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ABSTRACT

Social Security Expansion and Neighborhood Cohesion: Evidence from Community-Living Older Adults in China

Grants and services provided by the government may crowd out informal arrangements, thus weakening informal caring relations and networks. In this paper, we examine the impact of social security expansion on neighborhood cohesion of elders using China's New Rural Pension Scheme (NRPS), one of the largest existing pension program in the world. Since its launch in 2009, more than 400 million Chinese have enrolled in NRPS. We use two waves of China Health and Retirement Longitudinal Study (CHARLS) to examine the effect of pension receipt on two dimensions of neighborhood cohesion among older adults, i.e. participation in collective recreational activities (e.g., socializing and organizational activities) and altruistic activities (e.g., helping those in need in the community), and the frequencies of these activities. Employing an instrumental variable approach, our empirical strategy addresses the endogeneity of pension receipt via exploiting geographic variation in pension program roll-out. We find evidence that receiving pension only slightly reduces collective recreational activities while significantly crowding out altruistic activities in the communities.

JEL Classification: H55, I38, O22

Keywords: neighborhood cohesion, pension, crowd out, diversity

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1. Introduction

Neighborhood cohesion has long been argued to play an important role in the health and well-being of the aging population through, for example, informal network of relationships and shared values (Blazer, 1982; Tomaka et al., 2006; Golden et al., 2009; James et al. 2011; Hudson, 2017). A lack of social contacts among older adults has been shown to be associated with an estimated $6.7 billion in additional Medicare spending annually in the U.S. (Flowers et al., 2017). The rapid aging of the world population further highlights the importance of attention to the health and well-being of older adults. To alleviate poverty and mitigate its health effects in older adults, governments of 106 countries have rolled-out social pension programs (Pension Watch, 2017). Despite increasing efforts to evaluate the impacts of pensions on the elderly's income, health, and well-being (e.g., Case, 2004; Jensen and Richter, 2004; Lei et al., 2015; Chen et al., 2019), existing research has failed to adequately explore the causal impact of pension income on neighborhood cohesion, such as via social networking and social support.

Although government programs in services and income support have been found to bring multiple benefits (e.g., Duflo, 2000; Lovo, 2011; Hoynes et al., 2016; Cheng et al., 2018), some have promoted a crowding out hypothesis, in which grants and services provided by the government may reduce social networks and other informal arrangements (Etzioni, 1995; Putnam, 2000). Studies based on household survey data and experiments mainly focus on the crowding out effect on private transfers and predict varying degrees of crowding out effects of public transfers (e.g., Cox et al., 1998; Albarran and Attanasio, 2003; Juarez, 2009; Jensen, 2004; Stadelmann-Steffen, 2011). Despite dominant findings on crowd-out effects in the literature, some studies based on cross-country comparison refute the claims of crowding out. Comparing eight-scale measurement model of social capital of 23 European countries at both country and individual levels, Van Oorschot and Arts (2005) find that the only evidence for crowd-out effect lies in the case of people's trustworthiness, and most of their findings regarding other forms of social capital, for example, relations with friends, trust in institutions, and interpersonal trust, contradict the crowding out hypothesis. Some other researchers find that more generous welfare payments benefit neighborhood cohesion by increasing the total insurance available to people (e.g., Heemskerk et al., 2004; Gelissen et al., 2012). These contradictory findings suggest that crowd-out effects may vary across different contexts and methods.

Empirical research examining the causal relationship between public pension programs and neighborhood cohesion, an important form of public goods, is limited. The expansion of the New Rural Pension System (NRPS) in China, a nationwide pension system, presents an ideal opportunity to explore the potential crowding out effects related to expanding pension benefits. Launched in 2009, the NRPS is a public transfer of resources to residence above 60 in rural China. It is non-contributory for the elderly above age 60 at the time of roll-out in the county, and whether an individual is eligible to receive this pension does not depend on the own past work history[1].

This paper explores the impact of pension benefits on two essential dimensions of neighborhood cohesion of the elderly, i.e., collective recreational activities and altruistic activities such as helping others in the community[2]. We do this by empirically testing the effects of the NRPS on individuals' participation in *collective recreational activities* (measured by playing Ma-jong, chess, cards, going to a sport, social, or other kinds of community clubs, or joining a community-related organization) and in *altruistic activities* (measured by voluntarily providing help to or caring for those in need in the community).

Theoretically, the effects of receiving pension on elders' neighborhood cohesion as indicated by collective recreational activities and altruistic activities are ambiguous. First, collective recreational activities include collectively organized activities in the community that are mainly recreational and to some extent also help build or maintain networks in the neighborhood. More income may enable older adults to devote more leisure time to such activities because of the income effect. However, the pension program offers an alternative form of risk sharing, which may weaken demand for social networking function of collective recreational activities and therefore lower realized participation in such activities. Second, altruistic activities involve providing social supports to those in need, partly in exchange for informal insurance against future risks. On the one hand, receiving a pension may relax budget constraints on both time and money, effectively conferring greater resources on elders to invest more efforts in altruistic activities that add to neighborhood cohesion. On the

[1] In some area, NRPS has a "binding" scheme requiring all pensioners' adult children to participate.
[2] In some studies, such as Pynnönen et al. (2012), they divide social activities into collective (e.g., cultural and organizational activities) and productive (e.g., helping others) social activity, which is very similar to our classification.

other hand, government-funded pensions may offer more financial security in old age, which in turn crowd out elders' demand for social support and therefore may attenuate individuals' propensity to offer support to the community. In both cases of collective recreational activities and altruistic activities, the pension program is expected to erode neighborhood cohesion if the crowd-out effect dominates, or strengthen neighborhood cohesion if the income effect dominates. Relative to collective recreational activities, altruistic activities are reciprocal with more feature of public goods for risk sharing, and thus may tend to be subject to more crowd-out because of pension. Therefore, we hypothesize that pension provision may discourage altruistic activities more than collective recreational activities.

