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# DO PENSIONS REDUCE THE INCENTIVE TO WORK? EVIDENCE FROM EGYPT

**ABSTRACT:** *In this study we investigate the impact of the receipt of contributory and social pensions on the labour supply of individuals in Egypt, using individual fixed-effect regressions and panel data from the Egypt Labour Market Panel Surveys in 2006 and 2012. The study compares the effect of social pensions and contributory pensions. We find that the receipt of contributory pensions reduces the probability of working as well as the probability of having a waged job of household members aged from 15. The receipt of social pensions has no significant effect on the probability of working for those aged 15–60. However, receiving social pensions can reduce both working and labour market participation of people aged over 60.*

**KEY WORDS:** *Pension, social pension, impact evaluation, household welfare, labour supply, Egypt.*

**JEL CLASSIFICATION:** H55, J14, J22, D04.

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## 1. INTRODUCTION

Nowadays, most countries pursue pro-poor growth policies that not only promote economic growth but also provide support for low-income people (Bhagwati 1988; Kakwani and Ernesto 2000). Providing pensions for the elderly, especially the poor and disadvantaged elderly, is an important income redistribution policy. Social protection for older people has received a great deal of attention because populations tend to be ageing.

Recently there has been rising concern about the unintended effect of pensions on the labour supply of working-age people. Especially in developing countries, people tend to cohabit in extended families, with family members sharing a common income and consumption. In this situation the receipt of pensions can affect not only the elderly but also other family members. According to the neoclassical theory of labour supply, leisure is a normal good, and an exogenous increase in income will relax the household budget constraint, increase leisure, and reduce the working time of household members (Cahuc and Zylberberg 2004). Several empirical studies have found a negative effect of social pensions and cash transfers on labour supply (Sahn and Alderman 1996; Bertrand et al. 2003; Dreze 2005; Gertler et al. 2006; Alzua et al. 2012). However, other studies do not find a significant effect of pensions on labour supply (Galasso 2006; Skoufias and Di Maro 2008; Ardington et al. 2009).

The effect of pensions on the labour supply of household members cannot be determined a priori. It depends on different country contexts, and this requires more empirical studies to better understand the magnitude and mechanism of the effect of pensions on labour supply. This study aims to assess the effect of both contributory and social pensions on the labour supply of working-age people and old people in Egypt. More specifically, this study examines to what extent the reception of a contributory or social pension of households affect the working status, labor market participation and working hours of household members.

Egypt is an interesting country case for various reasons. Egypt is the largest country in the Arab world. It is a low-to-middle income country, with a per capita GDP of around US$ 3,300 in 2013 (World Bank 2014). Egypt has implemented a social insurance system since 1953. The system is now a Pay-As-

You-Go (PAYG) one in which current pensions for retirees are paid from the contributions of current workers. People who are from 60 years old and have at least 120 months of contributions are eligible for contributory pensions (Sieverding and Selwaness 2012; Ameta and El Shafie 2015).

Poverty in Egypt is persistent, with a poverty rate of around 20% during the last two decades, though Egypt has achieved an annual economic growth rate of around 5% (El-Laithy 2011). In an attempt to reduce poverty the Egyptian government has provided several assistance programmes, including social pensions for the poor and disadvantaged (Korayem 2013; Ameta and El Shafie 2015). Old age people who do not have contributory pension and are poor or unable to work can be provided with social pensions ((UNFPA 2015; Ameta and El Shafie 2015).

There have been no quantitative studies on the impact of pensions in Egypt. Several studies have assessed the social safety net. For example, Korayem (2013) finds that the food subsidy and social assistance programmes are inefficient in reaching the poor. Most studies focus on assessing the targeting and coverage of the social assistance and social insurance system in Egypt (World Bank 2005; Loewe 2005; El-Laithy 2011; Selwaness 2012; Korayem 2013). Egypt is a country where the population is ageing (Saxena 2010). Thus, findings on the effect of pensions can be important for policy makers to improve pension schemes for the elderly in the future.

The availability of panel data from the Egyptian Labour Market Panel Surveys in 2006 and 2012 allows us to use panel techniques to estimate the impact of contributory and social pensions on the labour supply of Egyptian households. The main advantage of panel data is that it can reduce estimation bias due to omitted time-invariant variables. We also examine whether the effect of pensions differs across different household values and individual characteristics such as urbanism, gender, and education. The findings should have useful implications for social assistance and social insurance policies in Egypt, as well as for a wider group of emerging and transition Arab countries.

The rest of the paper is structured as follows. The second section reviews the theoretical framework of and literature on the effect of pensions on labour supply of household members. The third section presents data sets and

descriptive analysis. The fourth and fifth sections present the estimation method and empirical results of the impact of pensions on the labour supply of working-age and older people. Finally, the sixth section presents the conclusions and policy recommendations.

## 2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Pensions are expected to affect the labour market and household welfare through several channels. The expected effects can be positive or negative, and the sign of the total impact is not known a priori and needs to be addressed empirically. Like for other cash transfer programmes, the most direct impact of pension and social cash transfers is the positive effect on households' disposable income. With additional income, households can increase spending on consumption of both food and non-food items for family members, and their health may also improve (Bertranou and Grushka 2002; Barrientos 2003; Nguyen 2013; Téllez-Rojo et al. 2013). In turn, this may improve children's education, as they may have better conditions and more support to attend school. [1] However, several studies do not find that pensions and social allowances have a significant effect on household welfare (Jensen and Richter 2003; Snyder and Evans 2006; Puhani and Tabbert 2013). A reason is that social pensions might not reach the poor: several studies find that the poorest tend to receive less from social allowances than the middle class and the richest (e.g., Howe and Longman 1992; Barrientos and DeJong 2006).

Pensions can have both direct and indirect effects on the labour supply of household members. According to the neoclassical theory of labour supply, people maximize their utility from consumption of goods and leisure, given their budget constraints. Leisure is a normal good, and under no credit constraints an exogenous increase in income will increase leisure and reduce working time (Cahuc and Zylberberg 2004). Thus, like other cash transfer programmes, pensions may create disincentive effects and decrease the labour supply of recipients and their household members. In the long run the

[1] A large number of studies find that cash transfers increase consumption and reduce poverty and help receiving households decrease child labour, increase child schooling, and improve nutrition and health (Hoddinott et al. 2000; Sadoulet et al. 2001; Jensen and Richter 2003; Duflo, 2003; Lloyd-Sherlock 2006; Barrientos and DeJong 2006).

recipients may prefer not to work and may become more dependent on social assistance (Dreze 2005; Sahn and Alderman 1996). Several empirical studies find a negative effect of cash transfer programmes on labour supply (Gertler et al. 2006; Alzua et al. 2012). Bertrand et al. (2003) show that pension receipt reduces the labour market participation of working-age adults remarkably in South Africa.

However, the effect of pensions on labour supply is not necessarily negative. In developing countries, especially in rural areas, households face credit constraints. Increased income might not be used for consumption and leisure but to acquire productive inputs or to invest in productive assets or small sale activities, multiplying the cash received (Sadoulet et al. 2001; Farrington and Slater 2006; Lloyd-Sherlock 2006). When households lack reliable sources of credit, cash transfers may allow them to intensify or expand their production to a scale they would otherwise have been unable to obtain (Sadoulet et al. 2001). As a result, household members can increase labour supply and work.

