizing goods with unintended negative effects on wellbeing. In Brazil, Carvalho de Filho (2008) finds that older adults who received pensions increased their cigarette smoking. Similarly, Joubert (2015) similarly finds that an expansion of federal pension programs in Chile led to increases in alcohol consumption and transfers of workers from the formal to the informal labor market. Therefore, the net effects of income on wellbeing may be positive or negative, depending on the degree to which the elderly benefit from better access to health care or are harmed by changes in habits.

Researchers have examined the effects of unconditional cash transfer policies on the wellbeing of the elderly in developing countries. Bando, Galiani, and Gertler (2020), Galiani, Gertler, and Bando (2016) and Bando, Galiani, and Gertler (2021) study federal government increases in old-age pensions in Mexico, Peru and Paraguay respectively. The findings in all three Latin American countries suggest a small positive effects of the pension program on wellbeing. Hessel et al. (2021) also considers the relationship between aging and wellbeing in Colombia. The research finds that the additional income causally and significantly decreases both geriatric depression and the number of paid work hours. Unnikrishnan and Imai (2020) similarly investigate a policy that raised old-age pensions in India and find that it increased consumption expenditures and reduced the household labor supply of elderly women.

Recent experimental evidence emerging from studies shows that cash transfer pro-

grams can increase adults' mental health and well-being. Two cash transfer programs decreased physical intimate-partner violence in Mali (Heath, Hidrobo, & Roy, 2020) and Mexico (Angelucci, 2008). Additionally, evidence from other studies that analyze the effects of a randomized cash transfer on psychological health and wellbeing find a significant and positive effect on the mental health of the targeted individuals and a reduction of their stress levels (Haushofer and Shapiro, 2016; Ohrnberger, Fichera, Sutton, and Anselmi, 2020; Hjelm et al., 2017 and Hussam, Kelley, Lane, and Zahra, 2021). None of these studies, however, directly targeted elderly populations.

A number of studies have also looked at the impact of unconditional transfers on labor supply effects of adult household members in South Africa. Lam, Leibbrandt, and Ranchhod (2006) and Ranchhod (2006) find that eligibility to the pension causes the labor force participation to decline significantly among the elderly population. When analyzing the rest of the household members, Bertrand, Mullainathan, and Miller (2003) find a decrease in both the on the employment status and on the hours worked, which is larger when the oldest offspring is a son and when the pensioner is female. In particular, Ardington, Case, and Hosegood (2009) suggest that the mechanism behind the expansion is an increase in the availability of childcare by the elderly and a decrease in the constraints to job search and migration. Along the same lines, Posel, Fairburn, and Lund (2006) analyzed the same old age pension and find that female family members not residing in the same household are more likely to be migrant workers in female-pensioner households.<sup>3</sup> However, as Lam et al. (2006) and Ranchhod (2006) note, since elderly populations in South Africa tend to live in multi-generational households (which was also found to be linked to the pension program, Hamoudi and Thomas, 2014), the identification of exogenous causal effects is harder in this setting.

To test whether the pension provided by Ekiti state had an impact on the wellbeing of the elderly, we first follow Bando et al. (2020), Galiani et al. (2016) and Bando et al. (2021) and use a geriatric depression scale that measures self-reported depression levels on a 15-point scale.<sup>4</sup> We also study wellbeing with three additional variables: a composite measure of life satisfaction, an indicator of the morbidity of the elderly and a measure of tobacco and alcohol consumption in the last 30 days. Second, we examine the labor force participation of the elderly individuals by studying whether they were engaged in subsistence agriculture activities or have worked in market oriented activities; and the number of hours per week spent working in market oriented activities. Over the year-long pilot, we test these outcomes twice, at six and twelve

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<sup>3</sup>Ambler (2016) looks at how the South African pension affected the bargaining power of elderly women. She finds that women eligible for the benefit are 15 percent more likely to be the primary decision makers in their households. The literature also finds positive spillovers on other family members. Duflo (2000) analyze the spillovers of a pension-reform program in South Africa that raised pensions for the black population and find that pensions had a positive impact on the height-for-age of girls born after the reform. Overall positive associations have, moreover, been reported for such outcomes as child enrollment (Duflo, 2003), household composition, and private transfers.

<sup>4</sup>On this scale, zero indicates no sign of depression, while 15 indicates that the individual's mental health is poor.

months. The effects of the pensions are estimated in both the short run (6 months) and one year after the beginning of the program. Third, we account for the possibility of spillovers by considering the short-term effects of the program on other household members' labor force participation and a number of household income and composition characteristics.<sup>5</sup>

Given the large number of outcome variables examined in this study, we account for multiple comparisons using two distinctive econometric approaches. First, we address the issue of simultaneous inference using a family-wise error multiple hypothesis testing methodology. We estimate the corrected p-values using the re-sampling method of Westfall and Young (1993) as implemented by Jones, Molitor, and Reif (2019) for every family of outcome variables. We next follow Kling, Liebman, and Katz (2007) and create a standardized index for each family pooling all outcomes with-in each set together. Then we analyze the standardized impact of the pension program on these outcome indexes.

Our work, thus, tests the effect of an unconditional cash transfer on the elderly and is directly related to a more recent strand of literature that links increases in income to improved happiness and stress reduction. Haushofer and Shapiro (2016) and Haushofer and Fehr (2014), have written specifically about the importance of wellbeing considerations in the design of poverty-alleviation programs. Additionally, our findings not only indicate an increase on the overall wellbeing of the elderly, but also strongly hint at the possibility of a change in the household dynamics. Third, given the results in Latin America and South Africa, the Nigerian context provides insights into the external validity of pension programs for the elderly.

A key challenge in public finance in developing countries is the question of how fiscal policy (such as cash transfers) can be used to address issues related to elderly poverty and their vulnerability to income shocks. A major aspect of this challenge is assessing the effectiveness of public-finance options in an environment of increasingly constrained budgets. The fact that the Ekiti program was implemented by a local African government suggests that it has the potential to be repeated in other developing countries with vulnerable elderly populations.

The rest of the paper is organized as follows. In the next section, we discuss pension programs in Sub-Saharan Africa, the challenges of aging in Nigeria and describe the Ekiti State pension for the elderly. In section 3, we detail our research design and our data collection methods. Section 4 provides a description of the baseline and follow-up data summary statistics. The empirical strategy is discussed in section 5. Section 6 describes the empirical findings and section 7 contains the concluding remarks.

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<sup>5</sup>Non elderly individuals were only interviewed during the first follow up.

## 2 Background

### 2.1 Pension systems in SSA

Social protection for the elderly has a significant role in providing income security and access to essential health and care services. However, this type of programs have a limited scope in Sub-Saharan Africa compared to other regions of the world.<sup>6</sup> Issues with efficiency, sizeable informal sectors, and the aging pace of the population highlight these countries' inability to grant income security to the elderly populations. This fact, combined with the lack of access to health care and similar important services, increases the vulnerability of old age populations.

In the Sub-Saharan context, regional governments have a limited capacity to expand the coverage of contributory pension programs. The constraint is primarily explained by the large share of population living in poor rural areas. This population group is usually characterized by high unemployment rates, low paying jobs, or significant participation in subsistence agriculture production. Thus, people are not able to save for their old-age and do not have the incentives to participate contributory systems. Only comparatively privileged individuals, with large and reliable incomes, are able to participate in contributory pension systems (Güven & Leite, 2016).