To test these hypotheses, we use the waves 2011 and 2013 of the China Health and Retirement Longitudinal Study (CHARLS). The CHARLS is a nationally representative sample of Chinese residents aged 45 and above collected by Peking University. It was designed as a HRS-sister[3] study to facilitate cross-country comparisons. Our analysis is restricted to rural residents age 60 and older with rural-*Hukou* and had not participated in other social pension programs, which means they were eligible to receive the NRPS pension. To overcome the endogeneity of pension receipt, we use the duration of the NRPS in the county as the instrumental variable in the main analyses. Reduced form analyses also used to check the robustness of the results.

We also examine potential heterogeneities of pension program effects on recreational and altruistic activities to better understand the mechanisms behind our main findings. Specifically, we test the effects of pension by community diversity (defined by whether to have two major surnames accounting for more than half of the local population) and by family income. We show that pension benefits impose no significant impact on collective recreational activities, even for the poor whose budget tends to be more binding. Meanwhile, pension saliently crowds out altruistic activities, but no distinguishable effects are identified by community diversity. Our suggestive evidence indicates no declined social support pensioners may obtain from others as a results of pension receipt, therefore the crowd-out of altruistic activities can be interpreted as formal old age support in the form of pension replacing some demand for risk insurance scheme.

[3] The Health and Retirement Study (HRS) is a longitudinal survey of individuals over age 50, which was sponsored by the National Institute on Aging (NIA) and the Social Security Administration in America since 1990. The data have been widely used to study important questions about aging population. Website: http://hrsonline.isr.umich.edu/

The paper makes novel contributions to the literature on public pensions and neighborhood cohesion. First, to our knowledge, we are the first to explore the causal relationship between pension and neighborhood cohesion at the individual level. Previous literature about the impacts of pension was mostly focused on income, health, well-being, private transfers, and living arrangements. (e.g., Jensen, 2004; Cai et al., 2012; Cheng et al., 2016, 2018; Chen et al., 2019). None has explored its effect on recreational and altruistic activities. Another branch of literature on the relationship between the welfare system and social capital is mostly country comparisons. The findings from previous studies are incomplete and potentially biased considering that they cannot control for all key differences that might affect social capital across countries (e.g., Van Oorschot and Arts, 2005; Stadelmann-Steffen, 2011). Thus, our study adds to the limited literature on the evaluation of social pension programs. Second, our results might be important for policy discourse. We show that even a modest public pension can have important implications for neighborhood cohesion via reduced altruistic activities among older adults. Given that many countries are aging fast with limited societal support, our study may have important policy implications globally.

The rest of the paper is organized as follows. Section 2 introduces the New Rural Pension System in China. Section 3 describes the data. Section 4 lays out the identification strategy. Section 5 presents our main results and subgroup results, including interpretations and discussions. Section 6 offers concluding remarks.

2. China's New Rural Pension System

Against the backdrop of rapid economic growth, China is aging rapidly. A combination of an increasing life expectancy and a declining fertility rate have led to an acceleration of demographic aging in China, following the introduction of the One-Child Policy in the 1970s. However, the formal social safety net for the rural elderly population was almost non-existent before 2009. To provide a robust system of old-age support, in 2009 China launched a pension program, the NRPS, for rural residents. By 2012, the NRPS covered more than four hundred million Chinese, among whom almost ninety million had reached the eligible age of 60 for pension payment. The eligibility to receive this pension does not depend on the past work history.

The financing of the pension payment consists of three parts, i.e., an individual premium, a local government subsidy, and a central government subsidy. Besides subsidies from the central government to finance the basic noncontributory pension, provincial and county governments (local governments) jointly finance subsidies, starting at 30 CNY, into the individual account. People can choose the individual premium level to pay pension premiums towards their personal accounts. According to the guidance released by the State Council of China, there are five categories of individual premiums: 100, 200, 300, 400, and 500 CNY per year per person. While some provinces have additional categories of individual premiums at 600, 700, 800 CNY or higher per year per person, a majority of participants only choose to pay the lowest level of premium, i.e., 100 CNY (Lei et al., 2013).

Under the NRPS, there are two types of pension payments, i.e., a basic noncontributory pension and an individual pension account. Both are paid to participants when they reach the age of sixty. Firstly, a basic pension, financed by the collective fund, is available to all residents and does not require any premium contributions. Many provinces set 55-60 CNY per month per person as the basic pension benefit, while a few rich provinces, such as Beijing and Tianjin, set the basic pension benefits to be 150-360 CNY per month per person. Since people who were older than age 60 when the NRPS was rolled out have no individual account, the basic pension is the only form of payment they can obtain. Those below age 60 when the NRPS was implemented in the local county are required to accumulate premium contributions to the individual account to receive pension benefits when they turn age 60. Therefore, the pension payment is higher for seniors who invested in their individual account before age 60.