Empirical evidence supports the multiplier-generating indirect effects of public transfers. Sadoulet et al. (2001) find that cash transfers to compensate Mexican farm households for the anticipated negative price effects of trade liberalization on basic crops multiply income between 1.5 and 2.6 times in the short run. Likewise, in three Southern African case studies, Devereux (2002) finds evidence that even small income transfers are often invested in income-generating activities, education, social networks, or acquisition of productive assets. Several studies find a positive effect of cash transfers on the labour supply of working-age people (Galasso 2006; Ardington et al. 2009).

In the absence of effective collective arrangements to manage risk, poor households cannot afford a major setback, and so will often choose to manage their livelihoods so as to minimize their exposure to risk, even if this results in low average returns (Conway and Norton 2002). Cash transfers can be simply used for savings and asset accumulation, and if this happens there are no effects on labour supply. Several studies find no significant effects of cash transfers on the labour supply of adults (Parker and Skoufias (2000); Skoufias and Di Maro (2008); Fizbein and Schady 2009).

## 3. DATA SET AND DESCRIPTIVE ANALYSIS

### 3.1. Data set

The main data sets that we use in this study are sourced from the Egypt Labour Market Panel Surveys (ELMPS). These surveys have been conducted since 1998 by the Economic Research Forum (ERF), in cooperation with Egypt's Central Agency for Public Mobilization and Statistics (CAPMAS). Until 2012 the survey was conducted three times, in 1998, 2006, and 2012. The 1998 the ELMPS covered 4,816 households with 23,997 household members. The 2006 ELMPS followed the 4,816 households visited in 1998 as well as the households that split from them, plus a new sample of 2,500 households. The final sample of the 2006 ELMPS consists of 8,351 households containing 37,140 individuals. The final sample for the 2012 ELMPS includes 12,060 households, consisting of 6,752 households from the 2006 sample, 3,308 new households that emerged from these households as a result of splits, and a refresher sample of 2,000 households. Of the 37,140 individuals interviewed in the 2006 ELMPS, 28,770 individuals were re-interviewed in 2012 (Assaad and Krafft 2013).

In this study we use panel data from the 2006 and the 2012 ELMPS. We do not use the 1998 ELMPS, since the number of households in the three-round panel data is smaller. In addition, the 2006 and the 2012 ELMPS contain more comparable questions on pensions and social allowances.

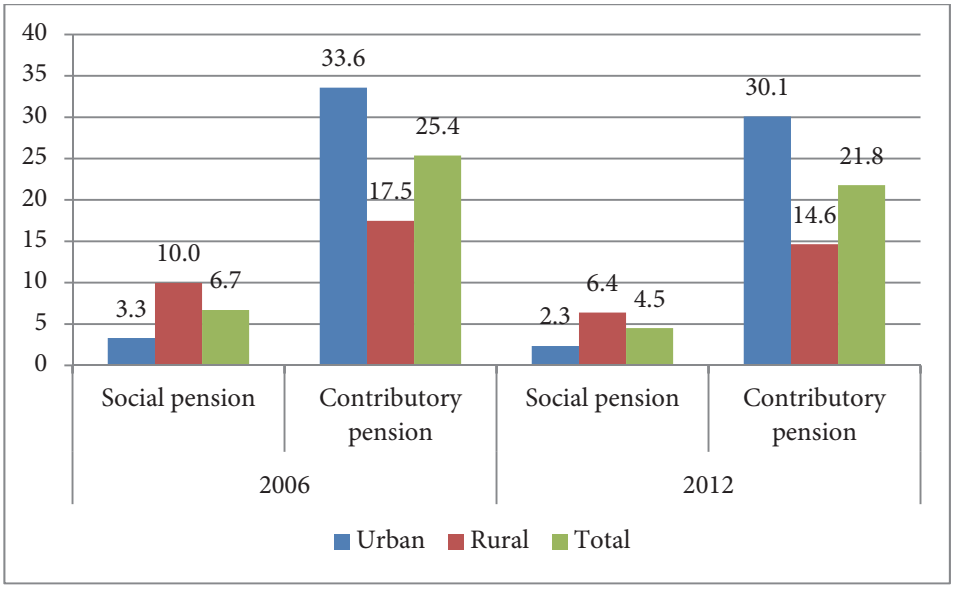
The ELMPS contain detailed data not only on individuals' labour but also on the living conditions of their household and family members. The information includes parental background, education, housing conditions, durables ownership, access to services, residential mobility, migration and remittances, time use, marriage patterns and costs, fertility, women's decision-making and empowerment, employment, savings and borrowing, household enterprises, farms and non-farm activities, and income. Particularly, there is information on contributory (retirement) pensions, social pensions, and social assistance that households received during the previous 12 months.

### 3.2. Descriptive analysis

Contributory pensions were implemented in Egypt in 1952. Workers contribute to a social insurance fund and receive a pension when they retire. The

contribution rate of workers and employees has been adjusted several times. Currently, employees' average contribution rate is 16.5% and employers' average contribution rate is 10% of the employee's monthly wage (Selwaness 2012). The retirement age is now 60, but will be increased to 65 in 2027 (Selwaness 2012). Social pensions or non-contributory pensions are provided for old age people without contributory pensions. The Egyptian government provides the poor elderly with social pensions under Law 112/1980, and other disadvantageous old people under the Sadat Pension scheme such as disabled people, and divorced and widowed women (UNFPA 2015). This study includes both social pension schemes and they are defined as social pensions.

**Figure 1:** Percentage of Egyptian households receiving social pensions and social allowances, 2006–2012




**Source:** Authors' estimation from the 2006 and 2012 ELMPS

Figure 1 shows that 6.7% of households had at least one member receiving a social pension in 2006, which decreased to 4.5% in 2012. A higher percentage of households receive contributory pensions, reaching 25.4% in 2006. This rate also decreased, to 21.8% in 2012. It should be noted that there can be more than one household member receiving a contributory pension within a household. In

2012, there were 4.2% of households in which there were two household members receiving a contributory pension.

Rural households are more likely to receive a social pension than urban households. This is expected, as they have lower living standards than urban households. On the contrary, urban households tend to receive more contributory pensions than rural households, since urban people are more likely to work in the formal sector than rural people.

Table 1 presents the percentage of households receiving contributory and social pensions by region and household head characteristics. The rural Upper region has the highest proportion of people receiving social pensions, while Greater Cairo, Alexandria, and Suez Canal cities have the highest proportion receiving contributory pensions. Households with a female head or head with lower education are more likely to receive both contributory and social pensions than those with a male or highly educated head.