Coverage of contribution-based pension programs has remained low in Sub-Saharan Africa for several decades (Güven & Leite, 2016). Thus, non-contributory pensions are a useful policy tool to increase the coverage and to address poverty among the elderly. As of 2016, eight countries had implemented a type of old-age social pension program (Güven & Leite, 2016). Botswana, Lesotho, Mauritius, Namibia, Seychelles and Swaziland have implemented universal programs. In contrast, eligibility to the pension programs is based on means tests in South Africa and Cape Verde.<sup>7</sup> Besides Nigeria, three other countries - Uganda, Kenya and Zambia - were testing universal programs in 2016.

There are important limitations associated with the implementation of non-contributory pension programs. Policy makers in Sub-Saharan Africa face the significant issue of fiscal affordability of universal social pension programs. Spending on social safety nets is relatively low in many countries in the region compared to other regions (Monchuk, 2013). In Mauritius, for example, universal old age pension program accounts for 60 percent of social safety net spending (Güven & Leite, 2016). Additionally, regional governments are characterized by the lack of reliable management and data gathering systems. Most importantly, regional characteristics limit the targeting capacity of the

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<sup>6</sup>As of 2016, Abels and Güven (2016) find that although 86 percent of the countries in the region have this type of program but pension coverage is less than 10 percent of the labor force. A few notable exceptions include Mauritius and Seychelles, where over half of the labor force contributes to the system; and Zimbabwe, where the coverage amounts to 33 percent.

<sup>7</sup>South Africa has in fact the oldest program in the region. It was introduced in 1927. Coverage in Cape Verde, Lesotho, Mauritius, Namibia, and South Africa has reached between 78 and 100 percent of the elderly population.



pension programs.

Advocates of universal pension programs have argued that this is an effective policy tool to increase the overall wellbeing in three important dimensions. First, elderly pensions have important spillovers for the human capital of children (see, for example, Ambler, 2016 and Duflo, 2003). Second, universal programs improve the status of the elderly in households because the elderly will be able to contribute to the household income. Third, advocates argue that the universal nature of contributory pension programs simplifies the implementation in countries where government infrastructure is low.

## 2.2 The elderly population in Nigeria

Since the end of the Nigerian civil war (1967–1970), the elderly (defined as those aged 65 and over) increased from 2.8 percent of the population in 1970 to 3.2 percent in 2011. This demographic transformation has largely been the result of declining fertility and increasing longevity (CIA, 2020). Life expectancy also increasing from 46.7 years in 2005 to 52.6 years in 2014 (CIA, 2020).<sup>8</sup> Nigeria’s aging population challenges its ability to provide decent living conditions and improve the well-being of the elderly.

Over half of the Nigerian population lives in rural areas, and a significant percentage of rural Nigerians are over 65. Rural-urban migration in Nigeria has been increasing at a rate of 3.5 percent per year—one of the highest rates in Africa. The major problem is that most of elderly population has worked in the informal sector all of their productive lives, mainly in subsistence agriculture and therefore has no access to formal employment-related pensions or other retirement benefits. Alternative means of support in old age are also limited because most elderly people do not have savings and are vulnerable to social and economic shocks.

The social-policy response of the Nigerian government to issues affecting the elderly has likewise been weak. Some limited legislation has been passed to protect formal-sector workers, but it does not extend to informal-sector activities (Holmes, Samson, Magoronga, Akinrimisi, & Morgan, 2012).<sup>9</sup> Given social norms and the level of informality in the country, most elderly Nigerians have limited safety nets. Children or close relatives remain the most reliable source of old-age support for most people (National Population Commission, 2011).<sup>10</sup> The fact that many individuals of working age leave their homes means that an increasing number of elders have no completely reliable support system.

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<sup>8</sup>The fertility rate dropped from 6.1% in 1990 to 5.2% in 2014 while the birth rate fell from 6% to 3.8% in the same period.

<sup>9</sup>A National Policy on the Care and Well Being of the Elderly, for example, was finalized in 2003 and subsequent administrations have failed to implement it.

<sup>10</sup>70% of the elderly reside with children or relatives, and only 10 percent live alone.

## 2.3 Ekiti’s pension program

This paper focuses on a program that the Nigerian regional government of Ekiti implemented in 2013. Ekiti is a small, rural state located in southwest Nigeria with a population estimated at 2.4 million. The state is composed of 16 Local Government Areas (LGAs) and 163 electoral districts.<sup>11</sup> Most inhabitants are either public-service workers or are involved in informal-sector activities such as subsistence agriculture and local market trading. The elderly, defined as individuals 65 or older, account for 3.6 percent of the population, with a dependency ratio of 6.1 in 2006.<sup>12</sup>

Motivated by concern for the well-being of its elderly population, the government of Ekiti decided to implement an unconditional and non-contributory cash transfer program. The government’s concern was that the majority of elderly citizens were unable to engage in rigorous economic activities, thereby leaving them vulnerable to social and economic shocks and poverty in old age. Individuals in treated districts were informed of the program during the month of October 2013, and payment of cash benefits began in November 2013. Payments were made at designated centers monitored by the officials of the implementation agency.

Treated individuals received the transfer during the 12 months between November 2013 and October 2014. Eligible citizens were those aged 65 years who were not receiving pensions and whose monthly income was less than NGN 3,000 (\$19 USD). They received a monthly cash payment of NGN 5,000 (approximately \$32 USD). The payment represented about 28 percent of the national minimum wage of NGN 18,000 at the time and 23 percent of the average monthly cost of living in Nigeria (NGN 22,094). This comes out to about one dollar per day, which is in line with the international poverty threshold.

## 3 Research Design

### 3.1 Randomization

To capture the effects of the policy intervention on the elderly, we designed a cluster-randomized controlled trial at the district level. Out of the 163 eligible districts, only 112 had the required number of registered elderly individuals, according to our power calculations.<sup>13</sup> The randomization design was then carried out using this sample group of 112 selected districts, 56 of which were assigned to the treatment group and the other half to the control.<sup>14</sup>

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<sup>11</sup>Each LGA is administered by a Local Government Council and is subdivided into districts. A typical LGA has between 10 and 16 districts. At the time of our study, Ekiti was comprised of 16 electoral districts.

<sup>12</sup>This calculation is based on the national census (National Population Commission, 2011).

<sup>13</sup>We conducted power calculations using several variables from the baseline survey: total household income, *per capita* income, and *per capita* health expenditure. The intra-cluster correlation is 0.10.

<sup>14</sup>Because the population is highly homogeneous within each district, to avoid contamination, we assigned every eligible individual in the district to the treatment or control group.

The random allocation of electoral districts was carried out after the baseline survey conducted between July and September 2013. The total sample consisted of 6,326 eligible individuals. The treatment group included 3,230 individuals (51.1 percent of the total), while 3,096 individuals were placed in the control group.<sup>15</sup>

## 3.2 Data Collection

The data for our analysis came from three surveys carried out by the research team in partnership with the government of Ekiti State. The data was collected in three stages: (i) at baseline, (ii) at first follow-up, six months after the baseline survey; and (iii) at second follow-up, six months after the first follow-up survey.

The baseline survey, conducted between July and September 2013, collected information on eligible beneficiaries and on some members of their households before the disbursement of cash transfers and before random assignment to treatment/control groups. The first follow-up survey was conducted between June and September 2014, after the program had been in operation for almost six months. As in the baseline survey, this round included a household module and an individual interview with an elderly adult in the household. Finally, after a minimum of six months had elapsed since the first follow-up, we administered a second follow-up survey between April and July 2015.