China's NRPS was gradually expanded to the whole country (Figure 1). As stated in the official document No. [2009]32 (State Council of China, 2009), the central government attempted to select counties for pilot implementation without any written criteria. Also, Chen et al. (2019) test for whether county government self-selected into pilot implementation or its roll-out timing based on a rich set of observable characteristics and find none. The first pilot starting at the end of 2009 covered roughly 10 percent counties; the second pilot starting in August 2010 increased the number of counties covered to 25 percent; the third pilot was implemented from July 2011, and 60 percent counties were covered. All the rest counties were covered by the end of 2012 according to the official documents released by the Ministry of Human Resources and Social Security. Figure 2 shows the distribution of NRPS duration.

For all elders who receive the pension payment, the pension income accounts for roughly 15 percent of earned income (CHARLS 2011). However, the NRPS may demonstrate heterogeneous impacts given China's large economic disparities. For example, pension payment accounts for more than half of the income per capita for a household in the lowest 10th income percentile in China (Cai et al., 2012). Since the older population on average earns much less than the younger people, and agriculture is often the only source of income for rural older adults in China, the NRPS may therefore account for a larger portion of income for older persons than for younger cohorts, especially in regions that are lagging behind (Chen et al., 2017; Chen et al., 2017).

3. Data and descriptive analysis

In this paper, we use the China Health and Retirement Longitudinal Study (CHARLS), a nationally representative sample of Chinese residents age 45 and older collected by Peking University. The baseline national wave in 2011 includes about 10, 000 households, 17, 500 individuals in 450 villages/communities. The 2013 follow-up wave successfully resurveyed more than 85 percent of the 2011 baseline sample. We use both wave 2011 and wave 2013 in our analysis.

The CHARLS collects rich information including individual demographic characteristics, social relations and activities, household economic background and community characteristics. In both waves, respondents were asked to recall whether they had participated in a given list of social activities in the last month. Further, they chose the frequency from three options - "Almost daily," "Almost every week" and "not regularly" for each activity that they had participated in. To standardize the frequency variable, we recode the frequency variables into 1 (never), 2 (not regularly), 3 (almost every week), 4 (almost daily). For empirical analysis, we define neighborhood cohesion in two dimensions and set each activity into one of them. One dimension is "collective recreational activities," which include following options: "played Ma-jong, played chess, played cards, or went to community club," "went to a sport, social, or other kinds of clubs," and "took part in a community-related organization." The second dimension is "altruistic activities, " which include two activities: "provided help to family, friends, or neighbors who do not live with you and who did not pay you for the help" and "cared for a sick or disabled adult who does not live with you and who did not pay you for the help." In the analyses, we have two variables for each dimension. The first is a binary variable which takes

the value of 0 when the respondent had not undertaken given activities in the last month and takes the value of 1 when the respondent had done those activities. The other is an ordinal variable that represents the frequency of the collective recreational activities / altruistic activities, which takes the maximum value of frequencies of all sub-activities, from 1 (never) to 4 (almost daily).

The primary analysis is restricted to 10,271 elders above age 60 with rural-*Hukou* and had not participated in other social pension programs, which means they were eligible to receive the NRPS pension. Table 1 shows the summary statistics of variables in the main analysis. Pension income and family assets are deflated to 2011 constant price using consumer price index.

4. Empirical Strategy

In this paper, we estimate the following equation to identify the causal relationship between receiving pension and neighborhood cohesion:

$$y_{it} = \gamma NRPS_{it} + X'_{it}\beta + Prov'_i + T_t + \epsilon_{it} \quad (1)$$

where y_{it} denotes whether the respondent i had participated in collective recreational / altruistic activities in the last month of the interview and frequencies of each type of activities $NRPS_{it}$ represents the binary variable pension receipt, indicating whether the respondent receives the pension. X_{it} is a vector of individual demographic characteristics, such as gender, age, age squared, education, and marital status. Other control variables include whether living with children, log family assets, community size dummies and average per capita income at community level. $Prov_i$ and T_t are provincial and year fixed effect, respectively. The estimates are clustered at the community level.[4] Results are adjusted for sampling weights provided by the CHARLS.

If unobserved factors, such as personal preferences and life experiences, cause a correlation between participation in NRPS and social activities, then the estimator will be biased. To instrument for pension receipt and pension benefits, we measure NRPS duration by the time gap between NRPS roll-out at the county level (see Figure 1 for a visualization of variations in

[4] Our results are also robust to clustering at the county level where the official documents/policies were issued for the NRPS.

roll-out year) and the interview date for each respondent. Since the central and provincial government decide when to implement NRPS in counties, both NRPS roll-out timing and the interview date are exogenous to households and individuals (Cheng et al., 2016; Chen et al., 2019).[5] We recode the time gap to 0 if the respondent was interviewed before the introduction of the NPRS in the county. Our results are also robust to dropping those recoded respondents. The first stage equation is:

$$NRPS_{it} = \alpha NRPSduration_{it} + X''_{it}\sigma + Prov'_i + T_t + \mu_{it} \quad (2)$$

The instrument variable approach estimates the local treatment effect of pension, which identifies the causal impact of pension for the group of compliers, i.e., who receive pension income with the introduction of the local NRPS and who would not receive pension income without the introduction of the local NRPS.

To further test the robustness of the results, we also use a simple reduced form strategy to estimate the effect of NRPS duration on individuals' social activities described by the following equation:

$$y_{it} = \beta_0 + \lambda NRPSduration_{it} + X''_{it}\eta + Prov'_i + T_t + \epsilon_{it} \quad (3)$$

The dependent variable y_{it}, covariates X'_{it} and D_{it}' are the same as those in equation (1). As discussed before, the NRPS duration in the county is exogenous to households and individuals. We can obtain an intent-to-treat (ITT) estimate of the effect of the NRPS.

