I Z A Institute
of Labor Economics
Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 10425

The Power of Social Pensions

Wei Huang
Chuanchuan Zhang

DECEMBER 2016

I Z A Institute
of Labor Economics

Initiated by Deutsche Post Foundation

DISCUSSION PAPER SERIES

IZA DP No. 10425

The Power of Social Pensions

Wei Huang
Harvard University, NBER and IZA

Chuanchuan Zhang
Central University of Finance and Economics

DECEMBER 2016

IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

The Power of Social Pensions*

This paper examines the impacts of social pension provision among people of different ages. Utilizing the county-by-county rollout of the New Rural Pension Scheme in rural China, we find that, among the age-eligible people, the scheme provision leads to higher household income (18 percent) and food expenditure (10 percent), lower labor supply (6 percent), and better health (11-14 percent). In addition, among the age-ineligible adults, the pension scheme shifts them from farming to non-farming work, lowers insurance participation rate, but does not change income, expenditure or health significantly. Finally, among the children aged below 15, the pension scheme leads to more pocket money received, more caring from grandparents, improved health, and higher schooling rate.

JEL Classification: E21, H55, I38, O22
Keywords: pension, health, elderly

Corresponding author:
Wei Huang
Department of Economics
Harvard University
1805 Cambridge Street
Cambridge, MA 02138
USA
E-mail: huangw@nber.org

* We thank Amitabh Chandra, David Cutler, Richard Freeman, Edward Glaeser, Lawrence Katz, and Adriana Lleras-Muney for their constructive suggestions. We also thank the participants at different seminars and conferences for their helpful comments. Wei Huang is also grateful for the financial support from NBER Pre- and Post-Doctoral Fellowship Program on the Economics of an Aging Workforce. Chuanchuan Zhang thanks for the financial supports from the National Natural Science Foundation of China (71503282), the Young Elite Teacher Project of Central University of Finance and Economics (QYP1609) and the Fundamental Research Funds for the Central Universities. All errors are ours.

"To care for those who once cared for us is one of the highest honors."

— Tia Walker, The Inspired Caregiver: Finding Joy While Caring for Those You Love

1 Introduction

As the world is aging rather rapidly, many countries are considering to start or reform social pension programs to better support the lives of the elderly. A natural question to ask is how much impact of social pensions have on the individual behaviors and welfare of the elderly. Since the governments usually are faced with tight fiscal budget, the answer to this question is crucial because the effects are key parameters for evaluating and designing efficient pension programs and retirement policies.

In spite of a long literature on this topic, the answers are still far from satisfactory. First, the exogenous shock in pension wealth usually exhibits little variation. For example, the social pension expansion in South Africa is universal (Duflo, 2000, 2003; Case, 2001; Jensen, 2004). In addition, the changes in pension benefits in industrial countries are usually based on individual previous earnings and thus could be correlated with underlying personal tastes or characteristics (Coile and Gruber, 2000; Chan and Stevens, 2004). Some findings in this literature even conflict. For instance, Snyder and Evans (2006) find that higher pension income leads to higher mortality because of social isolation, while other studies find that higher pension income leads to better health status (Case, 2001) and lower mortality (Jensen and Richter, 2004).

In this paper, we provide new evidence on the effects of a pension provision on income, labor supply, expenditure, health status, and mortality, etc. We first estimate the effect of a social pension provision on mortality using historical aggregate-level data from 10 countries. We use the official starting years of the social pension programs as exogenous shocks, and identify the effects of the pension provision in a Regression Discontinuity (RD) framework. Among the pension-eligible people , we find a significant 1.7-2.2 percent drop in mortality immediately after the introduction of the pension programs. In contrast, among the pension-ineligible people , the comparable effects

are much smaller and statistically insignificant.

The New Rural Pension Scheme (NRPS) in China, combining with two largest ongoing individual surveys, offers a unique opportunity to provide micro-level empirical evidence for the effects of pension schemes.[1] The NRPS, launched in 2009, was rolling out in a county-by-county basis, and covered all the counties in mainland China by the end of 2012. Once the county was covered, all the local rural people aged 16 or above were able to *voluntarily* enroll, and the enrollees with age 60 and older could receive a fixed amount of pension, 55 yuan per month (i.e., about $9 US dollars, 15 percent of the median of the household income per capita in the rural areas by the end of 2009), regardless of previous earnings or income.[2] Meanwhile, the two largest ongoing individual surveys provide a nationally representative sample, with over 70,000 observations from more than 300 counties in China, and also cover the years from 2010 to 2013, exactly when the NRPS expanded. Following the methodology in the previous literature (e.g., Hoynes et al., 2012, 2016) we utilize the county-by-county rollout of the NRPS and employ the Difference-in-Differences (DID) methodology to identify the consequential effects.

We first examine the impact of the NRPS on income and expenditure. Consistent with the NRPS policy design, the rural age-eligible people (i.e., pension-eligible group) are 25 percentage points more likely to receive a pension immediately after the introduction of the NRPS. In contrast, we do not find any significant effects on pension receipt among the rural people aged below 60 or among the urban people. Among the pension-eligible group, we also find that 1) the NRPS significantly increases household income and food expenditure by 17.6 and 9.6 percent, respectively; and 2) the program also significantly reduces the labor supply by 3.0 percentage points (6.2 percent), and most of this effect originates from the significant decline in farm work with little change in

[1] The NRPS is an unprecedented welfare program having covered the largest population in human history. By the end of 2012, the central and local governments have input more than 262 billion yuan in the NRPS, with more than 232 billion from the central government. With a total cost of 0.11 percent of GDP and 2.0 percent of government expenditure in 2012, 89 million rural seniors started to receive pensions in 2012. By the end of 2014, the number of pensioners further increased to 140 million, and the total number of rural participants was approximately 426 million (65 percent) .

[2] As a condition, the offsprings of pensioners have to participate in the program and pay the pension premiums if their age is below 60. The age-ineligible enrollees need to choose one of the following levels of annual contribution: 100, 200, 300, 400, or 500 RMB. They have to pay for the premium annually until they reach age 60.

non-farm work. In addition, we do not find significant evidence that the pension program crowds out the private transfers received by the seniors or alters the living arrangement or migration of the elderly. In contrast, for the pension-ineligible groups, we do not find evidence for any significant effects on household income, expenditure, private transfers or living arraignment.[3]

We follow the same methodology and find the NRPS significantly improves the health status of the elderly. Among the pension-eligible people, we find that 1) the NRPS coverage reduces the rates of disability, underweight, and mortality by 3.2 percentage points (11.4 percent), 1.8 percentage points (11.3 percent), and 2.2 percentage points (14.4 percent), respectively;[4] and 2) consistent with the findings in Bitler et al. (2005), the program also crowds out the health insurance participation by 4.2 percentage points (5.7 percent). The effects on health insurance participation actually reflects the net effects from two aspects: higher demand in insurance because of income effects while lower demand caused by the improved health status. Meanwhile, we do not find any significant effects on health behaviors like smoking or medical care usage such as inpatient and outpatient cares. As a comparison, we do not find any significant effects on all the above health outcomes among those pension-ineligible groups.

We then go further to investigate the potential effects of the NRPS on the outcomes of the children. The CFPS provides a separate survey for the children with ages 0-15 and collects the information on demographics, education, health, and living conditions. The results in our paper suggest that the NRPS significantly increases the proportion of children receiving pocket money by 7-8 percentage points. Furthermore, the proportion of boys reporting excellent health and that of preschool boys being cared by their grandparents significantly increase after the introduction of

[3]Interestingly, the exception is that the NRPS shifts the age-ineligible rural people (i.e., those aged between 45 and 59) from farm work to non-farm work - the program significantly reduces the farm work by 5.8 percentage points but increases the non-farm work by 3.3 percentage points. One promising explanation is that the NRPS-induced higher (expected) income deters people to work heavily such as farm work (i.e., deterring effect), while those younger than 60 also need to pay the pension premium currently and thus participate in the cash-paid jobs such as non-farm work (i.e., liquidity effect). Consistently, we find that the deterring effect becomes smaller and insignificant while the liquidity effect is still significant for those aged younger than 50.

[4]The mortality effects are based on a sample from the Chinese Longitudinal Healthy Longevity Survey (CLHLS), composed of those aged over 65 in rural China. Our calculation suggests that the income-mortality elasticity ranges from 0.18 to 0.60; estimates in Jensen and Richter (2004) suggest the elasticity is 0.21 since the mortality increased by 5 percent when the income reduced by 24 percent.

the NRPS. For the girls, the NRPS increases their in-school rate. In particular, the effects on girls' in-school rate are significant in the first few years after age 7 (i.e., the school admission age), and during the years close to age 15 (i.e., the minimum school leaving age).

The validity of the DID estimation may not be taken for granted.[5] The major concern is that the effects from DID may just reflect the potential different trends across the counties.[6] For the counties with different starting years of the NRPS, we separately plot a series of local macroeconomic indices over the years from 2003 throughout 2009, including GDP per capita, salary of workers, government revenue and expenditure, and number of doctors and hospital beds. We do not find any significant unparalleled trends across the counties for these indices. Similarly, we do not find unparalleled pre-trends in mortality using CLHLS data either.

These findings have several important contributions to the ongoing literature. First, the comprehensive analysis on the effects of a pension program builds up the literature investigating the effects of welfare or pension programs on individual behaviors such as expenditure, labor supply, retirement, and health insurance participation (Case and Deaton, 1998; Madrian and Shea, 2001; Attanasio and Rohwedder, 2003; Attanasio and Brugiavini, 2003; Bitler et al., 2005; French, 2005; Ardington et al., 2009; Aizer et al., Forthcoming). In addition, the findings also provide new evidence on the causal mechanisms between income and health (Case and Wilson, 2000; Case, 2001; Frijters et al., 2005; Jensen and Richter, 2004; Snyder and Evans, 2006; Evans and Moore, 2011, 2012; Aizer et al., Forthcoming). Finally, our results on health insurance participation and labor supply for those *hukou* eligible but age-ineligible people are relevant to the literature on the indirect or spill-over effects of public policies (Atalay and Barrett, 2015; Staubli and Zweimüller, 2013; Gustman and Steinmeier, 2015).

[5]To be a pilot site for the NRPS, the counties need to first apply to the provincial government, then to the central government. It is the central government who made the decision of whether to approve the application or not. There are no details about the qualification for the pilot sites in official documents. But some news reports that the officials of the Ministry of Human Resources and Social Security (who are in charge of the NRPS) said the program started earlier in the middle and western regions.

[6]The empirical results above may help to alleviate this concern since they show that the NRPS-induced effects on income and health are much smaller and insignificant among the age-ineligible and *hukou*-ineligible groups.

2 Cross-Country Evidence from Cohort Data Analysis

We start our analysis by using aggregate-level data from 10 countries to investigate whether the introduction of social pensions reduces mortality in human history.

2.1 The Human Mortality Database and Introduction of Social Pensions

Mortality data are from the Human Mortality Database (HMD). The HMD contains detailed cohort life tables by year of birth and gender. A typical observation in the HMD is the mortality rate, per 100,000, for men (women) in a particular year in a particular country at certain age ranging from 0 to 110. The HMD data provide the mortality tables with various years across 38 countries or regions.[7] The country-specific timing of the introduction of social pensions is from Cutler and Johnson (2004) and Pension-Watch website.

We match the HMD data to the countries with available information of the first social pension scheme introduction, and restrict to the countries with both mortality information before and after the introduction of social pensions. These criteria result in a sample of 10 countries: Belgium, Canada, Denmark, Finland, France, Italy, Norway, Sweden, Switzerland, and the United States. Among these countries, the earliest to introduce a social pension is Denmark (1891) and the latest is Italy (1969). Table 1 presents the countries and the introductory year of social pensions in each of them.[8]

2.2 Methodology and Empirical Results

Because both the level and trends in mortality differ largely in a long time panel, we use regression discontinuity (RD) to identify the effects of provision of the social pension programs on mortality. We restrict the sample to those aged above 45 because the elderly people compose the targeted

[7]The country list and available years can be found here: http://www.mortality.org/.

[8]Table 2 of Cutler and Johnson (2004) provides the detailed year of introduction, case of introduction, type of system, and later changes for the social pension in 20 different countries, and the *Pension-Watch* website provides the policy-designed eligible ages for the pension schemes across the countries. The *Pension-Watch* website is http://www.pension-watch.net/about-social-pensions.