**Table 1:** Households receiving pensions and allowances in Egypt

| Region | % households receiving contributory pension | | Average contributory pension per receiving household (Egyptian pound/month) | | % households receiving social pension | | Average social pension per receiving household (Egyptian pound/month) | |
|---|---|---|---|---|---|---|---|---|
| | Year 2006 | Year 2012 | Year 2006 | Year 2012 | Year 2006 | Year 2012 | Year 2006 | Year 2012 |
| Greater Cairo | 36.13 | 34.39 | 659.4 | 1136.5 | 1.98 | 1.80 | 71.3 | 161.5 |
| Alx, Sz C. Cities | 37.16 | 32.68 | 562.6 | 1077.0 | 0.85 | 1.66 | 163.9 | 174.8 |
| Urban Lower | 30.16 | 24.28 | 475.9 | 878.1 | 5.52 | 3.30 | 70.1 | 199.3 |
| Urban Upper | 31.11 | 22.36 | 615.0 | 904.7 | 4.61 | 3.23 | 67.3 | 162.0 |
| Rural Lower | 16.46 | 16.25 | 364.4 | 683.6 | 8.70 | 5.39 | 90.8 | 155.2 |
| Rural Upper | 18.91 | 12.51 | 252.4 | 651.4 | 11.75 | 7.84 | 71.1 | 179.7 |
| *Sex of household head* | | | | | | | | |
| Male | 19.42 | 15.16 | 553.1 | 1015.7 | 4.64 | 3.22 | 82.1 | 172.6 |
| Female | 50.82 | 49.65 | 393.4 | 783.3 | 15.53 | 9.97 | 76.0 | 165.5 |
| *Education level of household head* | | | | | | | | |
| Illiterate | 28.29 | 27.46 | 303.1 | 622.6 | 13.69 | 11.14 | 80.4 | 170.9 |
| Read & Write | 29.68 | 27.15 | 398.3 | 768.0 | 4.34 | 2.51 | 69.4 | 161.4 |
| Below intermediate | 27.60 | 25.33 | 512.5 | 853.7 | 3.68 | 2.06 | 81.9 | 162.6 |
| Intermediate | 19.97 | 14.51 | 609.7 | 1140.8 | 2.55 | 1.74 | 80.3 | 160.1 |
| University & Higher | 22.25 | 18.99 | 981.5 | 1546.5 | 1.30 | 0.56 | 64.9 | 213.6 |
| All Egypt | 25.36 | 21.78 | 492.6 | 913.9 | 6.70 | 4.51 | 79.4 | 169.6 |

**Source:** Authors' estimation from the 2006 and 2012 ELMPS

In Table 1 we also estimate the average monthly amount of pension per receiving household in Egypt. The pension amount is estimated at the current price. Social pensions are substantially lower than contributory pensions. In 2012 the average amount of the contributory pension and the social pension was 914 and 170 Egyptian pounds, respectively. The average amount of social pension was higher for households in rural areas, with a female head, and with low level of household education. However, urban people, males, and people with high levels of education received higher pensions than rural people, females, and people with low levels of education.

**Table 2:** Individual outcomes in households with and without contributory pensions

| Outcome variable | 2006 | | 2012 | |
|---|---|---|---|---|
| | With contributory pensions | Without contributory pensions | With contributory pensions | Without contributory pensions |
| *People aged 15–22* | | | | |
| Currently attending school (yes=1, no=0) | 15.78 | 14.10 | 15.58 | 12.23 |
| *People aged 15–60* | | | | |
| Having worked (yes=1, no=0) | 54.81 | 67.64 | 47.72 | 61.82 |
| Having job in the formal sector (yes=1, no=0) | 21.35 | 24.58 | 20.34 | 24.74 |
| Having waged job (yes=1, no=0) | 32.03 | 35.78 | 32.63 | 39.62 |
| Number of working hours per week | 22.60 | 28.11 | 17.83 | 23.37 |
| *People above 60 years old* | | | | |
| Having worked (yes=1, no=0) | 16.96 | 42.21 | 13.35 | 27.18 |
| Having job in the formal sector (yes=1, no=0) | 3.90 | 5.52 | 2.94 | 3.80 |
| Having waged job (yes=1, no=0) | 2.08 | 3.73 | 2.75 | 4.50 |
| Number of working hours per week | 5.47 | 15.97 | 5.05 | 11.69 |

**Source:** Authors' estimation from the 2006 and 2012 ELMPS

In this study we estimate the impact of pensions on individuals' employment and labour supply. In Tables 2 and 3 we present estimates of the work variables of individuals in households with and without pensions. We measure

employment during the previous three months. [2] The outcome variables include a dummy variable indicating whether an individual was working during the previous three months. A person can have either a self-employed or employed job. An employed job is called a waged job. We also measure employment by a dummy indicating whether the individual has a job in the formal sector. A job in the formal sector is long-term and employees can receive social insurance and other employment benefits. It should be noted that having a waged job does not mean having a formal job. A waged job is defined as a job that a worker works for an employer for salary or wage. However, some waged workers do not have social insurance. Thus, the percentage of waged workers is much lower than the percentage of formal workers (Tables 2 and 3). Finally, for those who are working we measure the number of hours worked per week.

In addition to employment, we also look at the school enrolment of the young people in the households. Pensions received by old people can be used to pay for education and to release young people from working, and so encourage young people to attend school. Table 2 shows that school enrolment does not differ very much between households with and without contributory pensions. In 2012 the enrolment in education of people aged 15–22 was 15.6% in households with contributory pensions and 12.1% in households without. However, there is a large difference between the working rate of the two groups of households. People in households with contributory pensions are less likely to work than those in households without contributory pensions.

Table 3 shows that a lower percentage of people aged 15–60 living in a household with social pensions tend to have a formal or waged job than people living in a household without social pensions. In 2012, old people (aged above 60) with a social pension are less likely to work than those without a social pension.

[2] In the data sets there is information on employment status during the past week and the past three months. They are almost the same. In this study we use only the employment variables measured in the past three months.

**Table 3:** Individual outcomes in households with and without social pensions

| Outcome variable | 2006 | | 2012 | |
|---|---|---|---|---|
| | With social pension | Without social pension | With social pension | Without social pension |
| *People aged 15–22* | | | | |
| Currently attending school (yes=1, no=0) | 11.90 | 14.67 | 12.32 | 12.86 |
| *People aged 15–60* | | | | |
| Having worked (yes=1, no=0) | 68.22 | 64.48 | 57.81 | 59.47 |
| Having job in the formal sector (yes=1, no=0) | 12.20 | 24.67 | 12.34 | 24.51 |
| Having waged job (yes=1, no=0) | 27.71 | 35.44 | 30.84 | 38.76 |
| Number of working hours per week | 27.41 | 26.81 | 20.44 | 22.44 |
| *People above 60 years old* | | | | |
| Having worked (yes=1, no=0) | 26.95 | 26.78 | 13.53 | 19.95 |
| Having job in the formal sector (yes=1, no=0) | 1.13 | 5.18 | 0.45 | 3.75 |
| Having waged job (yes=1, no=0) | 1.70 | 2.92 | 1.30 | 3.82 |
| Number of working hours per week | 8.90 | 9.69 | 5.10 | 8.22 |

**Source:** Authors' estimation from the 2006 and 2012 ELMPS

## 4. ESTIMATION METHOD

Measuring the effect of a policy or a programme is always a challenge. In our study, pensions are not randomised. There is a potential bias in estimating the effect of pensions, since receipt of a pension and social assistance can be correlated with individuals' unobserved characteristics. We will use individual fixed-effect regressions to mitigate this endogeneity bias.