5. Results

5.1 Main results

We start with presenting the OLS estimates for pension receipt in Table 2. Columns 1-2 show that receiving pension increases the probability and the frequency of elders' collective recreational activities, while columns 3-4 display that pension barely affects altruistic activities.

Our preferred strategy for estimating the effects of receiving pension is to instrument the pension enrollment. As participation in NRPS and social activities might be correlated, more socially active elders might be more likely to enroll in the NRPS, the OLS estimate may

[5] Chen et al. (2019) regress county-level NRPS roll-out duration on a rich set of county-level characteristics as well as a rich set of characteristics of key politicians, and find no significant association.

underestimate the impact of the pension. Table 3 shows the results using the IV approach. Column 1 examines the first stage correlation between county-level pension roll-out duration and individual pension enrollment, including the likelihood of pension receipt. The first-stage coefficient of the instrumental variable is positive and significant, indicating that individual pension receipt is strongly positively correlated with NRPS duration in the county. Specifically, one year earlier a county implements the NRPS, elders who are living in the county will have 6.3 percentage points higher rate of receiving pension. The first-stage F-statistics are 36, well above the usual threshold value for weak–strong IV test.

Different from the OLS estimation results in Table 2, the second stage results (Column 2 - 5 of Table 3) suggest that receiving a pension has a negative but insignificant effect on collective recreational activities[6], while pension significantly reduces the incidence of engaging in altruistic activities by 14.3 percentage points, and reduces the frequency of altruistic activities by 0.18.

For robustness, we also estimate these models in reduced form regressions. The estimates are shown in Table 4, measuring the impact of the NRPS duration on elders' social activities. In general, the results are consistent with the IV estimates. Specifically, one year earlier a community implements the NRPS decreases the probability of altruistic activities by 0.9 percentage point and lowers the frequency by 0.01. Similar to the IV estimations, the NRPS duration in the community imposes insignificant negative effects on the probability of elders' participating in collective recreational activities and the frequency of such activities.

It is possible that pensioners reduce social support to others in response to declined support they obtain from others in the community. To test this possible channel, in Table A1 we restrict our analysis to the subsample of non-pensioners only and repeat the 2SLS estimations. As shown in the last row of Table 1, non-pensioners account for about 60 percent of older adults in the analytical sample. In column (1) we regress community pension receipt rate on NRPS duration at the county level (our instrumental variable) and control for the same set of covariates as in our main estimations in Table 3. In columns (2) and (3) we regress elders' altruistic activities and their frequency on the community pension receipt rate using the

[6] We also separately estimate each item of collective recreational activities, but find none is statistically significant. These results suggest that it is unlikely the muted effect on collective recreational activities is due to their effects offsetting each other.

subsample of non-pensioners only. As we find little effect of rate of pension receipt in the community on non-pensioners offering social support to those in need, we interpret our results as dominated by formal old age support to pensioners crowding out their demand for risk insurance scheme and thus their offering of social support.

5.2 Subsample Analysis and Other mechanisms

5.2.1 Pension income and social cohesion

Our analysis above is mainly restricted to understand the extensive margin of the pension effect, i.e., in comparison to non-pensioners how receiving pension per se may affect older adults. To examine whether the level of the pension benefits matters in this question, we further investigate the effect of pension income on social activities using a subsample of pensioners only.

The results listed in Table 5 show that a 10 CNY increase in pension income significantly reduces the probability of altruistic activities by 1.7 percentage points and lowers their frequency by 0.025. However, it is worth noting that these results should be interpreted with caution. The first-stage F-statistic is 9.5, which is slightly below 10, the usual threshold value for weak–strong IV test. The reason is presumably that most of the pensioners in our study were already above age 60 at the time of survey, the NRPS policy stipulates that they are only eligible to receive the basic pension benefits with no individual account. All provinces set basic pension benefits at 55-60 CNY per month per person with little variation. As shown in Figure A1, pension benefits are centered around 60 CNY, the variation in pension benefits is indeed small.

5.2.2 Crowd-out by family income

Abundant research has documented vast economic disparities in rural China (e.g., Xie and Zhou, 2014). A given amount of pension might have very different effects for families of different SES. On the one hand, we would expect more pronounced crowd-out effect of public pension provision on recreational and altruistic activities among richer families as they are more likely to achieve economic independence. On the other hand, the positive income effect of pension provision on neighborhood cohesion could be larger in poorer communities where residents are more subject to binding budget and time constraints.

Dividing the sample into three groups by family income per capita, summary statistics listed in columns (1) – (3) of Table 6 show that elders in high-income families have the largest proportion participating in the NRPS, the longest NRPS duration in the community and the highest level of social activities. Columns (1) – (3) of Table 7 presents regression results for the elderly in three income groups, respectively. The results show that receiving pension does not significantly change collective recreational activities among older persons in poor, middle-income or rich households. This finding suggests that the reduced demand for social networking function of collective recreational activities (to share risk) may largely offset the income effect and therefore demonstrate null effects. Similarly, columns (1) – (3) of Table 7 also displays no significant differences in crowd-out effects on altruistic activities by income. It is plausible that, because of the relaxed budget constraint and therefore strengthened financial security in old age after receiving pension, the crowd-out effect cancels out with the income effect.[7]

5.2.3 Community diversity and crowd-out

Community diversity may play a role in pension provision and crowd-out of altruistic activities and public goods in general.[8] Canonical models proposed by Andreoni (1989, 1990) and Hungerman (2009) posit two incentives for individuals to voluntarily provide public goods: *altruism* and *warm glow*. Residents in more diverse communities often have different preferences over public goods and therefore higher cost of delivering public goods. Driven more by *warm glow* than *altruism*, people in such communities may value their *own contribution* to altruistic activities. That is, they simply value the good feeling such action gives the provider, rather than anticipating future paybacks through exchanges, which is less likely to be crowded out by government intervention.