Table 1: Social Pension Programs in 10 countries

Country	Year introduced	Age of eligibility
Belgium	1924	65
Canada	1927	65
Denmark	1891	65
Finland	1937	65
France	1956	65
Italy	1969	65 and 3 months
Norway	1936	67
Sweden	1913	65
Switzerland	1948	65 (men) 60 (women)
United States	1937	65

NOTE: Data are from Cutler and Johnson (2004) and Pension-Watch website (http://www.pension-watch.net/about-social-pensions).

population for social pensions. We also drop those aged above 90 because of possible misreporting issues and large measurement errors. For convenience, we define relative year t as the years difference of current year with the first year of social pension programs. For example, t equals to -1 if the current year is the year before the introduction of social pensions, and equals to 1 if the current year is just one year after that.

To control for the invariant factors such as country, gender, and age which may influence mortality, we keep the sample with a 10-year bandwidth (i.e., $\mid t \mid \leqslant 10$), and divide the sample into 900 different groups (s) based on country (10), gender (2), and age (45). Within each group s, we detrend the logarithm of mortality rate over the relative year by regressing the logarithm of mortality on relative year and its square. We then pool the residuals from all the groups.[9] Figures 1a and 1b plot the linearly fit lines and confidential intervals (CIs) over the relative year for the age-eligible (i.e., those older than the pension eligibility age), and the age-ineligible (i.e., those younger than the pension eligibility age), respectively. Figure 1a shows that, among the age-eligible people, the introduction of the social pensions significantly reduces the mortality by 1.7 percent. In contrast, the reduction in mortality after the introduction of social pensions is much smaller (0.3 percent)

[9]We follow Ruhm (2000) and weight the residuals by the squared root of represented population size.

and statistically insignificant for the age-ineligible.

We estimate the following equation to further test the robustness of the results:

$$lnMR_{gact} = \alpha Post_{ct} + \delta_{gac} + t_{gac} + t_{gac}^2 + \varepsilon_{cagt} \tag{1}$$

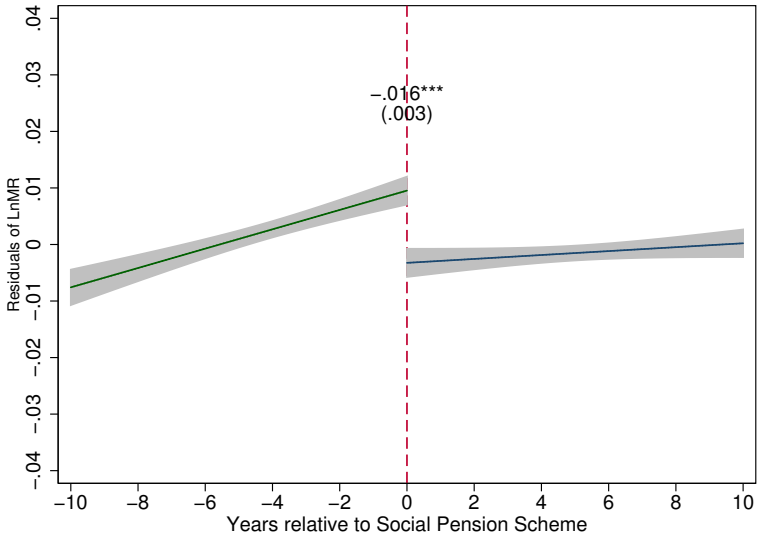
The dependent variable, $lnMR_{cagt}$, is the logarithm of mortality rate of people of age a, gender g in country c in relative year t. $Post_{ct}$ is an indicator variable which equals to one if the country c had social pension in year t, and equals to zero if not. The coefficient, α, captures the effects of the introduction of social pensions on mortality in the interested sample. To control for the potential unobserved confounding factors, we include the fixed effects of gender, age, country and all the three combinations (δ_{gac}) in the regressions. And, for each combination of gender (g), age (a) and country (c), we also control for the linear and square trends in relative year, t_{gac} and t_{gac}^2. For example, for those men aged 70 in Belgium, we have both linear and square trends; and we have another two trends for the women of the same age in Belgium. That is to say, if we estimate the equation (1) using the whole sample, we will have 900 dummies and 1800 trend terms.

Following the graphic analysis, we again divide the sample into age-eligible group and age-ineligible group, and report the OLS point estimates in Panel A and Panel B of Table 2, respectively. Different columns show the RD regression results for different bandwidths - five, six and seven years.[10] The estimates in panel A consistently show that the introduction of social pensions significantly reduces the mortality of those age-eligible people by 1.6-2.2 percent. In contrast, the comparable effects among age-ineligible people are much smaller and statistically insignificant. The differences in the coefficients between age-eligible and age-ineligible groups are also statistically significant for all the three columns. The last column reports the results when we follow Card et al. (2008, 2009) to control for specific linear trends in relative year before and after the social pensions provision. Consistent with the results above, the mortality rate among the age-eligible people drops by 2.2 percent immediately after the introduction of social pensions with no significant effect in the age-ineligible group.

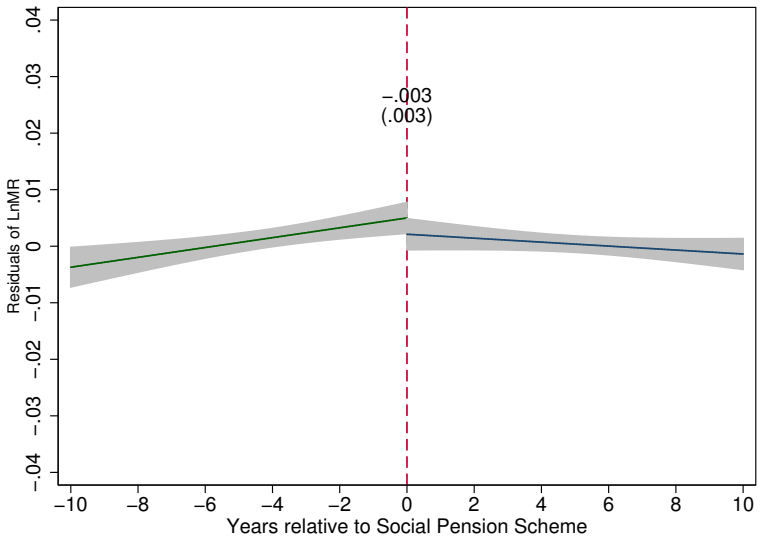
[10] We choose these bandwidths because the "optimal" bandwidth according to Calonico et al. (2014) is 6 years.

Figure 1: Regression Discontinuity Estimation for the Effects of Social Pension Provision on Mortality

(a) Age-eligible group



(b) Age-ineligible group



NOTE: The mortality data are from the HMD and the data about timing of pension are from Cutler and Johnson (2004) and Pension-Watch website (http://www.pension-watch.net/about-social-pensions). For each country-gender-age cell, we regress the logarithm of mortality on relative year and its square, then keep and pool the residuals of all the groups, and plot the linearly fit lines and confidential intervals (CIs) over the relative year.

Table 2: Regression Discontinuity Results for the Effects of the Introduction of Social Pensions

	(1)	(2)	(3)	(4)
Variables	Logarithm of Mortality Rate			
Bandwidth	5 years	6 years	7 years	6 years
Trends terms		Relative year and its square		Relative year linear trends before and after pension
Panel A: Age eligible group (pension age threshold and above)				
$Post_{ct}$	-0.022***	-0.017***	-0.016***	-0.022***
	(0.003)	(0.003)	(0.003)	(0.003)
Observations	5,605	6,539	7,421	6,539
R-squared	0.996	0.995	0.995	0.996
Panel B: Age ineligible group (45 - pension age threshold)				
$Post_{ct}$	-0.002	0.003	0.005	-0.001
	(0.003)	(0.003)	(0.003)	(0.004)
Observations	4,331	5,053	5,735	5,053
R-squared	0.994	0.994	0.994	0.994
F-statistics	17.68	19.10	20.48	19.45
P-value	0.00	0.00	0.00	0.00

NOTE: Data are from the Human Mortality Database (HMD), Table 2 of Cutler and Johnson (2004) and Pension-Watch website. All the regressions are weighted by the square root of population size. All the standard errors are clustered at the country-gender-age level. The F-statistics in the bottom of the table test the significance of the difference between coefficients in Panel A and those in Panel B.
**** p<0.01, ** p<0.05, * p<0.1*

3 Evidence from the New Rural Pension Scheme (NRPS)

Because of lack of detailed official documentation, however, it is difficult to know how much money was spent and how the pension was distributed. In addition, without reliable micro-level data, it is even more difficult to know individual behavioral responses to the pension programs introduction. These limitations call for micro-level evidence on the effects of pensions, and the NRPS in China provides a natural setting to fill in this gap.

3.1 Background

Many rural regions in China are really poor. By the end of 2013, there are still more than 80 million rural people in poverty, of whom the daily income is below one dollar. According to the 2005 inter-census population sample survey, the largest and the most recent population survey that has income information, the median earning among the rural adults was about 200 yuan (about $30 US dollars) per month in 2005. The poverty is even more serious for the elderly: 67.5 percent of the rural people aged over 60 had no labor earnings, and 91 percent of them were living with and relied on their offsprings. According to a recent survey on the website, the pension reform is the top issue among the rural people with 35.4 percent of respondents considering the social pension reform as the most important problem in rural China.[11] These seem to have motivated the Chinese government to initiate the social pension program in rural regions.

This is the first time of the rural China starting such a large and generous welfare program.[12] The NRPS started in September 2009, and it reached a universal coverage by the end of 2012 after four rounds of expansions. The first round in the end of 2009, the second in middle 2010, and the rest two in middle 2011 and in late 2012. The pension scheme was rolled out at county-by-county

[11] Source: http://toutiao.com/i6243882674679726593/.

[12] It was the "new" rural pension scheme to distinguish it from the old rural pension scheme initiated in 1992. The old rural pension scheme is somewhat like an organized saving account, with premiums accumulated in an individual account and accrued at a low interest rate (Leisering et al., 2002). At the height of the old rural pension scheme, 75.4 million people invested in the accounts, but the amount of pension it afforded was extremely insignificant. The development of the old pension scheme stagnated after 1998, partly because of the widespread mismanagement of the funds and the insignificance of the program (Shi, 2006; Wang, 2006). In 2005, the enrollment rate for the old pension scheme has dropped to less than 3 percent, according to the China Agricultural Statistical Yearbook.

base. Specifically, to start the NRPS, the county-level governments need to initially applied to the provincial government, and then formally sent the application to the central government after receiving provincial government's approval. It is the central government who made the final decision to approve the counties to initiate the NRPS in each year. As stated in the official documents, the government aimed to evenly distribute the approved counties across regions in the first wave. In the next two years, the central government tended to start the NRPS earlier in the counties in the middle and western regions.

After the county was covered, all the rural people who are aged 16 or above (not including students) can voluntarily participate in the scheme. All the enrollees with age above 60 years at start of pension scheme are eligible to get 55 yuan (i.e., about $9 US dollars) per month, regardless of previous earnings or income. In 2014, the benefits increased to 75 yuan per month. But the prerequisite is that their offsprings have to participate. The age-ineligible enrollees need to choose one of the following levels of annual contribution: 100, 200, 300, 400, or 500 RMB.[13]

The amount of 55 yuan per month is not trivial for the rural elderly, which is 28 percent of the median household income per capita in rural regions in 2005. The proportion is even higher for the older people since many of them do not have labor earnings and mainly rely on their children. This amount of money may guarantee the survival of an old person living in the poor rural areas. For example, in the rural regions of Shandong province, a senior who solely relies on the pension may purchase one big or two small steamed buns or a bowl of rice per day.[14]

The NRPS is an unprecedented welfare program having covered the largest population in hu-

[13]Starting from the pension eligible age of 60, the pension benefits for a beneficiary is the sum of the accumulated total funds in the individual account, plus the basic pension benefits. According to the formula, the funds in accumulated individual accounts are paid out as follows: when a beneficiary turns 60, he/she starts to receive a monthly benefit (1/139 of the total accumulation) from the individual account. At the same time, he/she receives a basic pension benefit (currently 55 RMB per month). For instance, one person who participates in the program at the age of 45 and chooses to pay a yearly premium of 100 RMB will have a total amount of 1,838 RMB accumulated in the individual account (assuming at one-year deposit rate at the age of 60) and will receive a monthly benefit of 68.22 RMB (1838/139+55). Those who are already 60 years old at the time the program starts automatically receive a basic pension benefit (i.e., 55 RMB per month) without paying any premiums. Therefore, this pension scheme was fully funded defined contribution plan with added attraction of government subsidy toward contributions, coupled with a minimum pension guarantee wholly funded by the government.