We measure labour supply by work status and number of working hours per week. There are a large number of people who do not work and have zero or a missing number of working hours. Thus, for the dependent variable of the number of working hours we should use a Tobit model. However, a fixed-effect Tobit estimator is not available due to an incidental parameter problem in maximum likelihood methods (Wooldridge 2001; Greene 2004; Cameron and Trivedi 2009). Two-part models are widely used to model a variable with a large number of zero values (Duan et al. 1983; Manning et al. 1987). We also use a

panel data fixed-effect two-part model to remove the endogeneity bias due to time-invariant unobserved variables, as follows:

$$Y_{ijt} = \beta_0 + Con\_pension_{jt}\beta_1 + Soc\_pension_{jt}\beta_2 + T_t\beta_3 + X_{ijt}\beta_4 + \nu_{ij} + u_{ijt}, \quad (1)$$

$$Log(L_{ijt}) = \delta_0 + Con\_pension_{jt}\delta_1 + Soc\_pension_{jt}\delta_2 + T_t\delta_3 + X_{ijt}\delta_4 + \varepsilon_{ij} + \pi_{ijt}, \text{for } Y_{ijt} > 0 \quad (2)$$

In equation (1), $Y_{ijt}$ is a dummy variable indicating whether individual *i* in household *j* in year *t* is working or not. $Con\_pension_{jt}$ and $Soc\_pension_{jt}$ are two dummy variables indicating households' receipt of contributory pensions and social pensions, respectively. Members of the same household have the same value of these pension variables. $T_t$ is a year dummy, which is equal to 1 for 2012 and 0 for 2006. This dummy variable enables controlling for common macroeconomic changes over years. $X_{ijt}$ is a vector of individual- and household-level explanatory variables. $\nu_{ij}$ and $u_{ijt}$ are unobserved variables which are time-invariant and time-variant, respectively. In equation (2), $Log(L_{ijt})$ is the log of working hours during a certain period of time of individual *i* in household *j* at time *t*. This equation is estimated using the sample of working people, since the working hours for non-working are missing.

In addition to the dependent variable 'work status', we also regress the variables 'having a job in the formal sector' and 'having a waged job' on pension variables and other control variables using the same model specification as Equation (1).

As mentioned above, the main problem in estimating the effect of pensions is the endogeneity of pensions, which cause the estimates of pension to be biased. To address this bias we use individual fixed-effect regression, which relies on the assumption that only time-invariant unobserved variables are correlated with the receipt of pensions. The time-invariant unobserved variables, $\nu_{ij}$ and $\varepsilon_{ij}$, are eliminated in the fixed-effect regression, and the remaining errors, $u_{ijt}$ and $\pi_{ijt}$, are uncorrelated with the receipt of pensions. As a result, the fixed-effect

regression can produce unbiased estimates of the receipt of pensions. [3] Although there is no guarantee that the fixed-effect regression fully addresses the endogeneity bias, we expect the bias to be small after time-invariant variables and unobserved explanatory variables are controlled for.

We tend to use the more exogenous explanatory variables, which should not be affected by the receipt of pensions (Heckman et al. 1999; Angrist and Pischke 2008). The explanatory variables *X* include both household-level and individual-level variables. Household variables consist of household size, proportion of children and elderly people, children's age in months, age, gender, and education of household heads (see Table A.1 in Appendix for summary statistics of these variables). The individual-level variables include schooling years. Variables that are time-invariant such as age, gender, parental age and education, and geographic variables are eliminated in fixed-effect regressions and not presented in the regression results.

Finally, it should be noted that we estimate Equation (1) using a linear probability fixed-effect regression. Binary dependent variables are often estimated using a logit or probit model. However, fixed-effect probit estimators are not available, while fixed-effect logit estimators are inefficient. In cases where no non-linear probability models are available, linear probability models are widely used (e.g., Angrist 2001; Angrist and Krueger 2001).

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[3] To present the basic idea of the fixed-effect estimator, assume that we want to estimate the follow model:

$$y_{it} = \alpha + x_{it}\beta + u_i + \varepsilon_{it}. \qquad \text{(A.1)}$$

The key assumption for the fixed-effect estimator is that $x_{it}$ is correlated with $u_i$ but not $\varepsilon_{it}$. Firstly, we take the average of observations across time *t*, and get the average model as follows:

$\bar{y}_{it} = \alpha + \bar{x}_{it}\beta + u_i + \bar{\varepsilon}_{it}$, where $\bar{y}_{it} = \frac{1}{T}\sum_{t=1}^{T} y_{it}$ ; $\bar{x}_{it} = \frac{1}{T}\sum_{t=1}^{T} x_{it}$ ; *and* $\bar{\varepsilon}_{it} = \frac{1}{T}\sum_{t=1}^{T} \varepsilon_{it}$ .

Then we compute the difference between the original and the average model to get the following model:

$$(y_{it} - \bar{y}_{it}) = (x_{it} - \bar{x}_{it})\beta + (\varepsilon_{it} - \bar{\varepsilon}_{it}). \qquad \text{(A.2)}$$

Now $u_i$ is eliminated, and model (A.2) can be estimated without bias, since its error is not correlated with *x*.

## 5. EMPIRICAL FINDINGS

### 5.1. The impact on labour supply

Table 4 presents the fixed-effect regression of employment variables of people aged 15–60 on dummy variables indicating whether households receive contributory pensions and social pensions. Since most people receiving pensions are 60 years and older, the regressions in Table 4 reflect the spill-over effects of pensions on younger people. We consider four employment variables: having worked during the past three months, having a job in the formal sector, having a waged job, and the number of hours worked per week of working people.

Results in column 1 show that receipt of a contributory pension tends to reduce the probability of working by 0.066, equivalent to 12% of the mean of the proportion of working people (55%). Having a family member receiving a contributory pension also reduces the probability of other members having formal or waged jobs, but does not affect the number of working hours per week. Receiving pensions reduces the probability of labour market participation. However, receiving pensions does not reduce the working time of people who are currently working.

Overall, our findings appear to support the hypothesis of cash transfers having disincentive effects. Bertrand et al. (2003) report similar results for the case of South Africa. Elderly Egyptians who receive contributory pensions may transfer part of the money to other family members, giving more to those that are needy. This seems to produce two different effects. First, the extra income augments the consumption of leisure and reduces the effort to search for work. Second, the family safety net allowed by intra-family distribution of cash transfers from the elderly produces disincentive effects in exactly the same way as public safety nets. If the needy family members who receive more from the elderly work more and increase their income, the elderly may decrease the amount of money they transfer to them. Those two effects reduce the labour supply of the household members.

Several empirical studies find a positive effect of cash transfers on children's education (Barrientos and DeJong 2006; Duflo 2003). If pensions can reduce young people's work burden and encourage them to attend school, they can

have a long-term effect on human capital formation and income. However, the last column of Table 1 shows no significant effect of the receipt of pensions on education enrolment of young people aged 15–22.