The surveys collected detailed information from the beneficiary concerning household demographics, household members' labor activities and outcomes, and household consumption. The questionnaires contained three modules: (i) a general beneficiary information module; (ii) a household member module, which collected information on the household members of eligible beneficiaries; and (iii) a household module, which collected information on the household characteristics of the beneficiary; heads of household, defined as the persons (beneficiary or otherwise) who provided the required information, were also interviewed.

In the current study we examine all the outcomes collected throughout the follow-up surveys. There are, however, several challenges to implementing rigorous impact evaluations in sub-Saharan countries in which violence and fiscal policy constraints, among other factors, limit data collection. In fact, we encountered a number of problems with data collection, which was conducted by the statistical office of Ekiti State. Several baseline modules and follow-ups could not be administered because of budgetary constraints. A food diary to track food consumption could not be administered, for example, which made it impossible to estimate potential impacts on food consumption. Additionally, labor spillovers could not be identified in the second follow-up because we were not able to survey all household members. These points are important because household consumption and employment are direct mechanisms through which

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<sup>15</sup>In addition to the eligible beneficiaries, we also interviewed beneficiaries' household members at baseline in order to estimate spillovers.

the pension scheme affected beneficiaries (Haushofer and Shapiro 2016 & Angelucci and De Giorgi 2009). Our randomization, however, allowed us to make causal inferences regarding several important economic, social, and psychological outcomes.

### 3.3 Compliance

Our research design takes advantage of the fact that districts were randomly assigned to the pension treatment. In the 56 treated districts, all individuals were granted a pension for a period of 12 months. We therefore examine administrative records to understand whether all eligible individuals received less than 12 pension transfers. According to official records, every sampled individual received at least three transfers and nine percent of the individuals received less than the full year.

In addition to checking how many months a beneficiary received the cash payment, we also study the mode of collection and payments. Approximately 80 percent of the treated individuals collected the pension themselves. Around a fifth received the cash through home visits by government payment officials.

### 3.4 Attrition

As a consequence of the nature of the intervention, where it took place, and the fact that the beneficiaries were 65 years old or older, attrition was an important consideration. Attrition can result from relocation, migration to other cities, death, or other factors.

Appendix Table B.1 carefully study attrition for the treatment and control groups and the sources of the attrition for the first and the second follow-up. In order to do this, we regress an indicator variables for overall attrition, attrition due to a move, and attrition due to passing on our treatment variable. Overall, attrition is quite low across both follow-ups. At baseline, a total of 6,325 elderly people were interviewed: 3,178 eligible beneficiaries in the treatment group and 3,148 in the control group (representing 50.1 percent and 49.9% of the total, respectively).<sup>16</sup> We also analyze attrition in the study in Appendix Table B.2 where we regress an indicator variable for attrition on a set of individual characteristics and the treatment variable. We also consider the effects of the pension program on mortality in Appendix Table B.3.

In the first follow-up, 57 beneficiaries (less than 1 percent) who could not be contacted either because they moved (27 individuals) or passed away (14 individuals). The total attrition is slightly higher in the control group than in the treatment (35 vs 22 individuals). A year after the Ekiti State pension began, the number of sampled individuals who could not be reached increased to 329 (5.2 percent). The main source attrition was due to the individual having moved out of the district (N=292). The remaining respondents were those that could not be located.

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<sup>16</sup>No coefficient is statistically significant, with the exception of the the attrition due to a move in the second follow-up. This coefficient is small (0.008) and statistically significant at the 10 percent level.

## 3.5 Outcomes Variables

In this section, we describe the main outcome variables we analyze in this paper. We group the main set of variables into three sets: mental health, labor force participation, and indirect effects. The first two sets are comprised of variables for the elderly beneficiaries and the members of the control group. The third one includes only the rest of the household members who are not eligible for the pension program.

### 3.5.1 Measuring Wellbeing

An important variable in our analysis is the depression levels of the elderly population in Ekiti State. We construct the Geriatric Depression Scale (GDS) outcome using individual responses to fifteen yes or no questions that capture depressive symptoms and lack of self-esteem. The questionnaire was first developed by Sheikh and Yesavage (1986) and later used by Galiani et al. (2016), Galiani and Weinschelbaum (2012) and Bando et al. (2021). Affirmative answers are then summed to give a total score for the individual that ranges from 0 to 15. A higher score indicated a greater probability that the individual’s mental health is poor. The questions address topics related to satisfaction with health, overall depression level, general health and self-worth. The complete set of questions is presented in Appendix A. It should be noted that although the baseline questionnaire did not include a mental health module, specific questions were added to both follow-up surveys.

Secondly, we examine a life satisfaction composite outcome variable created using a similar methodology that the GDS score. The index outcome was created utilizing nine survey questions intended to assess the happiness and satisfaction with various aspects of life of the individuals of interest (Inglehart et al., 2014). In particular, the questions ask individuals who happy they are with health, themselves, performance, relationships, place of residence, and expenditures. The complete list of questions is presented in Appendix A. The answers can take a value of zero if the answer is no, one if the individuals feel like they are moderately happy, or two if they are very happy with that particular outcome. Hence, the life satisfaction index can take values between zero and eighteen.

The third outcome variable in the wellbeing family of outcomes examines the morbidity of the surveyed individuals. We define the outcome as the self-reported number of sick days the individual has experienced in the previous month. Thus, we evaluate morbidity as an indicator variable that takes a value of one if an individual has reported experiencing any symptoms and zero otherwise.

The fourth variable we examine is a measure of whether individuals have drunk alcohol and smoked tobacco in the last 30 days. We create this variable such that a value of zero indicates no consumption of either tobacco or alcohol, one if the individual report consuming either, and two if they have consumed both tobacco and alcoholic beverages.

Finally, to obtain the standardized treatment effects of the Ekiti State program, we proceed to standardize the four composite variables relative to the mean and standard deviation of the control group villages. Thus, throughout the estimation, the coefficients will be interpreted in standard deviations from the mean of the control group.

### 3.5.2 Labor Force Participation

Our second family of variables examines the impact of the program on the beneficiary's labor force participation. We first consider two indicator variables that take a value of one if the sampled individuals have engaged in subsistence agriculture or they have worked in market oriented activities during the previous six months and zero otherwise. Additionally, we examine how many hours per week they have spent working in market oriented activities in that period. We study the labor outcomes six months and a year after the beginning of the pension program.

Additionally, because in the first follow-up (conducted six-month after the beginning of the program) we collected data on these outcomes for other members of the elderly individual household, we analyze these three variables for this group. The variables are also indicator variables for working in subsistence agriculture and market oriented activities, and a measure of the hours per week they have spent working in market oriented activities.

### 3.5.3 Household income and composition

The final set of outcomes includes changes in household size (the number of individuals living in a household, including the beneficiary), the average household age and measures of total income and savings. Income was measured by summing self-reported income of all household members in the month prior to the interview.<sup>17</sup> Similarly, the savings variables are estimated for the previous month. Again, due to lack of data in the second follow-up, we are only able to examine the labor outcomes at the six month mark.