We therefore hypothesize that the pension effect on altruistic activities should be limited in diverse communities. We divide communities into less diverse and more diverse ones to identify potential differences in their pension effects.[9] Columns (5) – (6) in Table 6 show their

[7] Implementing cross-equation tests of the pension effect estimates, again we do not find significantly different effects on collective recreational activities or altruistic activities between income groups.

[8] For example, Hungerman (2009) studies how diversity and crowd-out are related, by exploiting the U.S. Supreme Court's 1991 expansion of the Supplemental Security Income (SSI) program, and finds that crowd-out of charitable spending by churches mostly occurred in racially less diverse communities. There was only modest evidence of crowd-out in more diverse communities.

[9] Different from Hungerman (2009), we define the diversity of the community in China using the measure of "big surnames". Specifically, less diverse communities are defined as those with two largest surnames accounting for more than 50% of the local population. All remaining cases are defined as diverse communities.

summary statistics. The t-tests in column (7) indicate that more diverse communities have longer pension roll-out duration and higher pension enrollment rate and benefits. However, there is no observable difference in the average level of altruistic activities between the two types of communities. The data support this hypothesis, as column (5) in Table 7 show that the crowd-out effect of pensions on altruistic activities is attenuated in more diverse communities.

6. Conclusion

This paper provides new evidence for a causal relationship between public pension and neighborhood cohesion. We study this by investigating two dimensions of social activities of elders: collective recreational activities as proxied by socializing and organizational activities; and altruistic activities as proxied by social support provided to others. The results show that pension plays different roles in these two dimensions of neighborhood cohesion. We also verify the robustness of the findings using reduced-form regressions.

Specifically, we show that the pension program has a negative but insignificant effect on collective recreational activities of elders. As collective recreational activities are recognized as an important protective factor against health risks in old age, this finding is encouraging. In contrast, our results show that the pension program may reduce helping others in need, reflected by a notable crowd-out effect of the pension program on altruistic activities in communities. The sizes of the crowd-out effect do not differ markedly by family income or community diversity. Informal care between neighbors in rural China is an important source of help from outside the family. Although public pension programs can act as extra help for people with lower income, the present research concludes that such programs may also have the unintended effect of crowding out altruistic activities of helping others in the community.

Rural China has largely been a patriarchal society. People who share a surname usually have a sense that feel to belong to the same clan, are highly conscious of their group identity, and derive benefits from the jointly-owned property and shared resources (Watson, 1982). Thus, we use this surname measure to define community diversity.

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Table 1: Descriptive statistics

Variables	All (1)	Non-pensioners (2)	Pensioners (3)	T-test (4)
Social activities				
Collective recreational activities	0.144	0.132	0.163	0.0305***
	(0.352)	(0.338)	(0.369)	(4.25)
Frequency of collective recreational activities	1.297	1.270	1.336	0.0712***
	(0.793)	(0.760)	(0.837)	(4.42)
Altruistic activities	0.0641	0.0505	0.0833	0.0324***
	(0.245)	(0.219)	(0.276)	(6.31)
Frequency of altruistic activities	1.088	1.071	1.113	0.0414***
	(0.379)	(0.345)	(0.420)	(5.30)
Pension				
NRPS duration	2.215	1.709	2.931	1.184***
	(1.534)	(1.567)	(1.154)	(43.47)
Monthly pension income(10 Yuan)	2.976	0.0394	7.137	7.141***
	(6.347)	(1.432)	(8.057)	(59.09)
Covariates				
Age	69.40	69.25	69.61	0.563***
	(7.592)	(7.789)	(7.299)	(4.09)
Male	0.467	0.472	0.460	-0.0122
	(0.499)	(0.499)	(0.498)	(-1.23)
Married	0.737	0.736	0.740	-0.00399
	(0.440)	(0.441)	(0.439)	(-0.48)
Education: below primary school	0.669	0.668	0.671	0.00573
	(0.471)	(0.471)	(0.470)	(0.61)
Education: primary school	0.238	0.239	0.237	-0.00317
	(0.426)	(0.427)	(0.425)	(-0.37)
Education: middle school	0.0782	0.0778	0.0788	-0.000760
	(0.269)	(0.268)	(0.270)	(-0.14)
Education: high school and above	0.0141	0.0150	0.0129	-0.00163
	(0.118)	(0.122)	(0.113)	(-0.69)
Number of children	3.612	3.572	3.670	0.0897**
	(1.560)	(1.574)	(1.537)	(2.93)
Living with children	0.330	0.279	0.403	0.108***
	(0.470)	(0.448)	(0.490)	(11.64)
Log total assets	9.957	10.09	9.769	-0.135*
	(3.461)	(3.256)	(3.726)	(-2.01)
Community size: lowest quantile	0.276	0.273	0.281	0.000986
	(0.447)	(0.446)	(0.449)	(0.11)
Community size: second quantile	0.280	0.272	0.292	0.0142
	(0.449)	(0.445)	(0.455)	(1.62)
Community size: third quantile	0.261	0.259	0.265	0.0136
	(0.439)	(0.438)	(0.441)	(1.59)
Community size: highest quantile	0.182	0.196	0.162	-0.0289***
	(0.386)	(0.397)	(0.369)	(-3.94)
Log mean community per capita income	7.767	7.787	7.738	-0.0171
	(0.923)	(0.936)	(0.904)	(-0.98)
Observations	10271	5854	4417	10365