[14]The website (http://toutiao.com/i6271139303825342977/) shows what one yuan may buy in rural Shandong province.

man history. It is also the most generous welfare program implemented in rural areas of China ever since. By the end of 2012, the central and local governments have input more than 262 billion yuan in the NRPS with more than 232 billion from the central government, and 89 million rural seniors started to receive pensions in 2012. By the end of 2014, the number of pensioners further increased to140 million, and the total number of rural participants was approximately 426 million (65 percent).

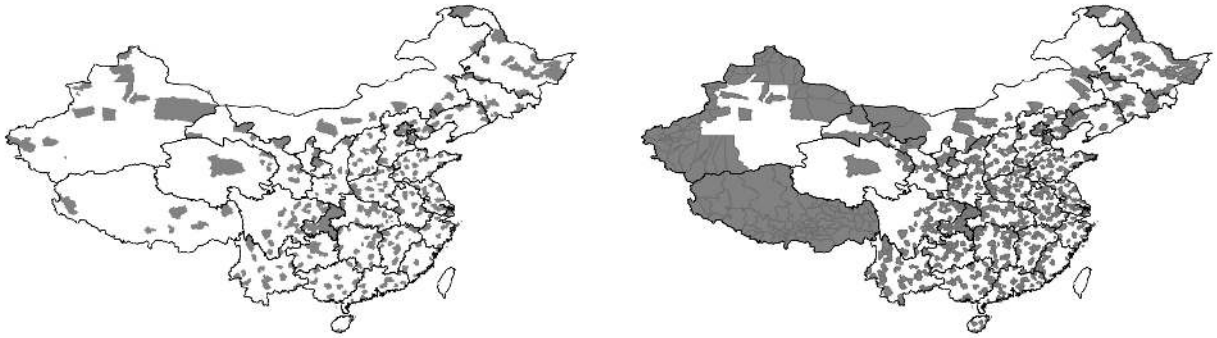
The distribution method of the pensions is determined by the local governments. In some developed regions such as Jiangsu and Zhejiang, the local governments establish individual bank accounts for the senior enrollees and automatically transfer the pensions to these accounts; however, in some less developed regions, the seniors or their offsprings have to go to the designated places in the local villages to get the pension by themselves. The funding is under strict regulations to avoid corruption or benefit fraud. To ensure the eligible enrollees receive the pension, the central government required the local governments to provide the personal information of each enrollee and then appropriate the corresponding funding after careful verification; and this information is needed to updated year by year. Because the offsprings of eligible pensioners can go and get the pension in case the seniors are ill or in bed, the evidence for aliveness of the pensioners has to be provided whenever receiving pension. The evidence could be a recent video or a certification from a local government official who personally visited the pensioner recently.

We requested the data of timing of the NRPS coverage in the counties from the State Council Leading Group Office of Poverty Alleviation and Development, and officially received the reply with a formal documentation in two weeks. Figures 2a-2d show the county coverage in mainland China in each year from 2009 to 2012. About 12 percent (about 320) of all the counties were covered in the first wave (2009), and 16 percent (450 counties) were covered in the next year (2010); 38 percent (about 1,075 counties) started the program in the third wave (2011) and all the rest (33 percent) were covered in the last wave (2012). In this study, we exploit the county-by-county rollout of the NRPS and conduct Difference-in-Differences (DID) regressions to identify the effects of the new pension scheme provision.

Figure 2: The NRPS Coverage over Time

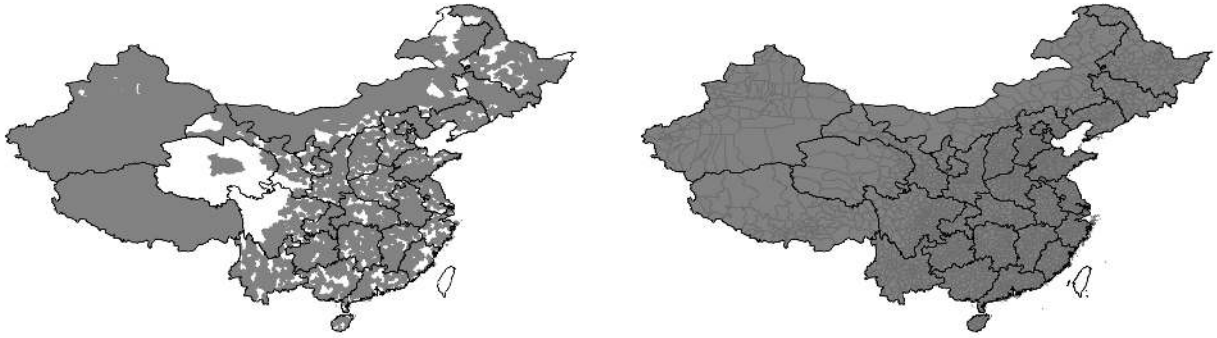
(a) First round, November 2009

(b) Second round, July - October 2010)



(c) Third round, July - September 2011

(d) Fourth round, July - October 2012



NOTE: The county rollout data for the NRPS coverage are from State Council Leading Group Office of Poverty Alleviation and Development. The data are not public and the researchers need to apply for the data directly from the office.

3.2 Data

China Family Panel Studies (CFPS) and China Health and Retirement Longitudinal Studies (CHARLS)

The main sample used in this study is from CFPS and CHARLS. The CFPS is a biennial survey and is designed to be complementary to the Panel Study of Income Dynamics (PSID) in the United States. The first national wave was conducted in 2010. The five main parts of the questionnaire include data collection on communities, households, household members, adults, and children. The China Health and Retirement Longitudinal Study (CHARLS) is also a biennial survey, and aims to collect a nationally representative sample of Chinese residents ages 45 and older, and is designed to be complementary to the Health and Retirement Survey (HRS) in the United States. More details about the two datasets are provided in data appendix. The baseline national wave of CHARLS was fielded in 2011. This study uses the 2010 and 2012 waves of CFPS, and the 2011 and 2013 waves of CHARLS.

Because of the consistency in variables and sampling, we pool the CFPS data and the CHARLS data together to make a larger sample to best exploit the regional and temporal variation in the NRPS expansion during 2009 to 2012. Both the CFPS data and the CHARLS data are nationally representative, and each covers about 5 percent of the total counties in mainland China.[15] The main sample used in our study comprises over 70,000 observations (i.e., about 34,000 from CFPS and 36,000 from CHARLS) and covers 312 counties (162 counties from the CFPS and 150 from the CHARLS).[16]

Chinese Longitudinal Healthy Longevity Survey (CLHLS)

The CLHLS is a longitudinal survey that aims for a better understanding of the determinants of healthy longevity of human beings in China. The baseline survey of CLHLS was conducted in

[15] In our analysis, we include the data source dummy and interact it with the counties all the time. Because the number of counties covered by both CHARLS and CFPS is small (i.e., only 5 counties), we name "county dummies" short for the county dummies interacting with data source.

[16] The number of observations and counties are consistent with the population distribution in mainland China.

1998, with follow-up surveys with replacements for deceased elders were conducted every three years in a randomly selected half of the total number of counties and cities in the 22 out of 31 provinces in mainland China. However, the earlier waves only surveyed people older than 80 and had a smaller sample size. We thus choose the sample started in 2005 that further included young elderly aged 65-79. Since the survey 2005, CLHLS followed the respondents in 2008, 2011, and 2014. Besides the information on basic demographic and socioeconomic status, the data also provide the survival status for all the seniors in each wave, as well as the date for the deaths.

3.3 Methodology and Empirical Results

3.3.1 Who Receive a Pension from the NRPS?

The first question to investigate is, who started to receive pensions from the NRPS. The answer is important to understand and interpret the results for the possible effects of the NRPS provision. By doing so, we can also test the mechanical effects of the NRPS provision and provide evidence for the policy effectiveness. We thus follow the strategy in Hoynes et al. (2012) and estimate the following equation:

$$Receipt_i^s = \alpha_0^s + \alpha_1^s NRPS_{ct}^s + \delta_c^s + \delta_t^s + X_{ict}^s + \varepsilon_{ict}^s \tag{2}$$

The superscript s indicates a specific subsample, which can be a group of people with certain characteristics. The dependent variable $Receipt_i^s$ is an indicator for the household of individual i receiving any pension. $NRPS_{ct}$ is another indicator of whether county c had the NRPS in year t. The covariates include county dummies (δ_c), year dummies (δ_t), and other demographic controls (X_{ict}) such as gender, age and its square and education level. The coefficient on $NRPS_{ct}$, α_1^s, captures the short-term effects of the NRPS on pension receipt in subsample s. All the standard errors are clustered at the county level (Bertrand et al., 2004).

We first divide the sample by *hukou* status and age in years and conduct the regressions as shown in equation (2) in each subsample. The results are shown in Figure 3a. The each point

and the corresponding intervals in the figure show the coefficient, α_1^s with the corresponding 90 percent CIs, derived by a separate regression in subsample s. The effects among urban people are never statistically significant. Contrary to this, among the rural people, the effects are positively significant for those aged over 60 but insignificant among those aged below 60. The pattern for rural people shows a significant jump at the threshold - age 60. Therefore, this pattern is fairly consistent with the policy design and verifies that only people aged over 60 of rural *hukou* are the eligible group for receiving pension benefits. We emphasize that the estimation only identifies the *short-term* effects, which reflects how much the outcome variables change *immediately* following the NRPS coverage.[17]

Then we restrict the sample to those aged 60 or above with rural *hukou* in Figure 3b. Panel A shows the point estimates for men and women, respectively. The effects are significant for both men and women with insignificant difference in between. Panel B divides the sample by education level, and the effects among the three groups are similar (i.e., all the coefficients are between 0.2 and 0.3). Panel C divides the sample by the county income level in 2005, and shows that the effect of NRPS on receipts in poorer regions is much larger than that in richer regions. This is consistent with the expectation that people in the regions with higher levels of poverty would have a higher incentive to enroll in the NRPS.

3.3.2 Effects of the NRPS on Income, Labor Supply and Expenditure

We also use the same framework to investigate behavioral responses to the NRPS:

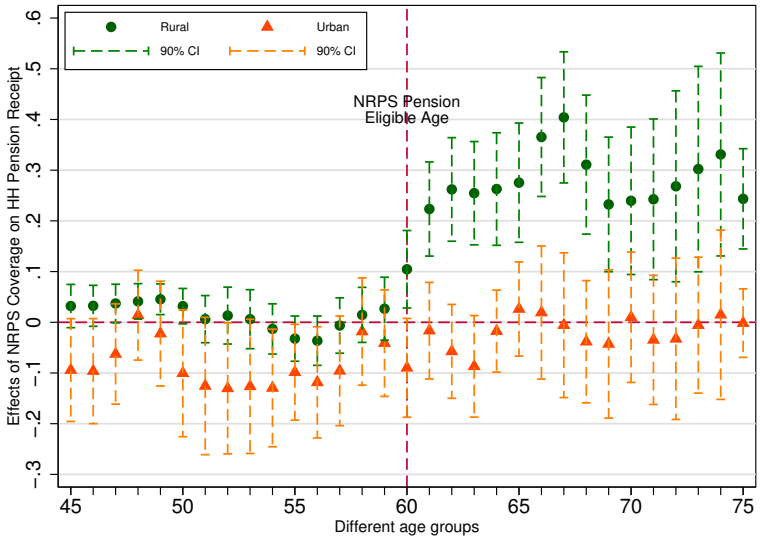
$$Y_{ict} = \beta_0 + \beta_1 NRPS_{ct} + \delta_c + \delta_t + X_{ict} + \varepsilon_{ict} \tag{3}$$

The dependent variable Y_{ict} is the candidate outcomes to examine, which can be household

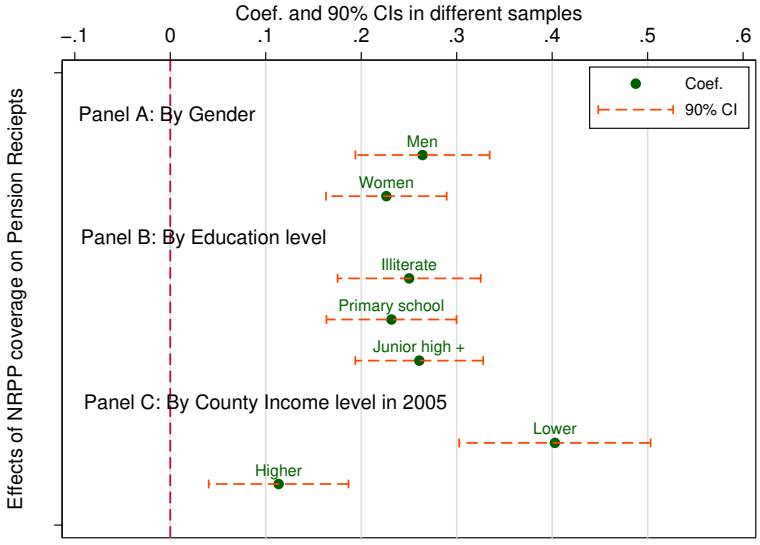
[17] There are some reasons why the older people may not fully participate in the program just after its implementation. First, they might not trust the policy in the early stage, especially peasants who have experienced the introduction and collapse of the old rural pension scheme; Second, some local governments need time to prepare documents and setup individual account; Third, information transition took some time because some potential enrollees may even not know the NRPS after its implementation. Fourth, their adult children may not want to enroll the NRPS, which is the prerequisite for them to receive pension benefit.