**Table 4:** Fixed-effect regression of labour supply of people aged 15–60

| | Aged 15–60 | | | | Aged 15–22 |
|---|---|---|---|---|---|
| Explanatory variable | Having worked (yes=1, no=0) | Having job in the formal sector (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week | Currently attending school (yes=1, no=0) |
| Households receiving contributory pension | –0.0660*** | –0.0785*** | –0.0907*** | –0.0165 | –0.0024 |
| | (0.0149) | (0.0113) | (0.0127) | (0.0251) | (0.0184) |
| Households receiving social pension | –0.0160 | –0.0205 | 0.0017 | 0.0119 | –0.0008 |
| | (0.0204) | (0.0135) | (0.0147) | (0.0351) | (0.0256) |
| Number of schooling years | 0.0067* | 0.0078** | 0.0053 | 0.0115 | –0.0813*** |
| | (0.0039) | (0.0038) | (0.0042) | (0.0081) | (0.0070) |
| Household size | 0.0114*** | 0.0013 | –0.0027 | –0.0004 | –0.0124*** |
| | (0.0025) | (0.0018) | (0.0023) | (0.0052) | (0.0036) |
| Proportion of children below 15 in household | –0.0089 | 0.0342* | –0.0075 | 0.1031** | 0.3543*** |
| | (0.0295) | (0.0197) | (0.0232) | (0.0466) | (0.0400) |
| Proportion of elderly above 60 in household | –0.2035*** | –0.1510*** | –0.1768*** | –0.0052 | –0.1391* |
| | (0.0423) | (0.0332) | (0.0353) | (0.1100) | (0.0743) |
| Proportion of female members | 0.0952** | 0.0501* | 0.0475 | –0.0437 | 0.0836* |
| | (0.0399) | (0.0282) | (0.0338) | (0.0703) | (0.0435) |
| Head is male (male=1, female=0) | 0.0213 | –0.0197* | –0.0450*** | 0.0512 | 0.0792*** |
| | (0.0219) | (0.0118) | (0.0166) | (0.0391) | (0.0220) |
| Household head aged below 31 | *Reference* | | | | |
| Household head aged 31–40 | –0.0572*** | –0.0256** | –0.0493*** | –0.0387 | 0.1057*** |
| | (0.0165) | (0.0120) | (0.0144) | (0.0236) | (0.0171) |
| Household head aged 41–50 | –0.0831*** | –0.0461*** | –0.0644*** | –0.0176 | 0.1228*** |
| | (0.0197) | (0.0137) | (0.0172) | (0.0296) | (0.0222) |
| Household head aged 51–60 | –0.0803*** | –0.0370** | –0.0447** | –0.0056 | 0.1148*** |
| | (0.0221) | (0.0159) | (0.0194) | (0.0381) | (0.0227) |
| Household head aged 61+ | –0.0777*** | –0.0592*** | –0.0451* | –0.0186 | 0.0816** |
| | (0.0280) | (0.0196) | (0.0233) | (0.0482) | (0.0326) |
| Number of schooling years of head | 0.0022 | 0.0014 | 0.0031* | –0.0061 | –0.0080*** |
| | (0.0021) | (0.0017) | (0.0017) | (0.0038) | (0.0022) |
| Dummy year 2012 (1 for 2012, 0 for 2006) | –0.0771*** | –0.0008 | 0.0126** | –0.0869*** | –0.2464*** |
| | (0.0065) | (0.0047) | (0.0056) | (0.0102) | (0.0131) |
| Constant | 0.5933*** | 0.2171*** | 0.4023*** | 3.7281*** | 0.9860*** |
| | (0.0455) | (0.0371) | (0.0411) | (0.0840) | (0.0760) |
| Observations | 30,724 | 30,724 | 30,724 | 17,236 | 11,740 |
| Number of individuals | 15,362 | 15,362 | 15,362 | 10,829 | 5,870 |
| R-squared | 0.05 | 0.04 | 0.03 | 0.04 | 0.49 |

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

**Source:** Authors' estimation based on the 2006 and 2012 ELMPS.

Social pensions have no significant effect on either employment or education. A possible reason is that social pensions are significantly lower than contributory

pensions. The small amount of a social pension is not enough to decrease recipients' incentive to work. To further analyse this issue we define two social pension dummies: the first indicates the receipt of a social pension that is below the average, and the second indicates the receipt of a social pension equal to or larger than the average. We re-run regressions of labour supply on these two dummies of social pension receipt. The results are reported in Table A.2 in the Appendix. Both dummies are still not statistically significant.

Pensions can help decrease the working rate of the elderly (e.g., Snyder and Evans 2006; De Carvalho Filho 2008; Kassouf and Oliveira 2012). Some old age people who received a contributory or non-contributory pension are still working for either self-employed or employed job. Table 5 shows that having contributory pensions decreases the probability of the elderly aged 60 years and over working by 0.082, equivalent to 50% of the average proportion of working people. The effect of pensions on labour market participation is higher for the elderly than for young Egyptians. Old people with pensions are less likely to have a waged job than those without pensions.

The effect of the receipt of social pensions is negative and significant in the regressions of the probability of having a formal job and the probability of having a waged job. Although the effect of the receipt of social pensions on working is not statistically significant, it shows a clear trend that social pensions reduce working for older people.

We also run regression of work variables on two social pension dummies indicating low and high amounts of social pension (reported in Table A.2 in the Appendix). The results show that only the receipt of high social pensions has a negative and significant effect on older people working. Thus a higher pension amount can have a stronger work disincentive.

Interestingly, the effect of social pension receipt on the hours worked by working people is positive and not statistically significant. So for people who are still working, receipt of social pensions does not reduce the time worked.

**Table 5:** Fixed-effect regression of labour supply of people aged over 60

| Explanatory variable | Having worked (yes=1, no=0) | Having job in the formal sector (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week |
|---|---|---|---|---|
| Households receiving contributory pension | −0.0821** | −0.0277 | −0.0395*** | −0.0152 |
| | (0.0365) | (0.0302) | (0.0152) | (0.2575) |
| Households receiving social pension | −0.0480 | −0.0224* | −0.0212* | 0.0669 |
| | (0.0377) | (0.0135) | (0.0110) | (0.1690) |
| Number of schooling years | 0.0041 | 0.0040 | 0.0073 | 0.4477* |
| | (0.0125) | (0.0073) | (0.0071) | (0.2610) |
| Household size | 0.0154 | −0.0088* | −0.0063 | 0.0049 |
| | (0.0095) | (0.0052) | (0.0047) | (0.0378) |
| Proportion of children below 15 in household | −0.3081*** | −0.1409*** | −0.0969** | −0.5571 |
| | (0.1140) | (0.0526) | (0.0484) | (0.5834) |
| Proportion of elderly above 15 in household | 0.0003 | −0.1828*** | −0.1295* | −0.7125 |
| | (0.0961) | (0.0700) | (0.0748) | (0.4743) |
| Proportion of female members | 0.0333 | −0.0162 | 0.1740* | 0.9515 |
| | (0.1329) | (0.0450) | (0.0995) | (0.8055) |
| Head is male (male=1, female=0) | 0.0539 | −0.0215 | 0.0488 | −0.2761 |
| | (0.0767) | (0.0236) | (0.0368) | (0.4292) |
| Household head aged 30 and younger | *Reference* | | | |
| Household head aged 31–40 | −0.0826 | 0.0326** | 0.0293* | −2.4613*** |
| | (0.1112) | (0.0165) | (0.0171) | (0.7577) |
| Household head aged 41–50 | −0.0706 | 0.0246 | 0.0276* | −1.6774* |
| | (0.1144) | (0.0186) | (0.0160) | (0.9311) |
| Household head aged 51–60 | 0.0376 | 0.0164 | 0.0350 | −4.9895* |
| | (0.1249) | (0.0276) | (0.0228) | (2.6737) |
| Household head aged 61+ | −0.0014 | 0.0753* | 0.0548 | −5.1807* |
| | (0.1340) | (0.0389) | (0.0400) | (2.7716) |
| Number of schooling years of head | −0.0081 | 0.0005 | 0.0002 | −0.4058* |
| | (0.0067) | (0.0016) | (0.0014) | (0.2459) |
| Dummy year 2012 (1 for 2012, 0 for 2006) | 0.3402* | 0.1642*** | −0.0434 | −0.2362** |
| | (0.1807) | (0.0610) | (0.0704) | (0.1014) |
| Constant | −0.2182*** | −0.0353*** | −0.0243*** | 8.8947*** |
| | (0.0176) | (0.0081) | (0.0076) | (2.4329) |
| Observations | 2,872 | 2,872 | 2,872 | 496 |
| Number of individuals | 1,436 | 1,436 | 1,436 | 379 |
| R-squared | 0.21 | 0.08 | 0.07 | 0.28 |

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

**Source:** Authors' estimation based on the 2006 and 2012 ELMPS.

### 5.2. Heterogeneous impact of pensions

Previous studies show the heterogeneous effect of cash transfers on labour supply (Moffitt 2002; 2014). An important issue is whether pensions have a differential effect on labour supply in Egypt. We include interactions between pension variables and other individual characteristics in regressions of the probability of working and the probability of having a waged job. The results of the interactions in the regression of the two dependent variables are very similar. In this section we interpret the results from the regressions of the probability of working. Table 6 presents the coefficients of pensions and interaction terms in regressions of the probability of working. In these tables we do not report the coefficients of control variables. The full regression results are presented in Tables A.2 and A.3 in the Appendix.