Note: Standard errors are reported in the parentheses. "Collective recreational activities" and "altruistic activities" are dummy variables indicating whether the respondents have undertaken collective recreational activities/altruistic activities in the last month. The frequency of the activity is a categorical variable that coded as 1 (never), 2 (not regularly), 3 (almost every week), 4 (almost daily). Assets and monthly pension income are in 2011 CNY. The sample is restricted to older adults above 60.

Table 2: Effects of pension on social activities: OLS regressions

A. Pension receipt				
Variable	Collective recreational activities	Frequency	Altruistic activities	Frequency
	(1)	(2)	(3)	(4)
Pension receipt	0.0260**	0.0606**	0.00878	0.00956
	(0.0106)	(0.0244)	(0.00739)	(0.0107)
Observations	10,278	10,278	10,278	10,278

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Covariants include individuals' gender, age, and its square, education, marital status, log total assets of the family, whether living with children under 18, number of children, community size dummies, log mean community per capita income, year dummies and provincial dummies. The estimates are clustered at the community level. Standard errors are reported in the parentheses. Assets and monthly pension income are deflated to 2011 constant price using rural CPI. The sample is restricted to older adults above 60.

Table 3: Effects of pension on social activities: IV regressions

A. Pension receipt						
	First stage		Second stage			
Variables	Pension receipt		Collective recreational activities	Frequency	Altruistic activities	Frequency
			IV	IV	IV	IV
	(1)		(2)	(3)	(4)	(5)
NRPS duration	0.0626***					
in the county(years)	(0.0104)					
Pension receipt			-0.0120	-0.0295	-0.143**	-0.183**
			(0.0974)	(0.227)	(0.0593)	(0.0907)
First stage F-statistic	36.00					
Observations	10,270	10,270	10,270	10,270	10,270	10,270

Note: First stage F-statistic is the duration of NRPS as instrument variable for pension receipt and pension income. ***, ** and * represent statistical significance at the 1%, 5%, and 10% levels, respectively. Covariants include individuals' gender, age, and its square, education, marital status, log total assets of the family, whether living with children under 18, number of children, community size dummies, log mean community per capita income, year dummies and provincial dummies. The estimates are clustered at the community level. Standard errors are reported in the parentheses. Assets and monthly pension income are deflated to 2011 constant price using rural CPI. The sample is restricted to older adults above 60.

Table 4: Effects of pension on social activities: Reduced form Regressions

Variables	Collective recreational activities (1)	Frequency (2)	Altruistic activities (3)	Frequency (4)
NRPS duration	-0.000750	-0.00184	-0.00895***	-0.0114**
	(0.00610)	(0.0142)	(0.00328)	(0.00520)
Covariates				
Age	-0.00533	0.00245	-0.00700	-0.00467
	(0.00801)	(0.0193)	(0.00510)	(0.00833)
Age^2	0.00131	-0.00499	0.00290	0.000923
	(0.00546)	(0.0133)	(0.00338)	(0.00557)
Male	0.0579***	0.0929***	0.0138**	0.0150*
	(0.0100)	(0.0223)	(0.00569)	(0.00864)
Married	-0.00183	-0.00554	0.000873	0.000365
	(0.0117)	(0.0277)	(0.00624)	(0.0103)
Education: primary school	0.0572***	0.127***	0.000645	-0.00607
	(0.0121)	(0.0281)	(0.00664)	(0.00979)
Education: middle school	0.094***	0.200***	0.010	0.009
	(0.018)	(0.040)	(0.011)	(0.017)
Education: high school and above	0.0941***	0.200***	0.00989	0.00945
	(0.0182)	(0.0404)	(0.0111)	(0.0173)
Number of children	0.00370	0.00378	-0.00251	-0.00375
	(0.00298)	(0.00693)	(0.00174)	(0.00276)
Living with children	-0.0170*	-0.0315	-0.00194	0.00251
	(0.00920)	(0.0212)	(0.00551)	(0.00837)
Log total assets	0.00316***	0.00914***	0.00277***	0.00465***
	(0.00113)	(0.00264)	(0.000632)	(0.00106)
Community size: second quantile	0.0302*	0.0800**	0.0106	0.0215
	(0.0155)	(0.0333)	(0.0103)	(0.0161)
Community size: third quantile	0.0128	0.0260	-0.00453	-0.00619
	(0.0175)	(0.0399)	(0.00961)	(0.0150)
Community size: highest quantile	0.0424**	0.111**	-0.00512	-0.00217
	(0.0212)	(0.0489)	(0.00944)	(0.0147)
Log mean community per capita income	0.0150***	0.0304**	0.00581*	0.00813*
	(0.00541)	(0.0123)	(0.00331)	(0.00473)
Observations	10,270	10,270	10,270	10,270
R-squared	0.067	0.055	0.045	0.036
Prov FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Covariants include individuals' gender, age, and its square, education, marital status, log total assets of the family, whether living with children under 18, number of children, community size dummies, log mean community per capita income, year dummies and provincial dummies. The estimates are clustered at the community level. Standard errors are reported in the parentheses. Assets and monthly pension income are deflated to 2011 constant price using rural CPI. The sample is restricted to older adults above 60.