Figure 3: Effects of the introduction of the NRPS on Pension Receipt

(a) By type of *hukou* and age



(b) By gender, education and initial income level



NOTE: The data are from CFPS and CHARLS. Figure a above divides the sample by type of hukou and age in years. Figure b only uses the pension-eligible sample and divide it by gender (panel a), education level (panel b), and county income level (panel c), respectively. Each point and corresponding 90 percent confidential interval are based a separate regression of equation (2). The confidential intervals are calculated based on standard errors clustered at the county level.

income, expenditures, private transfers, and other interested outcomes. All the other variables are the same as those in equation (2). All the standard errors are also clustered at the county level. The estimation is based on the differences between before-after changes in outcomes of the treated group and that in the same time period in the control group.[18]

The validity of our identification depends on the exogeneity of the introduction of the NRPS across counties. Since that the counties starting the NRPS in different years may not be randomly selected, the DID estimator, β_1, is subject to a number of limitations. Most importantly, the estimation presumes that the trend of outcome variable Y_{ict} in treated group would be parallel to that in control group had the NRPS been not conducted. We address this in two ways. First, we examine whether the counties covered in different waves have parallel trends in the outcome variables before NRPS coverage (i.e., pre-trend tests), and Section 3.4 provides details about this. Second, we explore a couple of potential comparison groups to test the robustness and validity of our results. According to the policy design, the first comparison group is composed by the urban *hukou* people in the same counties. It is expected that there would be no effects among them due to *hukou*-ineligibility. The other comparison group is the people with rural *hukou* but ages below 60. However, those aged below 60 in the NRPS covered villages may form different expectation because the enrollees are able to receive pension once they reach the pension-age, and the enrollees with ages below 60 also need to pay the NRPS premiums.

With the above considerations, we divide the whole sample based on both age and *hukou* eligibility - rural people aged 60 or above, rural people aged below 60, urban people aged 60 or above, and urban people aged below 60. The first is the only group of people who are eligible to both enroll in the pension scheme and receive 55 yuan per month. The second group of people are eligible to participate in, but not to receive the pensions. The third and the fourth groups are ineligible to participate in the NRPS.

[18]The estimation leads to the intention-to-treat (ITT) effects, averaging across individuals enrolled and not enrolled in the NRPS. We do not estimate the treatment on the treated effects, which can be obtained through instrumenting the individual take-up status by the NRPS rollout, because previous literature such as Angelucci and De Giorgi (2009) finds that cash transfer program also indirectly affects the behaviors of the ineligible households in the same villages. The treatment on the treated effects estimated at the individual level could be misleading if this spillover effect does exist.

Table 3 shows the results on the effects of the NRPS on receiving a pension and household income in each subsample. Panel A and panel B present the results for those aged 60 or above and those aged below 60, respectively. The first two columns examine the effects for those with rural *hukou*. Consistent with Figure 3, the estimates suggest that the NRPS coverage ($NRPS_{ct}$) significantly increases the probability of household receiving a pension by 24.5 percentage points among rural people with ages 60 or above. Consistent with this, the NRPS coverage also significantly increases the household income by 17.6 percent. In contrast, we do not find any significant evidence for the effects among rural but age-ineligible people in Panel B, and the coefficients are much smaller. The last two columns examine the effects for urban people. The estimates do not present any significant effects of the NRPS on pension receiving and household income in this group - regardless of age.

The NRPS-induced household income changes may not only originate from the mechanical effects (i.e., receiving a pension) since the people may also alter their labor supply behaviors correspondingly. Table 4 further examines the labor supply response to the NRPS coverage. Among the rural people, the labor supply of those aged 60 or above significantly reduces by 3.0 percentage points (6.4 percent of mean) , and that among those aged below 60 also reduces by 2.6 percentage points (3.6 percent of mean), though it is statistically insignificant.

The next two columns further investigate the effects by classifying the type of work into farm work and non-farm work. The NRPS significantly reduces the proportion of farm work by 3.6 and 5.4 percentage points for the age-eligible and age-ineligible people, respectively. For the age-ineligible people, however, the NRPS increases the proportion of non-farm work by 3.3 percentage points. One explanation for the "shift" is that farm work is generally more labor intensive and unfavorable, and thus people tend to "escape" from farm work in the presence of a stable income flow in the future. Our results are consistent with Angelucci and De Giorgi (2009), and also suggest that we need to be careful to interpret the results from econometric framework combining the age-ineligible people as control group. Consistent with expectation, the last column shows there is no significant effect among urban people.

Table 3: Effects of the NRPS on Pension Receipts and Household Income, by Type of *hukou* and Age-eligibility

Sample	(1) Rural *hukou*	(2) Rural *hukou*	(3) Urban *hukou*	(4) Urban *hukou*
Variables	Household receiving pension (Yes = 1)	Log (Household income)	Household receiving pension (Yes = 1)	Log (Household income)
Panel A: Age-eligible group (60+)				
Mean	0.43	9.67	0.63	10.64
$NRPS_{ct}$	0.245***	0.176***	-0.023	0.041
	(0.039)	(0.068)	(0.016)	(0.055)
Observations	21,434	20,584	8,601	8,298
R-squared	0.448	0.219	0.644	0.303
F-statistics	–	–	86.6	15.8
P-value	–	–	0.00	0.00
Panel B: Age-ineligible group (45-59)				
Mean of Y	0.07	10.12	0.28	10.71
$NRPS_{ct}$	0.012	0.058	0.013	0.005
	(0.011)	(0.060)	(0.011)	(0.044)
Observations	28,795	27,575	10,145	9,822
R-squared	0.091	0.195	0.335	0.274
F-statistics	42.1	4.87	–	–
P-value	0.00	0.03	–	–

NOTE: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether or not the differences with those for the rural people with ages 60 and over are significant.

**** p<0.01, ** p<0.05, * p<0.1*

Table 4: Effects of the NRPS on Labor Supply

	(1)	(2)	(3)	(4)
	Rural *hukou*			Urban *hukou*
VARIABLES	Working now (Yes = 1)	Doing any farm work (Yes = 1)	Non-farm work (Yes = 1)	Working now (Yes = 1)
Panel A: Age-eligible group (60+)				
Mean of Y	0.477	0.424	0.054	0.121
$NRPS_{ct}$	-0.030*	-0.036**	0.006	0.017
	(0.018)	(0.018)	(0.006)	(0.011)
Observations	21,290	21,264	21,264	8,484
R-squared	0.284	0.246	0.092	0.267
F-statistics	–	–	–	6.69
P-value	–	–	–	0.01
Panel B: Age-ineligible group (45-59)				
Mean of Y	0.727	0.544	0.184	0.453
$NRPS_{ct}$	-0.026	-0.058**	0.033**	0.003
	(0.022)	(0.024)	(0.015)	(0.020)
Observations	28,376	28,334	28,334	9,797
R-squared	0.225	0.208	0.209	0.315
F-statistics	0.06	1.42	3.80	–
P-value	0.80	0.23	0.05	–

NOTE: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.
**** p<0.01, ** p<0.05, * p<0.1*

Table 5: Effects of the NRPS on Received Private Transfers and Household Expenditure

VARIABLES	(1) Received private transfer (Yes = 1)	(2) Log(Received private transfer)	(3) Log(HH total expenditure)	(4) Log(HH food expenditure)
Panel A: Age-eligible group (60+)				
Mean of Y	0.38	6.67	9.48	8.55
$NRPS_{ct}$	0.001	0.129	0.032	0.096*
	(0.028)	(0.101)	(0.044)	(0.058)
Observations	21,300	8,099	16,220	15,906
R-squared	0.148	0.196	0.189	0.262
Panel B: Age-ineligible group (45-59)				
Mean of Y	0.45	7.05	9.86	8.76
$NRPS_{ct}$	-0.015	-0.039	-0.012	0.036
	(0.025)	(0.093)	(0.033)	(0.051)
Observations	28,447	12,871	23,024	22,702
R-squared	0.264	0.240	0.196	0.284

NOTE: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.
**** p<0.01, ** p<0.05, * p<0.1*

The first two columns in Table 5 examine the effects of NRPS on received private transfer of the household. The estimates show no significant effects, suggesting that the provision of NRPS might not crowd out the private transfers to the elderly. Our results are different from those in Jensen (2004), who uses the pension expansion in South Africa and finds that each rand of public pension income to the elderly leads to a 0.25–0.30 rand reduction in private transfers. One possible reason is that the pension expansion in South Africa is much larger than NRPS, which increased the individual income by almost 200 percent. The last two columns examines the effects on total expenditure and food expenditure. The results suggest that the NPRS significantly increases food expenditure by 9.6 percent. The effect on total expenditure is positive but small and statistically insignificant.

The effects on living arrangement and migration are also important because the above results would be misleading had the NRPS induced changes in living arrangement (e.g., the size of household increased and thus the total income increased).[19] Table A1 in the appendix examines the effect of the NRPS on household size and cross-county migration for these rural people. First of all, only 3 percent of people are registered for *hukou* in one county but currently living in another. Consistent with the expectation in Case and Deaton (1998), the estimates do not show any significant evidence for the short-term effects of the NRPS on household size or migration.

3.3.3 Effects of the NRPS on Health and Healthcare Usage

Then we move forward to estimate the effects of the NRPS on health outcomes. We use self-reported fair/poor health, reported disability,[20] and underweight as triple-dimension measures for health status. In addition, because of the many outcome variables, we exploit the methodology in Poterba et al. (2013) by using principal component analysis (PCA) on the three dimensions, and obtain an unhealthiness score for the full sample. This measure has zero mean and ranges from -1.37 to 3.35, with a standard deviation of 1.1. Similar to the "metabolic syndrome" used in previous literature (e.g., Kling et al., 2007; Anderson, 2012; Hoynes et al., 2016), this comprehensive measure by aggregating multiple measures could improve statistical power, and Poterba et al. (2013) also show that this measure is strongly associated with current health status and future mortality.

Table 6 shows the results. The first column presents the results for unhealthiness score for rural people. Results in Panel A show that the mean value of unhealthiness score is 0.31 for the age-eligible and -0.14 for the age-ineligible ones. Estimates in Panel A show that the NRPS coverage significantly reduces unhealthiness score by 0.12 among age-eligible people, indicating a 0.1 standard deviation improvement in healthiness. In contrast, the estimate for the sample in

[19]The seminal work in this literature, Case and Deaton (1998), expected that the short-term effect of pension on living arrangement and migration decision should be small. However, Case and Deaton (1998) did not provide empirical evidence on this important presumption because of data limitation.

[20]The disability variable is constructed based on a set of activities, including walking, cooking, dining, traveling, shopping, and doing housework. The respondents are asked whether have difficulty in doing these activities in both CHARS and CFPS, we define them disabled if they have difficulty in doing any of these activities.

age-ineligible group is insignificant and much smaller in magnitude, which is about one-third of that in Panel A.

The next three columns present the results for different health measures. We find significant effects of the NRPS on health improvement for all measures except for self-reported health. Specifically, the NRPS reduces the disability rate by 3.2 percentage points and likelihood of being underweight by 1.7 percentage points. In the age-eligible group, although the estimates suggest the health is improved after the NRPS, all the coefficients are about half or one-third of those in Panel A and are statistically insignificant. The F-tests suggest that the differences between the effects in age-eligible and those in age-ineligible group are statistically significant at the 10 percent level.