Table 6 shows that pensions have a differential impact on employment. Several empirical studies find that the effect of cash transfers on labour supply differs between men and women (Bertrand et al. 2003; Maluccio and Flores 2005; Abel 2014). In the case of Egypt, we find that the effect of the receipt of contributory pensions on the probability of working is higher for men than for women. One possible explanation is that for cultural reasons, Egyptian women have a lower bargaining power than men living in the same household, particularly when the men are highly educated. Moreover, women may show more altruism towards other family members than men. Bertrand et al. (2003) reach similar findings in the case of South Africa.

Table 6 also shows that people with higher levels of education are significantly less likely to participate in the labour market when they live with a pensioner than people with lower education levels. The effect is also higher for urban people than for rural people. This implies that when receiving pensions, individuals in high-income households are less likely to work than individuals in other households. It is possible that high-income people derive higher utility from leisure than low-income people. At high levels of income the elasticity of labour supply to income is larger. In addition, people in urban areas with high levels of education are more likely to have a waged job rather than being self-employed or working at home. Thus the labour-increasing effect of pensions through promotion of home production, if any, is smaller in urban than in rural areas.

**Table 6:** Fixed-effect regression of working status with interactions

| Explanatory variable | People aged 15–60 | | | People aged 60 and older | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| Households receiving | 0.0132 | −0.0112 | −0.0479** | 0.0145 | −0.0320 | −0.0174 |
| contributory pension | (0.0208) | (0.0240) | (0.0191) | (0.0436) | (0.0403) | (0.0490) |
| Households receiving social | 0.0107 | 0.0131 | −0.0056 | 0.0037 | −0.0289 | −0.0138 |
| pension | (0.0319) | (0.0301) | (0.0222) | (0.0431) | (0.0393) | (0.0431) |
| Households receiving | −0.1699*** | | | −0.2272*** | | |
| contributory pension×male | (0.0269) | | | (0.0712) | | |
| Hh. receiving social | −0.0543 | | | −0.1237 | | |
| pension×male | (0.0368) | | | (0.0869) | | |
| Hh. receiving contributory | | −0.0072*** | | | −0.0234*** | |
| pension×Number of schooling years | | (0.0024) | | | (0.0074) | |
| Hh. receiving social | | −0.0054 | | | −0.0129 | |
| pension×Number of schooling years | | (0.0036) | | | (0.0193) | |
| Hh. receiving contributory | | | −0.0491* | | | −0.2062*** |
| pension×urban | | | (0.0267) | | | (0.0605) |
| Hh. receiving social | | | −0.0792* | | | −0.1892*** |
| pension×urban | | | (0.0450) | | | (0.0635) |
| Control variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.5966*** | 0.5847*** | 0.5944*** | 0.3488* | 0.3028* | 0.3706** |
| | (0.0456) | (0.0452) | (0.0456) | (0.1808) | (0.1771) | (0.1774) |
| Observations | 30,724 | 30,724 | 30,724 | 2,872 | 2,872 | 2,872 |
| Number of individuals | 15,362 | 15,362 | 15,362 | 1,436 | 1,436 | 1,436 |
| Within R-squared | 0.06 | 0.06 | 0.05 | 0.22 | 0.21 | 0.21 |

Robust standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
**Source:** Authors' estimation based on the 2006 and 2012 ELMPS.

## 6. CONCLUSIONS

This study explores the patterns of contributory and social pensions in Egypt and investigates their effect on households' labour supply. The data is sourced from Egypt Labour Market Panel Surveys in 2006 and 2012. Our empirical findings show that the receipt of contributory pensions reduces the probability

of working for people aged 15 to 60 and over. We also find that contributory pensions have a differential impact. When living in a household that receives pensions, males, urban people, and those with high levels of education are less likely to work than female, rural people, and those with low levels of education, respectively.

Receiving social pensions has no significant effect on the work status of people aged 15–60. For those aged over 60, larger social pensions reduce the probability of working and having a waged job. This indicates that a possible reason why social pensions do not have a significant effect on young people's working habits is that social pensions are too small to decrease the incentive to work.

Taken together, our findings suggest that there might be intra-household redistribution of pensions, with some of the money ending up in the hands of non-targeted members. This appears to create distinctive effects and to lead to reduced participation of household members in the labour market. The decrease in labour supply can reduce the total income and mitigate the poverty-reducing effect of pensions, especially in the case of Egypt, a country with a low rate of labour force participation. To build more effective pension and social protection policies, Egyptian policymakers should take into account intra-household redistribution of the transferred money and the unintended effects of the policies on labour supply.

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## APPENDICES

**Table A.1.** Summary statistics of explanatory variables

| Variable | Type | 2006 | | 2012 | |
|---|---|---|---|---|---|
| | | Mean | Std. Dev. | Mean | Std. Dev. |
| Individual-level variables | | | | | |
| Age | Discrete | 36.40 | 15.96 | 38.56 | 17.49 |
| Male (male=1, female=0) | Binary | 0.482 | 0.500 | 0.492 | 0.500 |
| Number of schooling years | Discrete | 7.295 | 5.598 | 8.067 | 5.388 |
| Household-level variables | | | | | |
| Household size | Discrete | 5.747 | 2.924 | 4.812 | 2.319 |
| Proportion of children below 15 in household | Continuous | 0.250 | 0.214 | 0.236 | 0.227 |
| Proportion of elderly above 15 in household | Continuous | 0.095 | 0.194 | 0.130 | 0.250 |
| Proportion of female members | Continuous | 0.497 | 0.180 | 0.502 | 0.196 |
| Head is male (male=1, female=0) | Binary | 0.849 | 0.359 | 0.825 | 0.380 |
| Household head aged below 31 | Binary | 0.071 | 0.257 | 0.079 | 0.270 |
| Household head aged 31–40 | Binary | 0.155 | 0.362 | 0.152 | 0.359 |
| Household head aged 41–50 | Binary | 0.277 | 0.447 | 0.252 | 0.434 |
| Household head aged 51–60 | Binary | 0.288 | 0.453 | 0.275 | 0.446 |
| Household head aged 61+ | Binary | 0.209 | 0.407 | 0.242 | 0.428 |
| Number of schooling years of head | Discrete | 6.212 | 5.968 | 7.333 | 5.757 |
| Urban (urban=1, rural=0) | Binary | 0.355 | 0.479 | 0.351 | 0.477 |