Table 5: Effects of pension income on social activities

Variable	Collective recreational activities	Frequency	Altruistic activities	Frequency
	(1)	(2)	(3)	(4)
Monthly pension income (10 Yuan)	-0.00846	-0.0163	-0.0165**	-0.0246**
	(0.00929)	(0.0222)	(0.00751)	(0.0114)
Observations	4353	4353	4353	4353

Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. The sample is restricted to pensioners above 60. The first-stage F-statistic is 9.5. Covariants include individuals' gender, age, and its square, education, marital status, log total assets of the family, whether living with children under 18, number of children, community size dummies, log mean community per capita income, year dummies and provincial dummies. The estimates are clustered at the community level. Standard errors are reported in the parentheses. Assets and monthly pension income are deflated to 2011 constant price using rural CPI.

Table 6: Descriptive statistics for subgroups

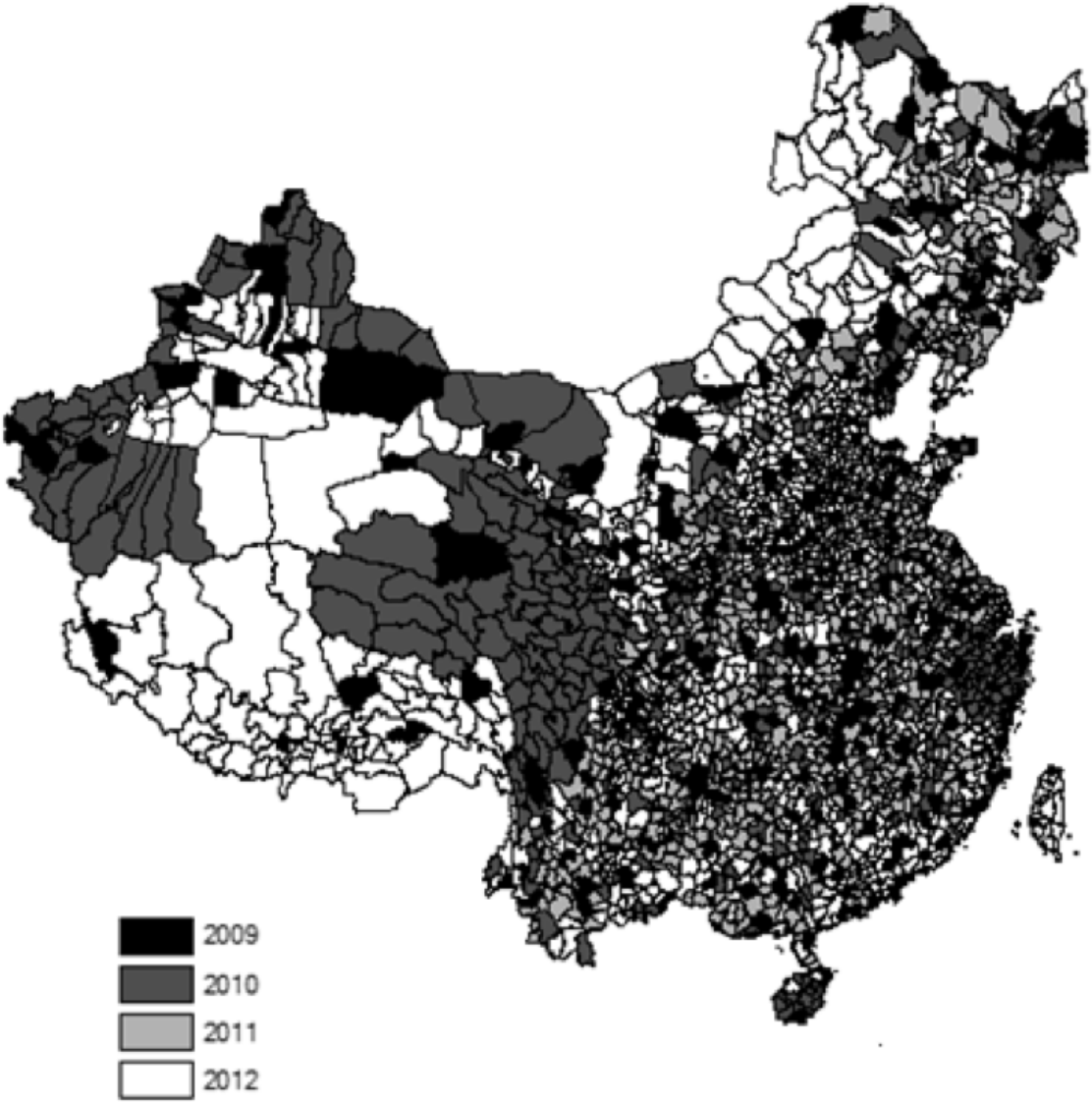
Variables	By income group				By diversity		
	Low	Middle	High	T-test (High-Low)	Less diverse communities	More diverse communities	T-test
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Social activities							
Collective recreational activities	0.139	0.132	0.161	0.0285**	0.140	0.143	0.00193
	(0.346)	(0.338)	(0.368)	(3.25)	(0.347)	(0.350)	(0.26)
Frequency of collective recreational activities	1.297	1.262	1.331	0.0511*	1.281	1.292	0.0182
	(0.804)	(0.738)	(0.831)	(2.57)	(0.768)	(0.782)	(1.12)
Altruistic activities	0.0558	0.0587	0.0774	0.0274***	0.0626	0.0668	0.00245
	(0.229)	(0.235)	(0.267)	(4.44)	(0.242)	(0.250)	(-0.46)
Frequency of altruistic activities	1.077	1.077	1.110	0.0385***	1.085	1.092	0.00601
	(0.360)	(0.342)	(0.426)	(3.98)	(0.366)	(0.388)	(0.75)
Pension							
NRPS duration	2.215	2.068	2.354	0.143***	2.063	2.238	0.213***
	(1.525)	(1.488)	(1.571)	(3.80)	(1.514)	(1.531)	(6.53)
Pension receipt	0.404	0.423	0.417	0.0249*	0.395	0.427	0.0332**
	(0.491)	(0.494)	(0.493)	(2.09)	(0.489)	(0.495)	(3.18)
Monthly pension income(10 Yuan)	2.913	2.812	3.205	0.297	2.657	3.034	0.363**
	(5.993)	(5.278)	(7.498)	(1.80)	(6.552)	(5.884)	(2.75)
Covariates							
Age	70.65	69.25	68.39	-2.756***	69.48	69.31	0.249
	(7.769)	(7.243)	(7.576)	(-16.10)	(7.761)	(7.383)	(1.69)
Male	0.433	0.485	0.480	0.0577***	0.463	0.479	0.00783
	(0.496)	(0.500)	(0.500)	(4.80)	(0.499)	(0.500)	(0.74)
Married	0.706	0.770	0.735	0.0573***	0.753	0.737	-0.0209*