The final column shows the results for urban people. These people are healthier than their counterpart group with rural *hukou*. As a placebo test, investigation in the effects of the NRPS in this group also yields little and insignificant effects. In addition, the F-statistic and P-value suggest a significant difference between the effects of the NRPS on health for rural and urban people.

Table 7 examines the effects of the NRPS on individual behaviors such as health insurance participation, healthcare usage, and smoking. The estimates in column 1 show that the NRPS crowds out health insurance participation for both age-eligible and age-ineligible people.[21] The provision of the NRPS significantly reduces the health insurance participation rate of the age-eligible group and that of the age-ineligible group by 5.2 and 3.5 percentage points, respectively, suggesting crowd-out effects of the NRPS on health insurance participation.[22] Although increased income would enable rural age-eligible enrollees to purchase the insurance (i.e., increased income), the NRPS program also reduces insurance demand (i.e., reduced risk in terms of better health, reduced labor supply, and higher risk-less income).[23] This is especially true when most of the

[21]The health insurance program for rural people is mainly New Rural Cooperation Medical Insurance Scheme (NCMS) began in 2003 and reached a universal coverage in 2008, which is a heavily subsidized voluntary health insurance program targeting rural residents(Wagstaff et al., 2009).The participation of NCMS is also voluntary. The enrollees need to pay for an annual premium, which is currently 120 yuan.

[22]The results are consistent with the findings in Bitler et al. (2005) that the welfare program deters people to participation in health insurance in the US.

[23]Take the age-eligible people as an example. Let the maximum price of insurance that individuals are willing to pay be P, cost of illness C, probability of suffering illness be $\delta = \delta(I)$, which is also determined by the income level I. According to the definition of P, we have $(1-\delta)u(I) + \delta(I)u(I-C) = u(I-p)$. Then take derivative with respect

Table 6: Effects of the NRPS on Health Outcomes

	(1)	(2)	(3)	(4)	(5)
	Rural *hukou*				Urban *hukou*
Variables	Unhealthiness score	Reported fair or poor health (Yes =1)	Reported disability (Yes = 1)	Underweight (Yes =1)	Unhealthiness score
Panel A: Age-eligible group (60+)					
Mean of Y	0.312	0.740	0.280	0.153	-0.00106
$NRPS_{ct}$	-0.117***	-0.015	-0.032*	-0.017*	0.030
	(0.045)	(0.020)	(0.017)	(0.010)	(0.041)
Observations	17,723	21,175	21,493	17,861	7,139
R-squared	0.167	0.071	0.197	0.120	0.160
F-statistics	–	–	–	–	13.9
P-value	–	–	–	–	0.00
Panel B: Age-ineligible group (45-59)					
Mean	*-0.139*	*0.713*	*0.108*	*0.0588*	-0.293
$NRPS_{ct}$	-0.042	-0.009	-0.010	0.000	-0.023
	(0.036)	(0.018)	(0.010)	(0.006)	(0.034)
Observations	24,568	28,647	28,899	24,611	8,316
R-squared	0.112	0.062	0.125	0.054	0.086
F-statistics	3.74	0.11	2.79	3.23	–
P-value	0.05	0.74	0.09	0.07	–

NOTE: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.

**** p<0.01, ** p<0.05, * p<0.1*

labor income is based on labor-intensive work such as farming in rural areas. The identified effects in column 1 can be interpreted as the net effects from both reduced demand and increased income. For those younger than 60, the income effects are weaker because they do not receive any pensions at the time of the surveys and even need to pay for the premium, it is reasonable that the pension program may also have crowded out their insurance participation.

The next few columns in Table 7 examine the effects on other behaviors. The estimates in columns 2 and 3 suggest little effect on healthcare usage measured by inpatient and outpatient cares. The estimates are insignificant and of small magnitude. The last column examines the smoking behaviors because previous literature suggests that higher income may not lead to better health because of increased smoking (Chaloupka and Warner, 2000; Ruhm, 2000). However, the estimates for smoking in column 4 only yields insignificant effects of the NRPS. Therefore, there is no significant evidence for the effects of the NRPS on the behaviors such as healthcare usage and smoking.

3.3.4 Other Results for CFPS and CHARLS

Since we pool the two datasets and conduct the above regressions, it may be a concern that the results above may not be nationally representative because of different population being represented in the two datasets. Table A2 provides the regression results weighted by the represented population size of each datasets, which are fairly consistent with our results above.

It is also worthy to discuss more about the labor supply and insurance participation effects of the NRPS among the age-ineligible group. If the reduced labor supply are caused by the expectation of higher income, the labor supply effects should be weaker among people with weak expectations. However, if the income effects are weaker, the crowding-out effects on insurance participation may

to I, we have $\frac{dP}{dI} = \sigma(P - \delta C) - \delta'(I)\Delta u$, where σ is relative risk aversion coefficient, Δu denotes utility difference $\frac{u(I) - u(I-C)}{u'(I-p)}$. Therefore, the first term is positive because $P > \delta C$, (i.e., the price willing to pay is always higher than the expected income loss caused by illness), which mainly reflects the income effect; the second term is negative because $\delta'(I) > 0$ (i.e., health is better under higher income), which reflects improved health effects. Therefore, the crowded out effect of social pension on health insurance participation depends on the forces between the two.

Table 7: Effects of the NRPS on Healthcare Usage and Health Behaviors

Sample	(1)	(2)	(3)	(4)	(5)
	Rural *Hukou*				Urban *Hukou*
Variables	Health Insurance Participation (Yes = 1)	Outpatient care (Yes = 1)	Inpatient care (Yes = 1)	Smoke currently (Yes =1)	Health Insurance Participation (Yes = 1)
Panel A: Age-eligible group (60+)					
Mean of Y	*0.915*	*0.258*	*0.167*	*0.282*	0.869
$NRPS_{ct}$	-0.043*	-0.012	0.004	-0.004	0.018
	(0.022)	(0.015)	(0.012)	(0.009)	(0.030)
Observations	21,310	21,457	17,336	19,887	8,672
R-squared	0.101	0.072	0.204	0.321	0.182
F-statistics	–	–	–	–	3.15
P-value	–	–	–	–	0.08
Panel B: Age-ineligible group (45-59)					
Mean of Y	*0.923*	*0.221*	*0.111*	*0.302*	0.817
$NRPS_{ct}$	-0.035**	-0.010	-0.013	-0.004	-0.020
	(0.016)	(0.012)	(0.009)	(0.007)	(0.022)
Observations	28,615	28,796	22,318	27,314	10,214
R-squared	0.119	0.057	0.246	0.432	0.203
F-statistics	0.28	0.01	1.64	0.00	–
P-value	0.60	0.91	0.20	1.00	–

NOTE: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.

**** p<0.01, ** p<0.05, * p<0.1*

be strengthened. Therefore, we examine this by only looking into the effects among those aged between 45 and 49, who are farther away from the pension-eligible age. The results in the first three columns of Table A3 suggest that these people may not reduce their labor supply over all. Although some people give up the farming work, yet more take non-farming work which have offset the effects. The last column examines the insurance participation in the same age group. And the crowding-out effects are still statistically significant.

3.3.5 Effects of the NRPS on Mortality

We transfer the CLHLS data to an individual balanced panel from 2006 to 2014, then use a dummy variable to denote the individual mortality status in the period.[24] We then use this individual panel data to match the NRPS coverage and conduct the following regression:

$$Die_{it} = \gamma_0 + \gamma_1 NRPS_{ct} + \delta_c + \delta_t + X_{ict} + \delta_{ia} + \varepsilon_{ict} \tag{4}$$

The new dependent variable is an indicator of whether individual i died between t and $t+1$. It equals to one if yes and zero otherwise. Thus the coefficients in equation (4) could be interpreted as the effects on one-year mortality. All the other variables are the same as those in equation (3) except that we include an indicator δ_{ia} here to capture whether individual i is lost in the following years (i.e., attrition). All the standard errors are also clustered at the county level.

However, the CLHLS does not provide information on *hukou* type. As a result, we use their residency type and the eligibility for a retirement plan instead.[25] In practice, we choose the people living in rural regions and having no retirement plan as the treated group, and those living in urban regions and having retirement plan as a comparison group. Column 1 of Table 8 presents the results. Panel A shows that the NRPS reduced the mortality by 2.2 percentage points (14.4 percent

[24] If a person is alive in 2014, then this variable is consistently equal to zero for the 9 years; and if the person died in year t, the value of this variable is set to zero for the years prior to year t, and is equal to one for year t and missing for the years afterwards. By doing so, we use best the time of the death and its variation.

[25] Only using residency type is incorrect because it is mainly defined by the population density and not exactly corresponding to the *hukou* type. We additionally use whether the individual i is eligible for retirement scheme because of the fact that those who enjoyed retirement scheme generally have urban *hukou* and are not eligible for NRPS.

Table 8: Effects of the NRPS on Mortality in CLHLS

Variables	(1) One-year mortality	(2) Died due to severe disease (Yes =1)	(3) Died without severe disease (Yes =1)
Panel A: Living in rural area and having no retirement scheme			
Mean of Y	0.150	0.0541	0.0962
$NRPS_{ct}$	-0.0217**	-0.00426	-0.0174**
	(0.00952)	(0.00638)	(0.00793)
Observations	29,871	29,871	29,871
R-squared	0.139	0.060	0.122
Panel B: Living in urban area and having retirement scheme			
Mean of Y	0.102	0.0568	0.0456
$NRPS_{ct}$	-0.00678	-0.00195	-0.00483
	(0.0136)	(0.0107)	(0.00939)
Observations	9,047	9,047	9,047
R-squared	0.196	0.125	0.179
F-statistics	0.86	0.04	1.03
P-values	0.35	0.84	0.31

NOTE: The data are from those ages 65 and above in CLHLS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, calendar year, county and whether the individual was lost in the years. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.
**** p<0.01, ** p<0.05, * p<0.1*

of the mean) among the treated group and had no significant effects on the comparison group.[26] Therefore, the estimates provide significant evidence for the effect of social pensions on mortality.

Our findings shed some lights on the mixed findings in the literature: Jensen (2004) finds a 5 percent increase in mortality after the pension system collapse in Russia in 1998,[27] but Snyder and Evans (2006) find a significant drop in mortality when the elderly receive less pension. Since the oldest-old people in rural areas are the poorest group in China, the basic pension matters signifi-

[26] Although the F-test cannot reject the null hypothesis for the coefficient difference due to large standard errors in the comparison group, the magnitude in the treated group is over three times larger than that in the comparison group.

[27] Jensen (2004) found that the income reduced by 24 percent and the two-year mortality increased by 5 percent, thus mortality-income elasticity = 0.21.

cantly to them. The back-of-envelop calculation of mortality-income elasticity in our study ranges from 0.18 to 0.60, compared to 0.21 in Jensen (2004).[28]

The next two columns investigate the causes of death. The results show that the NRPS-induced mortality reduction is mainly contributed by less likelihood of death without severe disease. This is reasonable because the deaths caused by severe disease are generally less likely to avoid by increasing nutritional intake or reducing work load.

Although the individuals who were lost are 8 percent of the full sample, it is not trivial when compared to the mortality rates. Because we have no information on whether the lost ones were dead or alive, we drop the individuals who are lost in these years and conduct the same regressions as in equation (4). Table A4 shows the results and they are fairly consistent with those in Table 8.

3.4 Effects of the NRPS on Children

The analysis above shows that the NRPS has significant effects on the labor and health outcomes for the elderly, indicating a direct and substantial improvement in wellbeing of old people. There also could be impacts on other household members given intrahousehold resource reallocation. Previous studies such as Duflo (2000, 2003) have shown that the expansion in social pensions improve the health status of the children. Inspired by this literature, we examine in this section whether the NRPS program has the similar effects on the outcomes of the children.

There is a separate section for children with ages between 0 and 15 (inclusive) in the CFPS, which collects their information on demographics, education, health, and living conditions. We confine this analysis to the rural children and choose four interested outcomes, including receiving pocket money, health status, care status, and in-school rate. For those aged 10 or above, the survey asked the children whether they received any pocket money and their general health status.