## 4 Baseline Balance

Table 1 reports the balance table for the elderly population in our sample. This table shows the means and the standard deviations across treatment and control groups. We also present the p-value of a joint test for the means across groups in Column 5. As expected from randomization, both groups are balanced in terms of age, gender,

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<sup>17</sup>If the household member self reported to not work the previous month, her income was estimated to be 0.

marital status, literacy, labor status, household monetary support, and health.<sup>18</sup>

The beneficiaries in both treatment and control groups are approximately 78 and 75 years old on average in the treatment and control group respectively and only about 30 percent of the sampled individuals are male across both groups. Most individuals in both groups are widows/widowers: 42.8 percent of treated individuals and 46 percent of the control group reported this status.<sup>19</sup>

The average number of people living with the beneficiary was 3.030 among treated households and 2.91 among the control group. Individuals in the treated districts are also more likely than their counterparts in control localities to be literate (11.7% vs. 9.7%) and to have attended school (16.4% vs. 12%,  $p < 0.1$ ).

Panel B is a list of variables that describe beneficiaries' labor characteristics. The percentage of the elderly population that works was 26.3 percent in treated districts and 24.2 percent in the control districts. Most employed beneficiaries work in subsistence farming (19.8% in the treatment districts and 18.9% in the control districts).<sup>20</sup>

The third panel in Table 1 displays the support given to the elderly population in the treated districts. The share of treated individuals receiving monetary support from someone in their social network is 41.8 percent, which is similar to the control group (45.5%). Ten percent of treated beneficiaries and 13 percent of non-treated individuals receive support from a child, and approximately half of this group reported help from other relatives. The amounts of support given to beneficiaries are NGN 1,001 on average in treated districts and NGN 1,082 in non-treated districts.<sup>21</sup>

Only a small share of the studied individuals across treatment and control groups report smoking or drinking alcohol (approximately 4.9% and 11.1% vs. 6.65% and 10.9%, respectively). We also present three self-assessment measures: an overall health level assessment, a measure of confidence in their abilities, and another that indicated the extent to which subjects felt integrated into their communities. The self-reported health assessment score is an average of 2.77 and 2.69 points out of a possible five in the treated and control groups, respectively. Both groups report an average confidence level score of 2.6 and an inclusion score of 2.3 points.

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<sup>18</sup>We also present the balance for household demographic characteristics and other household members characteristics in Appendix Table B.4.

<sup>19</sup>They are followed by individuals who reported being in a monogamous relationship (37.9% in the treatment group and 39.3% in control group) or in a polygamous relationship (13.5 and 10.8%, respectively). The differences are not statistically significant.

<sup>20</sup>In Table 1, we report that an additional 5.2 percent in the treatment districts and 3.9 percent in the control districts worked in non-farming jobs, including as salespeople or artisans. Non-subsistence farming is insignificant among the individuals in our sample. None of these differences was statistically significant.

<sup>21</sup>We do not observe whether the elderly populations received support from any family members or other individuals in any of the follow-ups.

## 5 Empirical Strategy

Equation 1 describes the intent-to-treat (ITT) effects of the Ekiti State pension program on the elderly recipients six and twelve months after the start of the program:

$$Outcome_{ijt} = \alpha + \beta_1 Treated\_district_j + \epsilon_{ijt} \quad (1)$$

where  $i$  denotes an individual,  $j$  denotes a district, and  $t = 1, 2$  refers to either the first or second follow-up periods. Thus,  $y_{ijt}$  describes the outcome variables enumerated in Section 3.5. For example,  $Outcome_{ij}$  might be the self-reported geriatric depression level of individual  $i$  who lives in the district  $j$  at the follow-up period  $t$ .

$Treated\_district_j$  is an indicator variable of whether the district in which individual  $i$  lived was eligible to receive the unconditional cash transfer. The coefficient on  $Treated\_district_j$ ,  $\beta_1$ , is the main coefficient of interest that captured the average difference in means between the treatment group (people who live in randomly selected treated districts) and the control group (those who do not reside in randomly selected districts). This coefficient can be interpreted as the impact of receiving an Ekiti State cash transfer. The ITT estimates are calculated by adjusting the standard errors for clustering at the district level.  $\epsilon_{ijt}$  is the error term.

Additionally, to consider the possibility of confounding factors, we undertake a post-double selection methodology proposed by (Belloni, Chernozhukov, & Hansen, 2014) and (Belloni, Chernozhukov, Hansen, & Kozbur, 2016) to elect controls. The approach has the advantage of being data driven. The set of variables the age of the individual, their marital status, gender, whether they received some type of monetary support, their literacy level, if they attended school and the household size. These results are presented in Appendix Section B.

Finally, equation 1 is also used to estimate the indirect effects of pension program on the non elderly members of the household and at the household level. We analyze labor market effects, as well as household savings and income, the average age and the household size. Due to the lack of survey data in the second follow-up, however, this level of analysis can only be conducted for the first follow-up period (six months after baseline).

### 5.1 Multiple Hypothesis Testing

Since in this paper we examine the impact of the Ekiti State pension program on a large set of outcome variables, it is important to account for multiple comparisons. Specifically, the econometric concern is that because there is a large number of independent variables, the probability of rejecting a true null-hypothesis is also high. To correct for this possibility, we adopt two strategies.

First, we follow the extensive literature on family-wise error rate (FWER) multiple-hypothesis testing (see, e.g., Gibson, McKenzie, and Stillman, 2011) and estimate the p-



values built using the re-sampling method of Westfall and Young (1993) as implemented by Jones et al. (2019) for every family of outcomes. Thus, the Westfall-Young p-values are used to account for the multiple tests of outcomes within the same category for every time period (mental health, labor force participation, and both household variable groups).<sup>22</sup>

Alternatively, we create indexes of the dependent variables within the distinctive families of outcomes following Kling et al. (2007). We construct each index pooling the outcomes in each family of outcomes. Within each family, the index is constructed such that higher values represent better levels of the outcomes.<sup>23</sup> We next standardize each index into a Z-score by subtracting the mean and dividing by the standard deviation of the villages in the control group. We then analyze the effects of the Ekiti State Program on the standardized outcome indexes. Statistically significant effects indicate that the program has an impact on treated individuals (Kling et al., 2007). The estimated regressions are presented in Table B.5.

## 6 Results

In this section, we present our main findings from the ITT effects of the program (Equation 1).

### 6.1 Treatment Effects on Wellbeing

Table 2 shows the estimates of the Ekiti State pension program on the overall wellbeing of the elderly. The top panel presents the results for the first follow-up and the bottom one the twelve-month survey. Column 1 shows the results for the GDS score, while the next one includes the Life satisfaction index. In Column 3, we describe Morbidity and in Column 4, we present the estimated coefficients for Alcohol and tobacco consumption.<sup>24</sup>

Column 1 shows results for the GDS score. Six months after the Ekiti State pension program was extended, our estimates suggest that treated individuals report a decrease of 0.146 SD ( $P < 0.1$ ). This effect is not detectable after 12 months. A possible explanation for the lack of persistence is the existence of anticipation effects since the Ekiti State government made it public knowledge that the program would be implemented

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<sup>22</sup>The mental health family of outcomes, however, only includes the GDS score, the life satisfaction index and the morbidity outcomes.

<sup>23</sup>To construct the mental health index, the geriatric depression scale and the risky behavior index are reversed, such that higher numbers are assigned to lower levels of depression and risk. The mental health index is therefore greater for individuals who report better mental health. Across all indexes that describe employment, the aggregation is such that lower values are associated with fewer hours of employment. Similarly, household outcome variables are summed over the levels.

<sup>24</sup>The results remain unchanged when individual level controls and local government fixed effects are added, as shown by Appendix Table B.6. The effects maintained the same level of significance, and the coefficients are similar in magnitude. We additionally interact the treatment indicator variable with an indicator for whether the the beneficiary is male. These results are presented in Table B.10.

after a period of time.