**Source:** Authors' estimation based on the 2012 ELMPS

**Table A.2:** Fixed-effect regression of labour supply using low and high amount

| Explanatory variable | People aged 15–60 | | | People aged 60 and older | | |
|---|---|---|---|---|---|---|
| | Having worked (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week | Having worked (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week |
| Households receiving contributory pension | –0.0679*** | –0.0905*** | –0.0129 | –0.0825** | –0.0394*** | –0.0127 |
| | (0.015) | (0.013) | (0.025) | (0.037) | (0.015) | (0.256) |
| Households receiving a low amount of social pension | –0.019 | –0.0078 | –0.0002 | –0.0118 | –0.0147 | 0.0039 |
| | (0.023) | (0.016) | (0.042) | (0.043) | (0.015) | (0.215) |
| Households receiving a high amount of social pension | –0.0417 | 0.0270 | 0.0147 | –0.0965* | –0.0261** | 0.1306 |
| | (0.030) | (0.022) | (0.046) | (0.051) | (0.011) | (0.225) |
| Number of schooling years | 0.0071* | 0.0056 | 0.0075 | 0.0036 | 0.0073 | 0.4662* |
| | (0.004) | (0.004) | (0.008) | (0.013) | (0.007) | (0.268) |
| Household size | 0.0114*** | –0.0027 | –0.0009 | 0.0150 | –0.0062 | 0.0053 |
| | (0.003) | (0.002) | (0.005) | (0.009) | (0.005) | (0.038) |
| Proportion of children below 15 in household | –0.0096 | –0.0061 | 0.1091** | –0.3177*** | –0.0955** | –0.5802 |
| | (0.030) | (0.023) | (0.047) | (0.112) | (0.048) | (0.593) |
| Proportion of elderly above 15 in household | –0.2016*** | –0.1771*** | 0.0025 | –0.0056 | –0.1287* | –0.7193 |
| | (0.042) | (0.035) | (0.111) | (0.095) | (0.074) | (0.475) |
| Proportion of female members | 0.0946** | 0.0452 | –0.0585 | 0.0327 | 0.1740* | 1.0217 |
| | (0.040) | (0.034) | (0.071) | (0.134) | (0.099) | (0.781) |
| Head is male (male=1, female=0) | 0.0203 | –0.0446*** | 0.0426 | 0.0545 | 0.0487 | –0.1992 |
| | (0.022) | (0.017) | (0.039) | (0.077) | (0.037) | (0.427) |

| Explanatory variable | People aged 15–60 | | | People aged 60 and older | | |
|---|---|---|---|---|---|---|
| | Having worked (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week | Having worked (yes=1, no=0) | Having waged job (yes=1, no=0) | Log of number of working hours per week |
| Household head aged 30 and younger | *Reference* | | | | | |
| Household head aged 31–40 | –0.0581*** | –0.0495*** | –0.0248 | –0.0848 | 0.0296* | –2.5072*** |
| | (0.017) | (0.014) | (0.023) | (0.110) | (0.017) | (0.763) |
| Household head aged 41–50 | –0.0842*** | –0.0655*** | 0.0023 | –0.0644 | 0.0268* | –1.7289* |
| | (0.020) | (0.017) | (0.029) | (0.113) | (0.016) | (0.940) |
| Household head aged 51–60 | –0.0814*** | –0.0455** | 0.0095 | 0.0420 | 0.0344 | –5.1621* |
| | (0.022) | (0.019) | (0.038) | (0.124) | (0.023) | (2.734) |
| Household head aged 61+ | –0.0784*** | –0.0461** | –0.0056 | 0.0126 | 0.0529 | –5.3648* |
| | (0.028) | (0.023) | (0.048) | (0.133) | (0.039) | (2.836) |
| Number of schooling years of head | 0.0021 | 0.0031* | –0.0055 | –0.0077 | 0.0002 | –0.4238* |
| | (0.002) | (0.002) | (0.004) | (0.007) | (0.001) | (0.252) |
| Dummy year 2012 (1 for 2012, 0 for 2006) | –0.0744*** | 0.0110* | –0.0923*** | –0.2092*** | –0.0255*** | –0.2501** |
| | (0.007) | (0.006) | (0.011) | (0.018) | (0.008) | (0.108) |
| Constant | 0.5839*** | 0.4012*** | 3.7645*** | 0.3290* | –0.0419 | 8.9814*** |
| | (0.046) | (0.042) | (0.085) | (0.180) | (0.070) | (2.483) |
| Observations | 30,724 | 30,724 | 17,236 | 2,872 | 2,872 | 496 |
| Number of individuals | 15,362 | 15,362 | 10,829 | 1,436 | 1,436 | 379 |
| R-squared | 0.055 | 0.031 | 0.0410 | 0.208 | 0.072 | 0.280 |

Robust standard errors in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1%.

**Source:** Authors' estimation based on the 2006 and 2012 ELMPSs.

## **Table A.3.** Regressions with interactions: sample of people aged 15–60

| Explanatory variable | Having worked (yes=1, no=0) | | | Having waged job (yes=1, no=0) | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| Households receiving contributory pension | 0.0132 | –0.0112 | –0.0479** | 0.0021 | –0.0429*** | –0.0759*** |
| | (0.0208) | (0.0240) | (0.0191) | (0.0115) | (0.0163) | (0.0156) |
| Households receiving social pension | 0.0107 | 0.0131 | –0.0056 | 0.0297** | 0.0205 | 0.0077 |
| | (0.0319) | (0.0301) | (0.0222) | (0.0119) | (0.0167) | (0.0159) |
| Households receiving contributory pension×male | –0.1699*** | | | –0.1990*** | | |
| | (0.0269) | | | (0.0247) | | |
| Households receiving social pension×male | –0.0543 | | | –0.0561* | | |
| | (0.0368) | | | (0.0311) | | |
| Hh. receiving contribu. pension ×Number of schooling years | | –0.0072*** | | | –0.0062*** | |
| | | (0.0024) | | | (0.0021) | |
| Hh. receiving social pension ×Number of schooling years | | –0.0054 | | | –0.0033 | |
| | | (0.0036) | | | (0.0029) | |
| Households receiving contributory pension×urban | | | –0.0491* | | | –0.0398 |
| | | | (0.0267) | | | (0.0253) |
| Households receiving social pension×urban | | | –0.0792* | | | –0.0395 |
| | | | (0.0450) | | | (0.0396) |
| Number of schooling years | 0.0065* | 0.0087** | 0.0067* | 0.0052 | 0.0070* | 0.0053 |
| | (0.0039) | (0.0039) | (0.0039) | (0.0042) | (0.0042) | (0.0042) |
| Household size | 0.0113*** | 0.0115*** | 0.0111*** | –0.0028 | –0.0026 | –0.0029 |
| | (0.0025) | (0.0025) | (0.0025) | (0.0023) | (0.0023) | (0.0023) |
| Proportion of children below 15 in household | –0.0065 | –0.0115 | –0.0088 | –0.0046 | –0.0095 | –0.0075 |
| | (0.0296) | (0.0295) | (0.0295) | (0.0231) | (0.0232) | (0.0232) |