[28]Note that this sample is different from the CHARLS and CFPS sample since it overweights the people aged over 80 and those with lower income. In this sample, the median household income is 3,000 yuan per year in 2005, and the average household size in the CLHLS sample is 2.9. However, there is no information in CLHLS about the participation of new pension scheme. We thus conducted a back-of-envelope calculation suggesting the mortality-income elasticity ranges from 0.18 to 0.6 (i.e., the elasticity 0.18 is derived under assumption all the seniors participated, the elasticity 0.6 is derived suppose the NRPS participation rate just coverage is 0.3).

We plot the gender-specific proportion of receiving pocket money and that of reporting excellent health over age in Figures 4a and b, respectively. On average, there are 80 percent of children with ages 0-10 having pocket money and 55 percent reporting excellent health. There is no significant different between boys and girls. The other two questions were asked to the household head. The survey asked who would mainly take care of the children. We construct a dummy variable, and code it to 1 if the children were mainly taken care of by their grandparents. If the children were age-eligible for the schooling, the survey also asked whether they were in school currently. Figures 4c and d plot the gender-specific mean values of these two outcomes against the children's age. Figure 4c shows that, for the infants (i.e., children with ages 2 and below), about 20 percent of the children were mainly taken care of by their grandparents. The proportion reaches the peak at ages 3-4 (i.e., about 40-45 percent) and then goes down as the children growing up. Figure 4d presents an inverse-U shape for the proportion of in-school children over age. The rate increases before age 10, indicating some children were delayed to go to school; after age 13, the rate goes down rapidly, which implies some children dropped out.

We now conduct regressions to see whether and how the social pension program provision to the old people would influence these outcomes. Specifically, we estimate

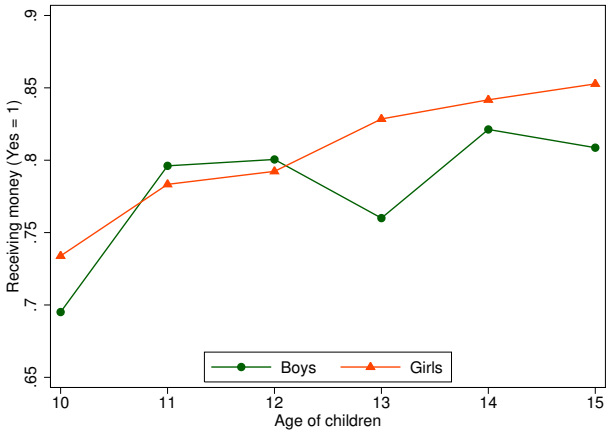
$$Y_{ict} = \theta_0 + \theta_1 NRPS_{ct} + \delta_c + \delta_t + \delta_{ag} + e_{ict} \tag{5}$$

The dependent variable, Y_{ict}, is now the outcomes for the children. All the other covariates are the same as those in equation 2. Considering the non-linearity in age patterns for the children, we include the gender-age dummies, δ_{ag}, in the regressions. All the standard errors are clustered at the county level.

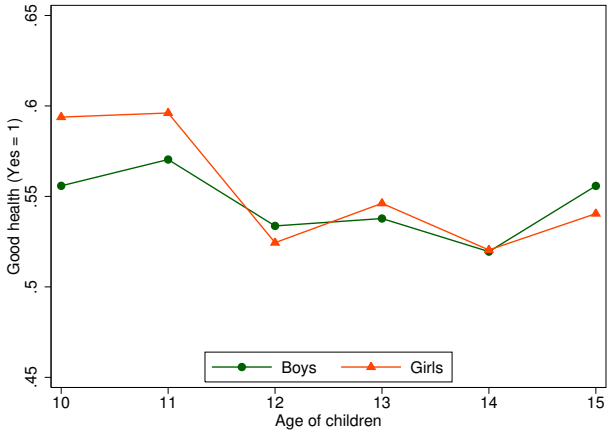
Table 9 shows the results. Column 1 shows that the NRPS increases the likelihood of having pocket money by 7-8 percentage points (10 percent), for both boys and girls. However, we are unable to verify if the pocket money is paid by their grandparents, i.e. the pension recipients, as the CFPS does not provide the information on the source of the money. Column 2 presents

Figure 4: Children outcomes over age, by gender of the child

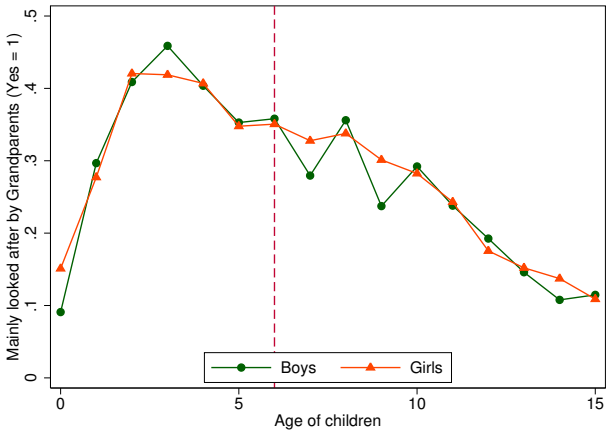
(a) Pocket money



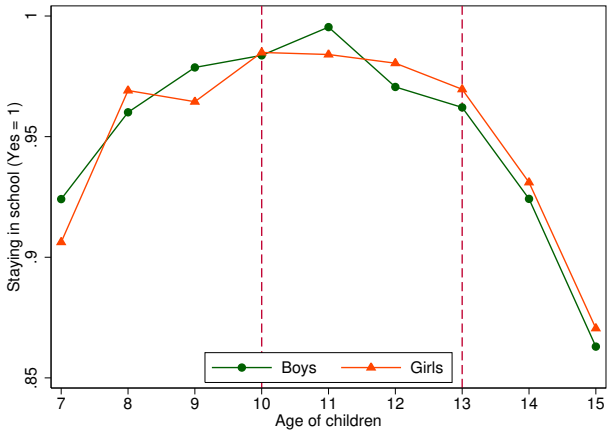
(b) Excellent Health



(c) Cared by grandparents



(d) In school now



NOTE: The data are from those ages 0-15 in the CFPS 2010-2012. The gender-specific mean values are plotted against age.

the results for health status of children with ages 10-15. It is shown that the NRPS significantly increases the likelihood of reporting excellent health by 10.6 percentage points (19 percent) for boys, but has no statistically significant impacts on the health status of girls. Columns 3 and 4 report the results for care status. We separate the children into two groups, the preschool children and those aged from 7 to 15. We find a significant effect of the NRPS on care status among boys with preschool ages. Specifically, the NRPS increases the likelihood of being taken care of by grandparents by 7.8 percentage points (22 percent). We find no significant effects for older boys, as well as girls in either age group.

The last three columns show the results for staying in school, by three different age groups. The three age groups, 7-10, 11-13, and 14-15 cover the in-school age of primary school, entry age of junior middle school (or graduation age of primary school), and the graduation age of junior middle school, respectively. We find that the NRPS increases the in-school rates for girls in the two ends - those with the ages 7-10 and those with ages 14-15. These suggest that the NRPS provision reduces the proportion of delayed receiving education at earlier ages and dropout rate at later ages for girls. Based on these results, we conclude that the social pensions increase the female human capital accumulation. We find no significant effects for boys.

3.5 Pre-trends Tests

Our previous analysis provides sound evidence for the effects of the NRPS among pension-eligible people and among children. However, the validity of the DID methodology cannot be taken for granted. For example, if the wave 1 counties have a more rapid improvement in health or development in economy prior to 2009, the effects identified by DID may just pick up the heterogeneous trends rather than the actual effects of the NRPS. The heterogeneous trends may be caused by county-year level unobserved factors.[29] Therefore, we plot the trends before the treatment (i.e., pre-trends) to test whether the presumption is true.

[29]We provide some evidence above to alleviate this concern that the NRPS-induced effects on income and health are much smaller and insignificant among the rural people aged below 60 and the urban people aged above 60.

Table 9: Impact of the NRPS on outcomes of children

Dependent variable	(1) Having pocket money (Yes = 1)	(2) Excellent health (Yes = 1)	(3) Looked after by grandparents (Yes = 1)	(4)	(5) Currently in school (Yes = 1)	(6)	(7)
Sample	Ages 10-15	Ages 10-15	Ages 0-6	Ages 7-15	Ages 7-10	Ages 11-13	Ages 14-15
Panel A: Results for Boys							
$NRPS_{ct}$	0.072*	0.106***	0.078**	-0.021	-0.035	0.007	-0.003
	(0.040)	(0.040)	(0.036)	(0.028)	(0.022)	(0.028)	(0.050)
Observations	2,452	2,449	3,160	3,694	1,769	1,300	861
R-squared	0.163	0.315	0.142	0.131	0.189	0.202	0.183
Mean of dep. var.	0.780	0.546	0.359	0.216	0.961	0.976	0.892
Panel B: Results for Girls							
$NRPS_{ct}$	0.083**	0.019	-0.024	0.018	0.030*	-0.023	0.086*
	(0.041)	(0.047)	(0.036)	(0.032)	(0.018)	(0.018)	(0.045)
Observations	2,320	2,317	2,737	3,382	1,563	1,158	865
R-squared	0.163	0.292	0.140	0.131	0.298	0.220	0.250
Mean of dep. var.	0.808	0.552	0.355	0.223	0.957	0.978	0.900

NOTE: The data are from those ages 0-15 in the CFPS 2010-2012. The covariates in the regressions in each column include dummies for gender-age, survey year and county. All the standard errors are clustered at the county level.
**** p<0.01, ** p<0.05, * p<0.1*

To shed some light on this, we collect prefecture-year panel data from 2003 to 2009 about the local economy, including the local GDP, local salary level, government revenue, government expenditure, and sanitary conditions such as the number of registered doctors and number of beds in local hospitals.[30]

Then we match the data to the counties and plot the macro economy indices over the calendar years by which wave the county started the NRPS. Panel A shows the pattern for the logarithm of GDP per capita. The time trends are fairly parallel across the counties with different starting year of the NRPS. We also conduct a regression with the interactions between the year and county groups dummies, and the F-test cannot reject the null hypothesis for the interactions (F-statistic = 0.19, P-value = 0.99). The similar patterns are also found for the other outcomes, including salary, government revenue and expenditure, and the quantity of doctors and beds in hospitals. These results suggest that the counties starting the NRPS in different years actually have no significant differences in trends for their local economic indices.

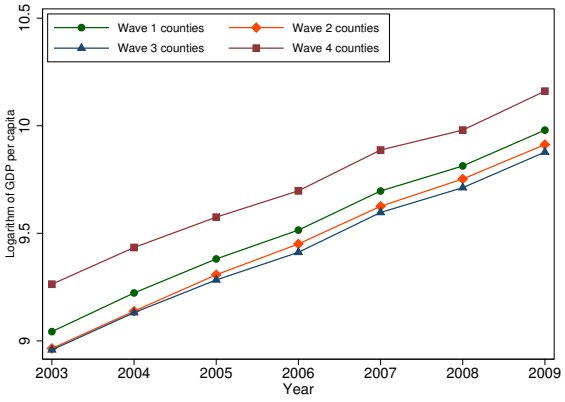
The mortality record data since 2005 provides information from four years before the starting year of the NRPS. We thus plot the mortality rates over each year since 2006, as shown in Figure 6, by the counties with different starting years. Prior to 2009, there are no obvious different trends across the different groups. We also conduct a regression for the sample prior to 2009, and the joint F-test cannot reject the null hypothesis (F-statistic = 1.48, P-value = 0.15). After 2009, the mortality usually drops most when the county was just covered by NRPS. For example, the mortality of the first wave counties dropped by 1.8 percentage points from 13.8 to 12.0 percent between 2009 to 2010, while the mortality of all the other counties actually increased during the same period. We emphasize that it is not just by accident because the second wave and fourth wave counties followed the similar pattern.[31]

[30]The micro-level data we use are from 2010 onwards, and thus it is impossible to plot and compare the pre-trends for both the treated and control groups using data from the CHARLS and the CFPS. Prefecture is one level higher than county according to the administrative system in China. There are no county-level statistical data for our selected variables. The data collect the balanced panel in 2003-2009 from local economy from 279 prefectures (97 percent of all counties) in mainland China.