Next, the Life satisfaction index shows a significant for both periods: an increase of 0.253 and 0.287 standard deviations six and 12 months after the beginning of the program. Both coefficients are statistically significant and remain significant after with the Westfall-Young multiple hypothesis correction at the five percent level. We detect no effects on morbidity (Column 3), while the effect on the levels of Alcohol and tobacco consumption is large and statistically significant (-0.072 and -0.080 SD, Column 3).<sup>25</sup> Both coefficients are significant at the five percent level.<sup>26</sup>

## 6.2 Treatment Effects on Labor Force Participation

### *Labor force participation of the beneficiaries*

We next investigate whether the Ekiti State pension program had an effect on the labor participation of the elderly population. The results are presented in Table 3. Overall, we do not find any statistically significant effects in the individuals' participation in subsistence activities (Column 1), their participation in market-oriented activities (Column 2) or the number of hours they spent in labor force participation activities (Column 3). This is the case for both follow-up surveys.

Appendix Table B.7 presents the estimated regression coefficients for the same regressions with individual level controls and LGA fixed effects. As shown in this table, coefficients were consistent with those in the main specification. In Appendix Table B.11, we present the results from a specification where we interact the treatment indicator variable with an indicator for whether the the beneficiary is male.

### *Labor force participation of other household members*

In Table 4, we present the results of the analysis of the treatment on the labor force participation of the household members living with the elderly individual. As mentioned, due to data restrictions, these coefficients are estimated for the first follow up only. The effects on the program on the household members' participation in subsistence activities (Column 1) and their participation in market-oriented activities (Column 2) are smaller than for the elderly sampled individuals and insignificant. In Column 3, we find a significant decrease of 0.819 hours spent in labor force participation activities. The significance of the p-value for this coefficient does not survive the Westfall-Young correction, however.<sup>27</sup>

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<sup>25</sup>The results on Alcohol and tobacco consumption are robust to an ordered probit specification. Similarly, when we define the outcome variable using a principal component methodology, we find similar results. Both specifications are available on request.

<sup>26</sup>The outcome variable is not included in the multiple hypothesis test.

<sup>27</sup>In Appendix Table B.8 we present the results with individual level controls and LGA fixed effects. Additionally, Appendix Table B.12 includes the results with an interaction for male beneficiary.

### 6.3 Household income and composition

Lastly, in Table 5, we present the treatment effects on household expenses (Panel A) and household composition (Panel B). Again, because of the lack of availability of data for the second follow-up, our estimates only consider the effects of the treatment six months after the beginning of the program. As seen in Column 1, households were a program beneficiary resided report a large and statistically increase in the *per capita* savings (1,195.05 Kw). We do not detect any significant effect in the *per capita* income.

In Panel B Column 1, we show the coefficient for the size and average age of households. We do not find any difference in the average age of the household members. Intriguingly, households in treated districts are 0.4 members smaller on average (SE 0.065,  $p < 0.01$ ) than control group households. The p-value for this coefficient is still significant after the Westfall-Young multiple hypotheses correction.<sup>28</sup>

## 7 Conclusion

This study is motivated by the fact that developing countries, especially those in Africa, have large informal sectors. Thus in scenarios where only a small portion of the population contributes to the pension system, vulnerable individuals such as the ones we study remain unprotected in their old age. At the same time, traditional support systems based on family and kinship networks in sub-Saharan Africa are very strong, and household and family members are still considered the main sources of support for the elderly. Younger household members may thus find it costlier to accumulate human capital if they have to allocate both pecuniary and non-pecuniary resources to the assistance of the elderly family member.

An important public-financing challenge in developing countries relates to how fiscal policies such as cash transfers can address poverty and improve wellbeing of the elderly to shocks. Recent decades have seen expansions of social-protection programs in developing countries aimed at improving the well-being of vulnerable populations. Most such programs cater to the youngest population, and protection has been more limited for the elderly not covered by social security. More recently, some governments in developing countries have started programs such as non-contributory pensions targeted at elderly citizens who have no access to formal retirement pensions. It is believed that this provides a way to improve the well-being of the elderly and also to alleviate old-age poverty in a context in which the aging population is growing rapidly all over the world. This increase is largely the result of improved living conditions, higher incomes, and demographic changes.

As in other countries in sub-Saharan Africa, the aging population presents a signif-

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<sup>28</sup>Heterogeneous effects were examined throughout the analysis. Specifically, we present these results considering the gender of the beneficiary on Appendix Table B.13. A specification with controls is also presented in Appendix Table B.10.

icant challenge for Nigeria’s capacity to provide decent living conditions and improve the well-being of the elderly. Most of the elderly population has worked in the informal sector all of their productive lives, mainly in subsistence agriculture, and therefore has no access to formal employment-related pensions or other retirement benefits.

We conduct a randomized experiment to test the introduction of an unconditional pension targeted at the elderly in Ekiti State in Nigeria. Our findings show improvements in the beneficiaries’ overall wellbeing. Additionally, other household members reduced total hours worked, while household income and savings increased. Intriguingly, we find a reduction in number of household members.

Overall, our results suggest that the Ekiti State pension program had a positive effect on the lives of the individuals who received the cash transfer. As we have acknowledged, our data do not allow us to provide evidence of spillovers a year after the start of the program. However, the increase in quality of life, the decrease in vulnerability, and the reduction in household size are consistent with a change in the bargaining position of the elderly, who were in an improved financial position as a consequence of the cash transfer. Alternatively, we hypothesize that cash transfers diminished the cost for younger members of caring for the elderly in their households, making it easier for them to leave the household while improving the conditions of those who stayed behind.

We demonstrate that conditional cash transfers benefit not only the elderly who receive the benefits but also other household members. Our findings are in line with the growing recognition of the role of the older generation in the household as agents of change and development. Social protections for the elderly may produce greater spillovers in their networks by loosening budget constraints and allowing beneficiaries’ family members the freedom to work less.

The Ekiti State intervention is the first of its kind to be implemented at the regional level in Nigeria and in West Africa, where properly assessing the effectiveness of public finance options in the context of increasingly constrained budgets presents a special challenge. As our results suggest, a small but reliable and regular transfer income can help address the intergenerational transfer of poverty by improving the elderly population’s overall mental health and changing the ways households allocate resources.

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Table 1: Balance Table - All Sample

	Treatment		Control		Diff- C-T (5)	P- value (6)
	Mean (1)	SD (2)	Mean (3)	SD (4)		
<b>Panel A: Demographics</b>						
Age	77.578	29.801	75.835	29.520	-1.743	0.021
Male	0.306	0.857	0.315	0.850	0.008	0.699
HH size	3.015	6.257	2.911	6.191	-0.104	0.509
Monogamous	0.386	1.332	0.395	1.320	0.009	0.784
Polygamous	0.137	0.714	0.109	0.708	-0.029	0.112
Widow	0.436	1.352	0.466	1.339	0.030	0.377
Individual is literate	0.119	0.624	0.097	0.619	-0.022	0.169
Attended school	0.164	1.005	0.120	0.995	-0.044	0.085
<b>Panel B: Labor</b>						
Working - Market	0.263	1.539	0.242	1.524	-0.021	0.581
Subsistence farming/hunting	0.209	1.384	0.201	1.370	-0.009	0.801
Farmer	0.212	1.371	0.202	1.357	-0.010	0.779
<b>Panel C: Receives support</b>						
Receives Support	0.426	1.327	0.458	1.314	0.032	0.340
Support from children	0.105	0.956	0.140	0.947	0.035	0.152
Support from friends/relatives	0.068	1.036	0.098	1.026	0.030	0.249
Amount	1020.09	3620.86	1088.57	3587.58	68.48	0.45
<b>Panel D: Health and health behaviors</b>						
Smokes	0.049	0.672	0.026	0.665	-0.023	0.167
Drinks Alcohol	0.111	1.025	0.109	1.015	-0.002	0.937
Self reported Health	2.774	3.530	2.684	3.494	-0.090	0.310
Self reported ability	2.565	6.145	2.559	6.080	-0.006	0.967
	2.660	4.533	2.799	4.485	0.140	0.220
Observations	3228		3095			
Joint F test						0.277