| Explanatory variable | Having worked (yes=1, no=0) | | | Having waged job (yes=1, no=0) | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| Proportion of elderly above 15 in household | –0.1975*** | –0.1949*** | –0.1976*** | –0.1698*** | –0.1696*** | –0.1719*** |
| | (0.0418) | (0.0416) | (0.0419) | (0.0344) | (0.0344) | (0.0347) |
| Proportion of female members | 0.0782* | 0.0910** | 0.0944** | 0.0276 | 0.0438 | 0.0467 |
| | (0.0400) | (0.0400) | (0.0400) | (0.0338) | (0.0340) | (0.0338) |
| Head is male (male=1, female=0) | 0.0173 | 0.0189 | 0.0203 | –0.0495*** | –0.0470*** | –0.0457*** |
| | (0.0219) | (0.0219) | (0.0219) | (0.0168) | (0.0167) | (0.0166) |
| Household head aged below 31 | Reference | | | | | |
| Household head aged 31–40 | –0.0551*** | –0.0574*** | –0.0565*** | –0.0469*** | –0.0493*** | –0.0487*** |
| | (0.0165) | (0.0165) | (0.0164) | (0.0144) | (0.0143) | (0.0143) |
| Household head aged 41–50 | –0.0785*** | –0.0831*** | –0.0821*** | –0.0590*** | –0.0642*** | –0.0635*** |
| | (0.0198) | (0.0197) | (0.0197) | (0.0173) | (0.0172) | (0.0171) |
| Household head aged 51–60 | –0.0731*** | –0.0791*** | –0.0780*** | –0.0364* | –0.0435** | –0.0431** |
| | (0.0221) | (0.0220) | (0.0220) | (0.0196) | (0.0194) | (0.0193) |
| Household head aged 61+ | –0.0675** | –0.0777*** | –0.0767*** | –0.0333 | –0.0448* | –0.0446* |
| | (0.0280) | (0.0280) | (0.0280) | (0.0233) | (0.0233) | (0.0233) |
| Number of schooling years of head | 0.0024 | 0.0018 | 0.0023 | 0.0034* | 0.0027 | 0.0032* |
| | (0.0021) | (0.0021) | (0.0021) | (0.0018) | (0.0018) | (0.0017) |
| Dummy of Year 2012 | –0.0788*** | –0.0780*** | –0.0775*** | 0.0107* | 0.0119** | 0.0125** |
| | (0.0065) | (0.0065) | (0.0065) | (0.0057) | (0.0056) | (0.0056) |
| Constant | 0.5966*** | 0.5847*** | 0.5944*** | 0.4061*** | 0.3953*** | 0.4034*** |
| | (0.0456) | (0.0452) | (0.0456) | (0.0413) | (0.0409) | (0.0412) |
| Observations | 30,724 | 30,724 | 30,724 | 30,724 | 30,724 | 30,724 |
| Number of individuals | 15,362 | 15,362 | 15,362 | 15,362 | 15,362 | 15,362 |
| R-squared | 0.06 | 0.06 | 0.05 | 0.04 | 0.03 | 0.03 |

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

**Source:** Authors' estimation based on the 2012 ELMPS.

## **Table A.4.** Regressions with interactions: sample of people aged 60 and older

| Explanatory variable | Having worked (yes=1, no=0) | | | Having waged job (yes=1, no=0) | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| Households receiving contributory pension | 0.0145 | –0.0320 | –0.0174 | –0.0012 | –0.0159 | –0.0362* |
| | (0.0436) | (0.0403) | (0.0490) | (0.0044) | (0.0150) | (0.0199) |
| Households receiving social pension | 0.0037 | –0.0289 | –0.0138 | –0.0068 | –0.0090 | –0.0186 |
| | (0.0431) | (0.0393) | (0.0431) | (0.0048) | (0.0119) | (0.0128) |
| Households receiving contributory pension×male | –0.2272*** | | | –0.0911*** | | |
| | (0.0712) | | | (0.0335) | | |
| Households receiving social pension×male | –0.1237 | | | –0.0316 | | |
| | (0.0869) | | | (0.0294) | | |
| Hh. receiving contribu. pension ×Number of schooling years | | –0.0234*** | | | –0.0112 | |
| | | (0.0074) | | | (0.0072) | |
| Hh. receiving social pension ×Number of schooling years | | –0.0129 | | | –0.0096* | |
| | | (0.0193) | | | (0.0056) | |
| Households receiving contributory pension×urban | | | –0.2062*** | | | –0.0108 |
| | | | (0.0605) | | | (0.0285) |
| Households receiving social pension×urban | | | –0.1892*** | | | –0.0178 |
| | | | (0.0635) | | | (0.0189) |

| Explanatory variable | Having worked (yes=1, no=0) | | | Having waged job (yes=1, no=0) | | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 3 | Model 1 | Model 2 | Model 3 |
| Number of schooling years | 0.0026 | 0.0197 | 0.0024 | 0.0069 | 0.0150* | 0.0072 |
| | (0.0126) | (0.0141) | (0.0125) | (0.0072) | (0.0078) | (0.0071) |
| Household size | 0.0141 | 0.0151 | 0.0146 | −0.0068 | −0.0064 | −0.0063 |
| | (0.0095) | (0.0096) | (0.0096) | (0.0047) | (0.0047) | (0.0047) |
| Proportion of children below 15 in household | −0.3050*** | −0.3050*** | −0.3157*** | −0.0963** | −0.0952** | −0.0977** |
| | (0.1129) | (0.1134) | (0.1132) | (0.0489) | (0.0485) | (0.0487) |
| Proportion of elderly above 15 in household | −0.0080 | −0.0000 | −0.0101 | −0.1330* | −0.1302* | −0.1300* |
| | (0.0964) | (0.0972) | (0.0963) | (0.0749) | (0.0754) | (0.0749) |
| Proportion of female members | 0.0280 | 0.0364 | 0.0283 | 0.1730* | 0.1756* | 0.1737* |
| | (0.1333) | (0.1325) | (0.1330) | (0.0996) | (0.0996) | (0.0996) |
| Head is male (male=1, female=0) | 0.0525 | 0.0546 | 0.0534 | 0.0488 | 0.0493 | 0.0486 |
| | (0.0781) | (0.0767) | (0.0767) | (0.0369) | (0.0368) | (0.0367) |
| Household head aged below 31 | Reference | | | | | |
| Household head aged 31–40 | −0.0846 | −0.0738 | −0.0745 | 0.0278 | 0.0330** | 0.0296* |
| | (0.1085) | (0.1075) | (0.1070) | (0.0180) | (0.0157) | (0.0170) |
| Household head aged 41–50 | −0.0743 | −0.0732 | −0.0630 | 0.0240 | 0.0254* | 0.0282* |
| | (0.1128) | (0.1113) | (0.1101) | (0.0169) | (0.0148) | (0.0159) |
| Household head aged 51–60 | 0.0421 | 0.0506 | 0.0573 | 0.0349 | 0.0401* | 0.0362 |
| | (0.1230) | (0.1213) | (0.1209) | (0.0233) | (0.0211) | (0.0228) |
| Household head aged 61+ | 0.0016 | 0.0159 | 0.0211 | 0.0543 | 0.0627 | 0.0562 |
| | (0.1342) | (0.1306) | (0.1309) | (0.0402) | (0.0388) | (0.0403) |
| Number of schooling years of head | −0.0067 | −0.0067 | −0.0074 | 0.0007 | 0.0008 | 0.0003 |
| | (0.0068) | (0.0068) | (0.0068) | (0.0013) | (0.0013) | (0.0014) |
| Dummy of Year 2012 | −0.2120*** | −0.2180*** | −0.2185*** | −0.0222*** | −0.0239*** | −0.0243*** |
| | (0.0175) | (0.0174) | (0.0176) | (0.0074) | (0.0073) | (0.0076) |
| Constant | 0.3488* | 0.3028* | 0.3706** | −0.0388 | −0.0618 | −0.0419 |
| | (0.1808) | (0.1771) | (0.1774) | (0.0704) | (0.0686) | (0.0709) |
| Observations | 2,872 | 2,872 | 2,872 | 2,872 | 2,872 | 2,872 |
| Number of individuals | 1,436 | 1,436 | 1,436 | 1,436 | 1,436 | 1,436 |
| R-squared | 0.22 | 0.21 | 0.21 | 0.08 | 0.08 | 0.07 |

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

**Source:** Authors' estimation based on the 2012 ELMPS.