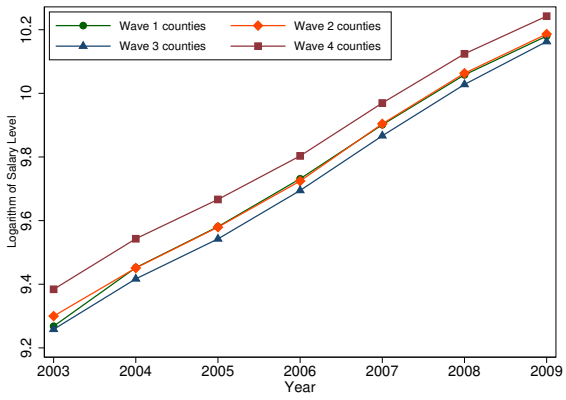
[31]For wave 2 counties, the mortality dropped by 4.36 percentage points from 2010 to 2011 and those for three other counties dropped 1.35, 4.12 and 1.82 percentage points; for wave 4 counties, the mortality dropped by 2.1 percentage points from 2012 to 2013.

Figure 5: Pre-trends Examination in counties, by Starting Year of NRPS

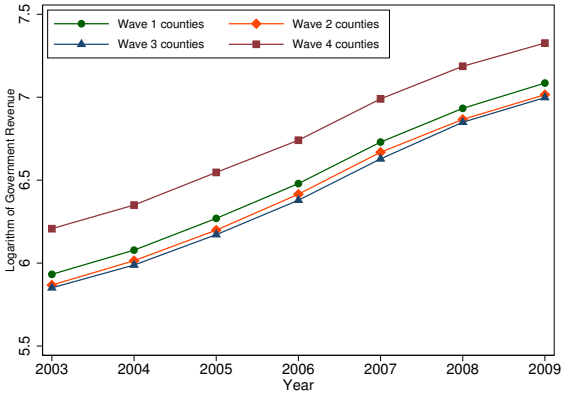
(a) Log(GDP per capita)



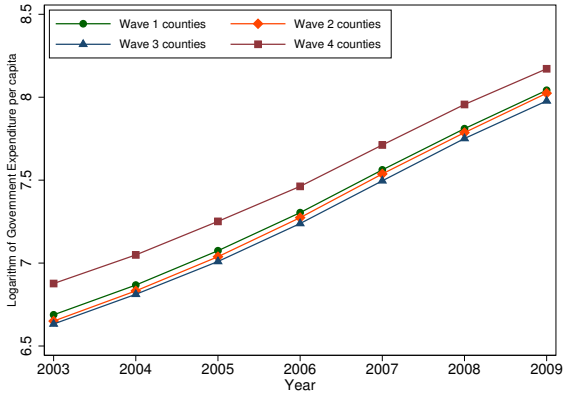
(b) Log(Salary)



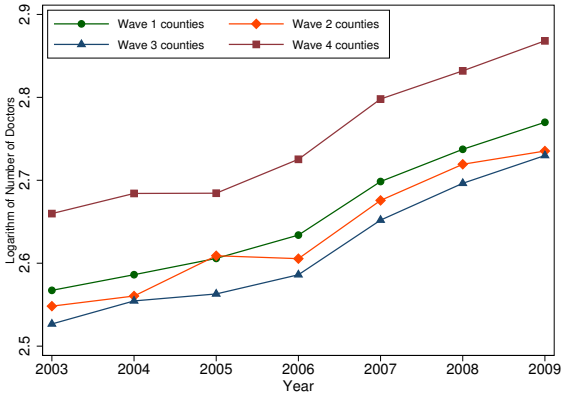
(c) Log(Government Revenue)



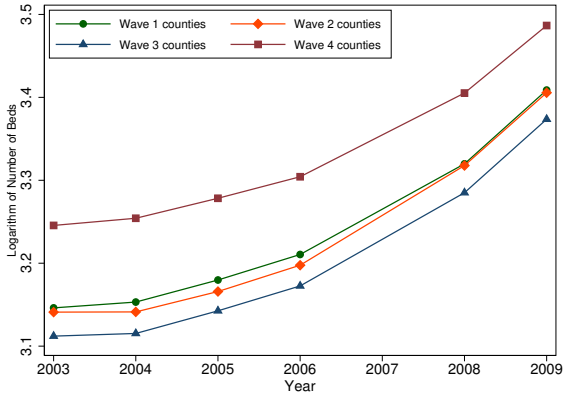
(d) Log(Government Expenditure)



(e) Log(Number of Doctors)

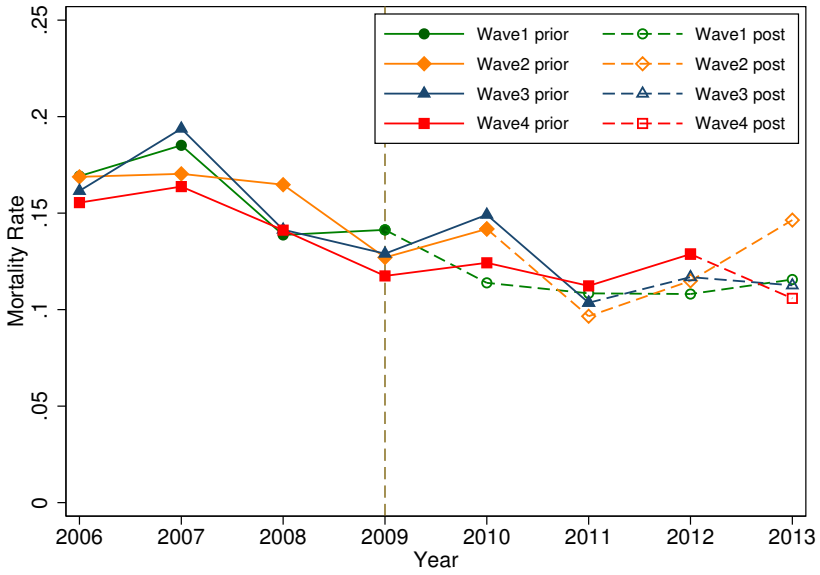


(f) Log(Number of Beds in Hospitals)



NOTE: The economic indexes from different prefectures are from China City Statistics Yearbook 2004-2010. The prefectures are grouped by the different starting years of the NRPS. Each figure plots the mean values of the logarithm of economic indexes over the calendar years from 2003 to 2009.

Figure 6: Mortality Time Trends in Counties, by NRPS Starting Year



NOTE: The mortality data are from CLHLS 2005-2014. The sample are divided by the different starting years of the NRPS. For each subsample, we plot the mean of mortality against the calendar year, with the solid lines for the period prior to the NRPS while dash lines for the period after the NRPS.

4 Conclusions and Discussion

This paper examines the effects of social pension provision on the lives of elderly in terms of income, expenditure, private transfers, labor supply, health, and mortality. We first conduct a cross-country analysis using aggregate-level data from 10 countries and find that the mortality of pension-eligible seniors dropped by around 2.0 percent just after the introduction of social pension, while there are no significant effects for the pension-ineligible people.

We then provide more detailed evidence from micro-level data by exploiting a policy experiment, the introduction of the New Rural Pension Scheme (NRPS) in China. First, we find the rural people with ages 60 and older have a 25 percentage points higher likelihood to receive pension immediately after the NRPS. Meanwhile, the NRPS increases the household income by 17.6 percent, food expenditure by 9.6 percent, and reduces labor supply by 3.0 percentage points (6.2 percent) and health insurance participation by 5.0 percentage points. Furthermore, the rates of reported disability and underweight reduce by 3.2 percentage points (11.4 percent) and 1.8 percentage points

(11.3 percent) after NRPS implementation, respectively. Finally, the analysis of an individual-year panel composed of those aged 65 and older in CLHLS shows that the implementation of NRPS reduces the mortality by 2.2 percentage points (14.4 percent).

In contrast, among the pension-ineligible groups, we do not find any significant effects on pension receipt, income, labor supply, health, and mortality. But the only exceptions are that, among the *hukou*-eligible people with ages below 60, the NRPS shifts their labor supply from farm work to non-farm work, and also reduces the health insurance participation.

To account for possible intrahousehold resource reallocation, we examine the effects of the NRPS on children aged below 15. We find that the NRPS generally leads to higher chances of receiving pocket money and being taken care of by grandparents, better self-reported health status, and a higher probability of at school, although the results vary across gender and age groups.

Our findings build up the ongoing literature that documents the short-term effects of social pensions or alike cash transfer programs on individual behaviors and welfare. Given the rapid population aging over the world, our analysis shows that a small portion of resources in a less developed economy such as China may generate substantial welfare improvements when the resources are properly allocated to the potentially vulnerable groups. In addition, since the NRPS is essentially a crash transfer program targeting the elderly, our findings also add new evidence to the causal mechanism from income to health status, which has long been studied in previous literature but of which the results are still inconclusive.

Although we exploit a natural experiment in China and employ the DID model in identifying the causal effects of a new pension program provision on a series of outcomes, the study still has some pitfalls. One of them is the measurement errors of reported income and expenditure. As mentioned in previous studies (e.g., Moore and Welniak 2000; Bound et al. 2001; Meyer and Sullivan 2003 etc.), the reported income and expenditure suffer serious measurement errors and the coefficients should be interpreted carefully.

Data Appendix

China Family Panel Studies (CFPS) CFPS is a biennial survey and is designed to be complementary to the Panel Study of Income Dynamics (PSID) in the United States. The first national wave was conducted under the collaboration of the Institute of Social Science Survey at Peking University and the Survey Research Center at the University of Michigan from April 2010 to August 2010. The five main parts of the questionnaire include communities, households, household members, adults and children data.

The 2010 round covered approximately 14,000 households in 25 provinces, in which 95% of the Chinese population reside. The population is divided into six subpopulation, i.e. five large provinces (Guangdong, Gansu, Liaoning, Henan, and Shanghai) and the other 20 provinces. The final sample is made to be representative of 25 provinces through careful weighting.

The survey sample was obtained by three-stage cluster sampling with unequal probabilities. In the first stage, 16 counties were sampled from each of the four large provinces and 32 township-level units from Shanghai, and 80 counties from 20 other provinces, with probability proportional to population size (PPS). In total there were 144 counties and 32 township-level units. In the second stage, 2 or 4 administrative villages or resident committees were sampled with PPS in each county or town. Together there were 640 villages or resident committees. In the third stage, 28-42 households were sampled from each village or resident committee, and in all there were about 16,000 households.

The national representative final sample covers 14,960 households and 33,600 adults (age 16+). The follow-up survey of CFPS was conducted in 2012, covers 13,448 households and 35729 adults, 12,724 households and 26,385 adults out of which originally covered in the baseline survey.

China Health and Retirement Longitudinal Studies (CHARLS) The China Health and Retirement Longitudinal Study (CHARLS) aims to collect a high quality nationally representative sample of Chinese residents ages 45 and older to serve the needs of scientific research on the elderly. The baseline national wave of CHARLS is being fielded in 2011. The individuals will

be followed up every two years. This study used the 2011 and 2013 two waves. In the base line survey, the sample was drawn in four stages. County-level units (counties or urban districts) were sampled directly. All county-level units in all provinces except for Tibet were stratified by 8 regions, by whether they were urban districts or rural counties, and by county GDP. They were sorted based on this stratification and 150 were randomly chosen proportional to population size. These counties cover 28 out of 30 provinces, other than Tibet. After the county units were chosen, the National Bureau of Statistics helped the CHARLS team to sample villages and communities within county units using recently updated village level population data. CHARLS sample used administrative villages in rural areas and neighborhoods, which comprise one or more formal resident committees, in urban areas as primary sampling units (PSUs). CHARLS then sampled three PSUs within each county-level unit, using PPS sampling, for a total of 450 PSUs. In each PSU, the CHARLS team constructed sampling frame using Google Earth base maps and a CAPI (computer assisted personal interview) program was then used to sample households and to conduct the interviews using laptops. All age-eligible sample households who were willing to participate in the survey were interviewed, with 10,257 households containing 18,245 respondents aged 45 and over and their spouses ultimately interviewed. The follow-up survey covers 10,979 households containing 19,666 respondent, with 16,159 (9,185) out of 18,245 (10,257) individuals (households) in the baseline survey successfully re-interviewed and 3507 individuals in 2,053 households newly interviewed. The main questionnaire includes information on basic demographics, family, health status, health care and health insurance, work, retirement and pension, and household economy (income, consumption and wealth).

Chinese Longitudinal Healthy Longevity Survey (CLHLS) The CLHLS is a longitudinal survey conducted by the Center for Healthy Aging and Family Studies in Peking University, sponsored and supported by the National Institute on Aging, United Nations, Duke University and Max Planck Institute for Demographic Research. Demographic and statistical methods are used to analyze data in the longitudinal surveys with the research goal of determining which factors, out of a

large set of social, behavioral, biological, and environmental risk factors play an important role in healthy longevity.