*Notes:* Household size indicates the number of people living in the same household as the beneficiary. ‘Literacy’ and ‘attended school’ are self-explanatory. All variables in panels B, C, and D are reported for the month prior to the interview. “Hours Worked” is reported as the average number of hours worked per day during the previous month. Amount is the number of NGN received in a month by the beneficiary. All variables in Panel D were self-reported. Health self-assessment scores ranged from 0 to 5.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

Table 2: Treatment Effects on Wellbeing

<b>Panel A: First Follow-Up (6 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.146** (0.071)	0.243*** (0.091)	-0.003 (0.066)	-0.072** (0.031)
Westfall-Young p-value	0.061	0.008	0.967	
Observations	6268	6268	6268	6268
Adjusted R-Squared	0.005	0.015	0.000	0.001
Control Group Mean	9.18 (1.912)	6.438 (2.619)	12.481 (2.401)	0.034 (0.188)
<b>Panel B: Second Follow-Up (12 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.067 (0.084)	0.278*** (0.090)	-0.004 (0.061)	-0.080** (0.032)
Westfall-Young p-value	0.566	0.004	0.952	
Observations	5995	5995	5995	5995
Adjusted R-Squared	0.001	0.020	0.000	0.002
Control Group Mean	8.900 (2.354)	6.218 (3.067)	12.18 (3.023)	0.034 (0.188)

*Notes:* Standard errors in parentheses, clustered at the district level. For all regressions, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. The Geriatric Depression Scale is constructed using a set of questions aimed at estimating the beneficiaries' depression level; higher scores were associated with greater depression. Life Satisfaction is the sum of yes/no questions related to the quality of life. Health behavior indicated the number of risky behaviors in which beneficiaries engaged in the previous six months.

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

Table 3: Treatment Effects on Beneficiary Labor Supply

<b>Panel A: First Follow-Up (6 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	0.028 (0.023)	0.008 (0.016)	0.150 (0.481)
Westfall-Young p-value	0.474	0.701	0.753
Observations	6268	6268	6268
Adjusted R-Squared	0.001	0.001	0.000
Control Group Mean	0.571 (0.495)	0.226 (0.418)	6.897 (14.562)
<b>Panel B: Second Follow-Up (12 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	0.033 (0.024)	-0.003 (0.016)	-0.287 (0.480)
Westfall-Young p-value	0.253	0.456	0.456
Observations	5995	5995	5995
Adjusted R-Squared	0.001	0.000	0.000
Control Group Mean	0.568 (0.495)	0.183 (0.387)	3.948 (10.705)

Notes: Standard errors in parentheses, clustered at the district level. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, livestock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any market oriented activity and 0 otherwise. “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level

Table 4: Treatment Effects on Household Members Labor Supply

	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours Working market oriented activities (3)
Treated district	-0.005 (0.013)	-0.008 (0.008)	-0.819** (0.334)
Westfall-Young p-value	0.736	0.736	0.175
Observations	23542	23542	23542
Adjusted R-Squared	0.000	0.000	0.001
Control Group Mean	0.141 (0.348)	0.490 (0.500)	15.763 (17.336)

Notes: Standard errors in parentheses, clustered at the district level. The sampled is comprised of all the individuals living in the household. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, livestock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any marked oriented activity and 0 otherwise. Finally, “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level

Table 5: Treatment Effects on Household Level Variables

<b>Panel A: Income and Savings</b>		
	Total Household Savings (1)	Total Household Income (2)
Treated district	4031.174*** (567.441)	450.726 (887.256)
Westfall-Young p-value	0.000	0.649
Observations	6268	6268
Adjusted R-Squared	0.014	0.000
Control Group Mean	-6348.27 (21636.10)	39400.23 (35247.48)
<b>Panel B: Demographics</b>		
	Age (1)	HH size (2)
Treated district	-0.534 (0.605)	-0.400*** (0.058)
Westfall-Young p-value	0.357	0.000
Observations	6268	6268
Adjusted R-Squared	0.000	0.007
Control Group Mean	53.973 (23.932)	4.980 (2.417)

Notes: Standard errors in parentheses, clustered at the district level. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. In panel A, the outcome variables describe the household savings and income and savings. In Panel B, the variables describe the household size and age.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

## A Wellbeing Composite Outcome variables

We present the details of how the main outcome variables were constructed. Most of the outcome variables were composite variables constructed from the response options provided in the survey questionnaires.

### *Mental Health*

We first consider the Geriatric Depression Scale (GDS), which quantifies depression symptoms and lack of self-esteem. This scale is based on the elderly respondent's answer to fifteen yes/no questions related to how they feel about life (whether they feel like valuable people or whether they have energy to undertake daily activities, for example). The responses were then added to give a total score for the individual. Higher scores indicated a higher probability of problems in mental health. This scale was first developed by Sheikh and Yesavage (1986) and later used by Galiani et al. (2016) and Bando et al. (2020).

The following questions were asked in the first and second follow-up surveys in order to construct the GDS:

1. In general, do you feel satisfied (happy) with your life?
2. Did you give up many activities or personal interests?
3. Do you feel your life is empty (something missing)?
4. Are you often bored?
5. Are you cheerful and in good spirit most of the time?
6. Are you afraid that something bad will happen?
7. Do you feel happy/pleased most of the time?
8. Do you feel helpless often or left aside (inattentive)
9. Would you rather stay at home than go out and do things new?
10. Do you think you have more memory related problems than most people?
11. Do you think it's wonderful to be alive?
12. Do you think your life is worthless or not important?
13. Are you a valuable person?
14. Do you have enough energy for everyday life?
15. Do you have enough money to cover your needs?

Similarly, we constructed a six-question measure of Life Satisfaction using the same methodology to sample whether subjects were satisfied with aspects of their lives: general health, themselves, the ability to perform everyday activities, personal relationships, the conditions of their homes, and relationships with family members. A higher score was associated with a higher level of satisfaction with life.

The list of questions is presented below:

1. How happy are you with your health?
2. How happy are you with yourself?
3. How happy are you with your ability to perform everyday life activities(on daily basis)?
4. How happy are you with your personal relationships?

5. How happy are you with the conditions of the place you live in?
6. How happy are you with the relationship you have with your children / grand children?
7. Considering all of the mentioned aspects, just how happy are you with your life today?
8. Are your or do you think your opinions count when taking household expenditure decisions?
9. Do you think that the relationship with your family is?

## B Appendix Tables

Table B.1: Attrition

<b>Panel A: First Follow-up (6 months)</b>			
	Total: Attrition (1)	Total: Moved - not found (2)	Total: Died (3)
Treated Ward	0.004 (0.002)	0.001 (0.001)	0.003 (0.002)
Observations	6325	6325	6325
Adjusted R-Squared	0.000	0.000	0.000
Control Group Mean	0.007	0.002	0.005
<b>Panel B: Second Follow-up (12 months)</b>			
	Total: Attrition (1)	Total: Moved - not found (2)	Total: Died (3)
Treated Ward	0.015 (0.010)	0.008* (0.004)	0.057 (0.034)
Observations	6325	6325	6325
Adjusted R-Squared	0.001	0.003	0.018
Control Group Mean	0.045	0.002	0.017

*Notes:* Standard errors in parentheses, clustered at the village level. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level



Table B.2: Determinants of Attrition

	Dependent variable - Attrition	
	First follow-up (1)	Second Follow-up (2)
Treated Ward	0.003 (0.002)	0.012 (0.010)
Age	-0.000 (0.000)	-0.000 (0.000)
Male	0.003 (0.003)	0.002 (0.006)
Household size	0.000 (0.001)	-0.002 (0.003)
Monogamous	-0.009 (0.009)	0.010 (0.015)
Polygamous	-0.011 (0.009)	0.012 (0.016)
Widowed	-0.008 (0.008)	0.008 (0.015)
Literate	0.001 (0.004)	-0.006 (0.013)
Attended school	0.000 (0.004)	0.007 (0.013)
Working	-0.003 (0.005)	0.023 (0.027)
Subsistence activities	0.001 (0.003)	0.031 (0.030)
Farmer	-0.002 (0.004)	-0.062* (0.037)
Receives support	-0.002 (0.003)	-0.006 (0.011)
Receives support from child	0.001 (0.004)	-0.012 (0.012)
Receives support from other relatives	-0.006* (0.003)	-0.010 (0.012)
Smokes	-0.002 (0.006)	-0.033** (0.013)
Drinks alcohol	0.006 (0.005)	0.017 (0.012)
Self reported health status	-0.003*** (0.001)	-0.007 (0.005)
Self reported ability	0.001 (0.001)	0.004 (0.003)
Feels included in the community	-0.001 (0.001)	-0.002 (0.003)
N	6323	6323

Notes: Standard errors in parentheses, clustered at the village level. \*\*\* Significant at the 1 percent level. \*\* Significant at the 5 percent level. \* Significant at the 10 percent level

Table B.3: Table Appendix - Effects of the Program on Mortality

	Dependent variable = Mortality	
	First follow-up (1)	Second Follow-up (2)
Treated Ward	0.003 (0.002)	0.057 (0.034)
Number	6325	6325
Adjusted R-Squared	0.000	0.018
Control Group Mean	0.005	0.017
Control Group SD	0.072	0.13

*Notes:* Standard errors in parentheses, clustered at the village level.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level

Table B.4: Descriptive Statistics - Household and Household Members

	Household level				Difference (5)
	Treatment		Control		
	Mean (1)	SD (2)	Mean (3)	SD (4)	
<b>Panel A: Demographics</b>					
Average Age	54.580	47.964	53.931	46.742	-0.650
% male household members	0.444	0.670	0.447	0.655	0.003
Household size	3.026	6.189	2.914	6.028	-0.111
% married household members	0.487	1.155	0.532	1.126	0.045
% polygamous household members	0.096	0.659	0.070	0.643	-0.026
% widowers in the household	0.215	0.972	0.228	0.948	0.013
% alphabetised household members	1.498	0.961	1.486	0.937	-0.012
% HH members who attended school	1.527	0.982	1.523	0.958	-0.004
<b>Panel B: Labor</b>					
% employed household members	0.346	1.351	0.341	1.316	-0.004
% farmer household members	0.142	0.862	0.146	0.841	0.004
<b>Panel C: Income and expenditure</b>					
Average household income	2621.39	16466.50	2935.46	16047.74	314.07
Average household expenditure	3053.87	21070.11	2611.77	20529.67	-442.10
N	3292		3095		
Joint F test					0.874
<b>All other household members</b>					
	Treatment		Control		Difference (5)
	Mean (1)	SD (2)	Mean (3)	SD (4)	
Age	39.110	74.472	40.855	73.635	1.745
Male	0.537	1.058	0.528	1.049	-0.009
Monogamous married	0.536	2.015	0.569	1.993	0.033
Polygamous	0.067	1.009	0.062	0.998	-0.006
Widowed	0.070	1.171	0.105	1.158	0.034*
Literacy	1.228	1.857	1.268	1.836	0.040
Attended school	1.239	1.932	1.286	1.910	0.047
Works	0.421	2.132	0.438	2.088	0.018
Formal Farmer	0.127	1.371	0.166	1.357	0.040*
N	6831		6448		
Joint F test					0.221

*Notes:* The top panel describes all the households in the baseline sample and the bottom panel describe all the data available for other household members. Panel B includes all the data from other household members at baseline.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.



Table B.6: Treatment Effects on Wellbeing - Standard Deviations  
With controls

<b>Panel A: First Follow-Up (6 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.140** (0.069)	0.253*** (0.089)	-0.009 (0.066)	-0.077** (0.031)
Westfall-Young p-value	0.062	0.005	0.902	
Observations	6268	6268	6268	6268
Adjusted R-Squared	0.009	0.024	0.002	0.001
Control Group Mean	9.18 (1.912)	6.438 (2.619)	12.481 (2.401)	0.034 (0.188)
<b>Panel B: Second Follow-Up (12 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.067 (0.082)	0.287*** (0.089)	0.001 (0.061)	-0.083** (0.033)
Westfall-Young p-value	0.523	0.002	0.977	
Observations	5995	5995	5995	5995
Adjusted R-Squared	0.004	0.028	0.002	0.001
Control Group Mean	8.900 (2.354)	6.218 (3.067)	12.18 (3.023)	0.034 (0.188)

Notes: Controls were selected using a double lasso methodology and include the age, gender and literacy status of the beneficiary, whether they worked at baseline, whether they received any support at baseline and whether she attended school at some point. Standard errors in parentheses, clustered at the district level. For all regressions, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. The Geriatric Depression Scale is constructed using a set of questions aimed at estimating the beneficiaries' depression level; higher scores were associated with greater depression. Life Satisfaction is the sum of yes/no questions related to the quality of life. Health behavior indicated the number of risky behaviors in which beneficiaries engaged in the previous six months.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

Table B.7: Treatment Effects on Beneficiary Labor Supply

With controls

<b>Panel A: First Follow-Up (6 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	0.032 (0.023)	-0.001 (0.012)	-0.085 (0.383)
Westfall-Young p-value	0.309	0.959	0.930
Observations	6268	6268	6268
Adjusted R-Squared	0.011	0.138	0.097
Control Group Mean	0.571 (0.495)	0.226 (0.418)	6.897 (14.562)
<b>Panel B: Second Follow-Up (12 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	0.036 (0.024)	-0.013 (0.010)	-0.286 (0.293)
Westfall-Young p-value	0.190	0.300	0.331
Observations	5995	5995	5995
Adjusted R-Squared	0.010	0.009	0.003
Control Group Mean	0.568 (0.495)	0.183 (0.387)	3.948 (10.705)

Notes: Controls were selected using a double lasso methodology and include the age, gender and literacy status of the beneficiary, whether they worked at baseline, whether they received any support at baseline and whether she attended school at some point. Standard errors in parentheses, clustered at the district level. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, livestock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any market oriented activity and 0 otherwise. Finally, “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level. 35

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

Table B.8: Treatment Effects on Household members Labor Supply

	With controls		
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	-0.011 (0.008)	-0.001 (0.002)	-0.435* (0.221)
Westfall-Young p-value	0.208	0.719	0.092
Observations	23542	23542	23542
Adjusted R-Squared	0.519	0.962	0.856
Control Group Mean	0.141 (0.348)	0.490 (0.500)	15.763 (17.336)