The baseline survey was conducted in 1998, with follow-up surveys with replacements for deceased elders were conducted in 2000, 2002, 2005, 2008, 2011 and 2014 in a randomly selected half of the total number of counties and cities in the 22 out of 31 provinces in mainland China. The survey areas covered 1.1 billion people, 85 percent of the total population in China. An enumerator and a nurse or a medical school student conducted the interview and performed a basic health examination at each interviewee's home. We use data from the longitudinal datasets staring from the 2005 wave. The 2005 wave interviewed 15,638 individuals, with 4,955 young elderly aged 65-79 and 10,658 oldest-old aged 80+ (including 2,797 centenarians, 3,952 nonagenarians and 3,909 octogenarians), and another 25 elders who are younger than age 65.

References

Aizer, Anna, Shari Eli, Joseph Ferrie, and Adriana Lleras-Muney, "The Long Run Impact of Cash Transfers to Poor Families," *American Economic Review*, Forthcoming.

Anderson, Michael L, "Multiple inference and gender differences in the effects of early intervention: A reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects," *Journal of the American statistical Association*, 2012.

Angelucci, Manuela and Giacomo De Giorgi, "Indirect Effects of an Aid Program: How Do Cash Transfers Affect Ineligibles' Consumption?," *American Economic Review*, 2009, *99* (1), 486–508.

Ardington, Cally, Anne Case, and Victoria Hosegood, "Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa," *American Economic Journal: Applied Economics*, 2009, *1* (1), 22–48.

Atalay, Kadir and Garry F Barrett, "The impact of age pension eligibility age on retirement and program dependence: Evidence from an australian experiment," *Review of Economics and Statistics*, 2015, *97* (1), 71–87.

Attanasio, Orazio P and Agar Brugiavini, "Social security and households' saving," *The Quarterly Journal of economics*, 2003, pp. 1075–1119.

_ and Susann Rohwedder, "Pension wealth and household saving: Evidence from pension reforms in the United Kingdom," *American Economic Review*, 2003, pp. 1499–1521.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan, "How Much Should We Trust Differences-in-Differences Estimates?," *Quarterly Journal of Economics*, 2004, *119* (1).

Bitler, Marianne P, Jonah B Gelbach, and Hilary W Hoynes, "Welfare reform and health," *Journal of Human resources*, 2005, *40* (2), 309–334.

Bound, John, Charles Brown, and Nancy Mathiowetz, "Measurement error in survey data," *Handbook of econometrics*, 2001, *5*, 3705–3843.

Calonico, Sebastian, Matias D Cattaneo, and Rocio Titiunik, "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs," *Econometrica*, 2014, *82* (6), 2295–2326.

Card, David, Carlos Dobkin, and Nicole Maestas, "The Impact of Nearly Universal Insurance Coverage on Health Care Utilization: Evidence from Medicare," *American Economic Review*, 2008, *98* (5), 2242–58.

_ , _ , and _ , "Does Medicare Save Lives?*," *The Quarterly journal of economics*, 2009, *124* (2), 597–636.

Case, Anne, "Does Money Protect Health Status? Evidence from South African Pensions," Working Paper 8495, National Bureau of Economic Research October 2001.

_ **and Angus Deaton**, "Large Cash Transfers to the Elderly in South Africa," *Economic Journal*, 1998, pp. 1330–1361.

_ **and Francis Wilson**, "Health and well-being in South Africa: evidence from the Langeberg Survey," *Research Program in Development Studies, Princeton, NJ (December). Processed*, 2000.

Chaloupka, Frank J and Kenneth E Warner, "The economics of smoking," *Handbook of health economics*, 2000, *1*, 1539–1627.

Chan, Sewin and Ann Huff Stevens, "Do changes in pension incentives affect retirement? A longitudinal study of subjective retirement expectations," *Journal of Public Economics*, 2004, *88* (7), 1307–1333.

Coile, Courtney and Jonathan Gruber, "Social security and retirement," Technical Report, National Bureau of Economic Research 2000.

Cutler, David M and Richard Johnson, "The birth and growth of the social insurance state: explaining old age and medical insurance across countries," *Public Choice*, 2004, *120* (1-2), 87–121.

Duflo, Esther, "Child health and household resources in South Africa: Evidence from the Old Age Pension program," *American Economic Review*, 2000, pp. 393–398.

_ , "Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa," *The World Bank Economic Review*, 2003, *17* (1), 1–25.

Evans, William N and Timothy J Moore, "The short-term mortality consequences of income receipt," *Journal of Public Economics*, 2011, *95* (11), 1410–1424.

_ **and** _ , "Liquidity, economic activity, and mortality," *Review of Economics and Statistics*, 2012, *94* (2), 400–418.

French, Eric, "The effects of health, wealth, and wages on labour supply and retirement behaviour," *The Review of Economic Studies*, 2005, *72* (2), 395–427.

Frijters, Paul, John P Haisken-DeNew, and Michael A Shields, "The causal effect of income on health: Evidence from German reunification," *Journal of Health Economics*, 2005, *5* (24), 997–1017.

Gustman, Alan L and Thomas L Steinmeier, "Effects of social security policies on benefit claiming, retirement and saving," *Journal of Public Economics*, 2015, *129*, 51–62.

Hoynes, Hilary, Diane Whitmore Schanzenbach, and Douglas Almond, "Long-Run Impacts of Childhood Access to the Safety Net," *American Economic Review*, April 2016, *106* (4), 903–34.

_ **, Douglas L Miller, and Jessamyn Schaller**, "Who Suffers During Recessions?," *The Journal of Economic Perspectives*, 2012, *26* (3), 27–47.

Jensen, Robert T, "Do private transfers displace the benefits of public transfers? Evidence from South Africa," *Journal of Public Economics*, 2004, *88* (1), 89–112.

_ **and Kaspar Richter**, "The health implications of social security failure: evidence from the Russian pension crisis," *Journal of Public Economics*, 2004, *88* (1), 209–236.

Kling, Jeffrey R, Jeffrey B Liebman, and Lawrence F Katz, "Experimental analysis of neighborhood effects," *Econometrica*, 2007, *75* (1), 83–119.

Leisering, Lutz, Sen Gong, and Athar Hussain, *People's Republic of China: Old-age Pensions for the Rural Areas: from Land Reform to Globalization*, Asian Development Bank, 2002.

Madrian, Brigitte C and Dennis F Shea, "The Power of Suggestion: Inertia in 401 (k) Participation and Savings Behavior*," *The Quarterly journal of economics*, 2001, *116* (4), 1149–1187.

Meyer, Bruce D and James X Sullivan, "Measuring the Well-Being of the Poor Using Income and Consumption.," *Journal of Human Resources*, 2003, *38* (4).

Moore, Jeffrey C and Edward J Welniak, "Income measurement error in surveys: A review," *Journal of Official Statistics*, 2000, *16* (4), 331.

Poterba, James, Steven Venti, and David A. Wise, "Health, Education, and the Postretirement Evolution of Household Assets," *Journal of Human Capital*, 2013, *7* (4), 297 – 339.

Ruhm, Christopher J, "Are Recessions Good for Your Health?," *The Quarterly Journal of Economics*, 2000, *115* (2), 617–650.

Shi, Shih-Jiunn, "Left to market and family–again? Ideas and the development of the rural pension policy in China," *Social Policy & Administration*, 2006, *40* (7), 791–806.

Snyder, Stephen E and William N Evans, "The effect of income on mortality: evidence from the social security notch," *The Review of Economics and Statistics*, 2006, *88* (3), 482–495.

Staubli, Stefan and Josef Zweimüller, "Does raising the early retirement age increase employment of older workers?," *Journal of public economics*, 2013, *108*, 17–32.

Wagstaff, Adam, Magnus Lindelow, Gao Jun, Xu Ling, and Qian Juncheng, "Extending health insurance to the rural population: An impact evaluation of China's new cooperative medical scheme," *Journal of Health Economics*, 2009, *1* (28), 1–19.

Wang, Dewen, "China's Urban and Rural Old Age Security System: Challenges and Options," *China & World Economy*, 2006, *14* (1), 102–116.

Table A1: Effects of the NRPS on living arrangement and migration

VARIABLES	(1) Log(Household size)	(2) Cross-county migrants (Yes =1)
Panel A: Age-eligible group		
$NRPS_{ct}$	0.001	-0.021
	(0.014)	(0.018)
Observations	20,870	11,518
R-squared	0.265	0.133
Panel B: Age-ineligible group		
$NRPS_{ct}$	-0.001	-0.007
	(0.011)	(0.011)
Observations	28,240	16,445
R-squared	0.290	0.145

Notes: The data are from those ages 45 and above in CHARLS and CFPS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level. *** p<0.01, ** p<0.05, * p<0.1

Table A2: Effects of the NRPS in eligible group, weighted by represented population size in each dataset

Dependent variables	(1) HH receiving pension (Yes = 1)	(2) Log (HH income)	(3) Received private transfer (Yes = 1)	(4) Log(private transfer)	(5) Log(HH expenditure)	(6) Log(Food expenditure)
Mean of Y	0.43	9.67	0.380	6.667	9.478	8.551
$NRPS_{ct}$	0.254***	0.178**	-0.000	0.127	0.032	0.096*
	(0.039)	(0.070)	(0.027)	(0.100)	(0.044)	(0.058)
Observations	21,434	20,584	21,300	8,099	16,220	15,906
R-squared	0.435	0.221	0.151	0.193	0.189	0.262

	(7) Working now (Yes = 1)	(8) Unhealthiness score	(9) Reported fair/poor health (Yes =1)	(10) Reported disable (Yes = 1)	(11) Underweight (Yes =1)	(12) Health Insurance participation (Yes = 1)
Mean of Y	0.477	0.312	0.740	0.304	0.153	0.882
$NRPS_{ct}$	-0.047***	-0.126***	-0.020	-0.044**	-0.017*	-0.050**
	(0.018)	(0.048)	(0.054)	(0.020)	(0.009)	(0.021)
Observations	21,357	17,723	21,175	21,164	17,726	21,508
R-squared	0.223	0.165	0.195	0.191	0.120	0.134

Notes: The data are from those ages 45 and above in CHARLS and CFPS. All the regressions are weighted by the represented population of the datasets. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, survey year and county. All the standard errors are clustered at the county level.
*** p<0.01, ** p<0.05, * p<0.1

Table A3: Effects of the NRPS on Labor Supply and Insurance Participation, Ages 45-49 and Rural *hukou*

Variables	(1) Working now (Yes = 1)	(2) Farming work (Yes = 1)	(3) Non-farming work (Yes =1)	(4) Health Insurance Participation (Yes=1)
Mean of Y	0.761	0.534	0.228	0.917
$NRPS_{ct}$	0.003	-0.043	0.045*	-0.034*
	(0.027)	(0.029)	(0.023)	(0.018)
Observations	10,568	10,549	10,549	10,680
R-squared	0.238	0.231	0.245	0.145

NOTE: The data are from those ages 45-49 in CFPS and CHARLS. The covariates in the regressions in each column are the same with those in 3.
**** p<0.01, ** p<0.05, * p<0.1*

Table A4: Effects of the NRPS on Mortality in the CLHLS, without those without mortality information

Variables	(1) Died in this year (Yes =1)	(2) Died due to severe disease (Yes =1)	(3) Died but have no severe disease (Yes =1)
Panel A: Living in rural area and having no retirement scheme			
Mean of Y	0.157	0.0565	0.101
$NRPS_{ct}$	-0.0223**	-0.00417	-0.0181**
	(0.00981)	(0.00657)	(0.00817)
Observations	28,407	28,407	28,407
R-squared	0.137	0.060	0.124
Panel B: Living in urban area and having retirement scheme			
Mean of Y	0.124	0.0565	0.0690
$NRPS_{ct}$	-0.00798	-0.00359	-0.00438
	(0.0155)	(0.0122)	(0.0107)
Observations	7,456	7,456	7,456
R-squared	0.201	0.131	0.190

NOTE: The data are from the CLHLS. The covariates in the regressions in each column include age and its square, and dummies for gender, education level, calendar year and county. All the standard errors are clustered at the county level. The F-statistics in the bottom of each panel test whether differences with those for the rural people with ages 60 and over are significant or not.
**** p<0.01, ** p<0.05, * p<0.1*