Notes: Controls were selected using a double lasso methodology and include the age, gender and literacy status of the beneficiary, whether they worked at baseline, whether they received any support at baseline and whether she attended school at some point. Standard errors in parentheses, clustered at the district level. The sample is comprised of all the individuals living in the household. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, live-stock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any marked oriented activity and 0 otherwise. Finally, “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level

Table B.9: Treatment Effects on Household Level Variables - With controls

<b>Panel A: Income and Savings</b>		
	Total Household Savings (1)	Total Household Income (2)
Treated district	4157.952*** (565.0112)	839.196 (827.082)
Westfall-Young p-value	0.000	0.377
Observations	4918	4918
Adjusted R-Squared	0.029	0.023
Control Group Mean	-6348.27 (21636.10)	39400.23 (35247.48)
<b>Panel B: Demographics</b>		
	Age (1)	HH size (2)
Treated district	-0.132 (0.581)	-0.416*** (0.070)
Westfall-Young p-value	0.980	0.000
Observations	6325	6325
Adjusted R-Squared	0.000	0.007
Control Group Mean	53.973 (23.932)	4.980 (2.417)

Notes: Controls were selected using a double lasso methodology and include the age, gender and literacy status of the household member, whether they worked at baseline, and whether they attended school at some point. Standard errors in parentheses, clustered at the district level. The sampled is comprised of all the individuals living in the household. For every estimation, we also report the corrected p-values using the Westfall-Young multiple hypothesis method. In panel A, the outcome variables describe the natural logarithm of the household income and savings. In Panel B, the variables describe the average household size and age.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.



Table B.10: Treatment Effects on Wellbeing - Standard Deviations  
With interactions for male beneficiary

<b>Panel A: First Follow-Up (6 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.164** (0.078)	0.245*** (0.092)	-0.006 (0.071)	-0.089** (0.036)
Male	0.001 (0.043)	-0.018 (0.044)	-0.014 (0.048)	-0.022 (0.040)
Treated district × Male	0.061 (0.059)	-0.006 (0.057)	0.011 (0.063)	0.054 (0.055)
Observations	6268	6268	6268	6268
Adjusted R-Squared	0.006	0.015	0.000	0.001
Control Group Mean	9.18 (1.912)	6.438 (2.619)	12.481 (2.401)	0.034 (0.188)
<b>Panel B: Second Follow-Up (12 months)</b>				
	Geriatric Depression scale (1)	Life Satisfaction Index (2)	Morbidity (3)	Alcohol and tobacco consumption (4)
Treated district	-0.116 (0.085)	0.262*** (0.094)	-0.008 (0.066)	-0.101*** (0.037)
Male	-0.082 (0.055)	-0.047 (0.046)	-0.009 (0.044)	-0.028 (0.040)
Treated district × Male	0.157** (0.066)	0.051 (0.060)	0.013 (0.059)	0.066 (0.053)
Observations	5995	5995	5995	5995
Adjusted R-Squared	0.004	0.028	0.002	0.001
Control Group Mean	8.900 (2.354)	6.218 (3.067)	12.18 (3.023)	0.034 (0.188)

Notes: Standard errors in parentheses, clustered at the district level. We interact our treatment variable with an indicator variable for whether the beneficiary is male. The Geriatric Depression Scale is constructed using a set of questions aimed at estimating the beneficiaries' depression level; higher scores were associated with greater depression. Life Satisfaction is the sum of yes/no questions related to the quality of life. Health behavior indicated the number of risky behaviors in which beneficiaries engaged in the previous six months.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

Table B.11: Treatment Effects on Beneficiary Labor supply  
With interactions for male beneficiary

<b>Panel A: First Follow-Up (6 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	0.003 (0.017)	0.082 -0.538	0.019 (0.025)
Male	0.002 (0.012)	0.100 (0.430)	0.015 (0.020)
Treated district × Male	0.015 (0.018)	0.227 (0.614)	0.032 (0.030)
Observations	6268	6268	6268
Adjusted R-Squared	0.000	0.000	0.001
Control Group Mean	0.571 (0.495)	0.226 (0.418)	6.897 (14.562)
<b>Panel B: Second Follow-Up (12 months)</b>			
	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	-0.003 (0.011)	0.071 (0.331)	0.023 (0.026)
Male	0.003 (0.012)	0.281 (0.308)	0.021 (0.020)
Treated district × Male	-0.023 (0.015)	-0.994** (0.389)	0.032 (0.031)
Observations	5995	5995	5995
Adjusted R-Squared	0.000	0.001	0.00
Control Group Mean	0.568 (0.495)	0.183 (0.387)	3.948 (10.705)

Notes: Standard errors in parentheses, clustered at the district level. We interact our treatment variable with an indicator variable for whether the beneficiary is male. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, live-stock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any market oriented activity and 0 otherwise. Finally, “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level. 39

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.

Table B.12: Treatment Effects on Household members Labor supply  
With interactions for male beneficiary

	Works in subsistence activities (1)	Works in market oriented activities (2)	Hours working market oriented activities (3)
Treated district	-0.009 (0.015)	-0.007 (0.010)	-0.758* (0.406)
Male	-0.023** (0.010)	-0.012 (0.011)	-0.166 (0.448)
Treated district $\times$ Male	0.017 (0.014)	-0.005 (0.016)	-0.364 (0.613)
Observations	23542	23542	23542
Adjusted R-Squared	0.519	0.962	0.856
Control Group Mean	0.141 (0.348)	0.490 (0.500)	15.763 (17.336)

Notes: Standard errors in parentheses, clustered at the district level. The sample is comprised of all the individuals living in the household. We interact our treatment variable with an indicator variable for whether the beneficiary is male. “Works in subsistence activities” is an indicator variable equal to 1 if the sampled individual reports working in subsistence activities such as farming, livestock, hunting or fishing and 0 otherwise. “Works in market oriented activities” is equal to 1 if the sampled individual reports working in any marked oriented activity and 0 otherwise. Finally, “Hours Working market oriented activities” refers to the number of hours employed in market activities.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level

Table B.13: Treatment Effects on Household Level Variables  
With interactions for male beneficiary

<b>Panel A: Income and Savings</b>		
	Total household Savings (1)	Total household income (2)
Treated district	4,733.404*** (868.191)	406.574 (1,203.309)
Male	2,962.965*** (819.346)	805.999 (1,205.741)
Treated district × Male	-2,099.085* (1,201.740)	-1,538.456 (1,764.619)
Observations	5845	5845
Adjusted R-Squared	0.029	0.023
Control Group Mean	-6348.27 (21636.10)	39400.23 (35247.48)
<b>Panel B: Demographics</b>		
	Age (1)	HH size (2)
Treated district	-0.390 (0.739)	-0.507*** (0.072)
Male	1.126 (0.867)	-0.103 (0.091)
Treated district × Male	-0.427 (1.407)	0.199 (0.121)
Observations	5845	5845
Adjusted R-Squared	0.000	0.007
Control Group Mean	53.973 (23.932)	4.980 (2.417)

Notes: Standard errors in parentheses, clustered at the district level. The sampled is comprised of all the individuals living in the household. For every estimation. In panel A, the outcome variables describe the total the house-hold income and savings. In Panel B, the variables describe the average household size and age.

\*\*\* Significant at the 1 percent level.

\*\* Significant at the 5 percent level.

\* Significant at the 10 percent level.