	(0.455)	(0.421)	(0.441)	(5.61)	(0.431)	(0.440)	(-2.42)
Education: below primary school	0.703	0.691	0.619	-0.0855***	0.645	0.684	0.0361***
	(0.457)	(0.462)	(0.486)	(-7.44)	(0.478)	(0.465)	(3.58)
Education: primary school	0.228	0.223	0.260	0.0307**	0.254	0.229	-0.0249**
	(0.420)	(0.416)	(0.439)	(2.94)	(0.435)	(0.420)	(-2.71)
Education: middle school	0.0624	0.0740	0.0971	0.0368***	0.0856	0.0734	-0.0106
	(0.242)	(0.262)	(0.296)	(5.44)	(0.280)	(0.261)	(-1.79)
Education: high school and above	0.00656	0.0117	0.0236	0.0176***	0.0153	0.0134	-0.000781
	(0.0808)	(0.108)	(0.152)	(5.87)	(0.123)	(0.115)	(-0.31)
Number of children	3.884	3.583	3.394	-0.513***	3.581	3.635	0.0884**
	(1.586)	(1.523)	(1.532)	(-13.89)	(1.522)	(1.582)	(2.74)
Living with children	0.298	0.306	0.381	0.109***	0.314	0.333	0.0254**
	(0.458)	(0.461)	(0.486)	(9.66)	(0.464)	(0.472)	(2.61)
Log total assets	9.098	9.746	11.01	1.841***	9.927	9.921	0.0490
	(3.891)	(3.109)	(2.986)	(22.77)	(3.425)	(3.407)	(0.70)
Community size: lowest quantile	0.283	0.297	0.250	-0.0428***	0.278	0.298	0.0178
	(0.451)	(0.457)	(0.433)	(-3.87)	(0.448)	(0.458)	(1.80)
Community size: second quantile	0.290	0.277	0.274	0.000984	0.267	0.300	0.0492***
	(0.454)	(0.448)	(0.446)	(0.09)	(0.442)	(0.458)	(5.31)
Community size: third quantile	0.264	0.266	0.256	-0.00348	0.219	0.287	0.0420***
	(0.441)	(0.442)	(0.436)	(-0.33)	(0.413)	(0.452)	(4.67)
Community size: highest quantile	0.162	0.161	0.220	0.0453***	0.236	0.115	-0.109***
	(0.369)	(0.367)	(0.414)	(4.93)	(0.425)	(0.319)	(-13.64)
Log mean community per capita income	7.520	7.673	8.101	0.543***	7.713	7.765	0.0497**
	(1.008)	(0.755)	(0.800)	(26.16)	(0.871)	(0.884)	(2.77)
Observations	3366	3430	3447	6873	3449	6275	9809

Table 7: Heterogeneous effects of pension on social activities

Variables	By family income group			By diversity of the community	
	Low	Middle	High	Less diverse	More diverse
	(1)	(2)	(3)	(4)	(5)
Collective recreational activities	0.00750	-0.0690	0.0596	0.000948	-0.148
	(0.147)	(0.303)	(0.269)	(0.466)	(0.374)
Frequency of collective recreational activities	0.236	-0.137	-0.0955	0.0462	-0.388
	(0.303)	(0.269)	(0.466)	(0.374)	(0.343)
Altruistic activities	-0.127	-0.100	-0.243	-0.161	-0.152*
	(0.0835)	(0.0650)	(0.156)	(0.143)	(0.0793)
Frequency of altruistic activities	-0.182	-0.135	-0.263	-0.204	-0.206*
	(0.133)	(0.0993)	(0.226)	(0.214)	(0.121)
Observations	3,366	3,430	3,446	3,449	6,274
F-stats for the first stage	23.99	35.63	10.17	11.94	14.91

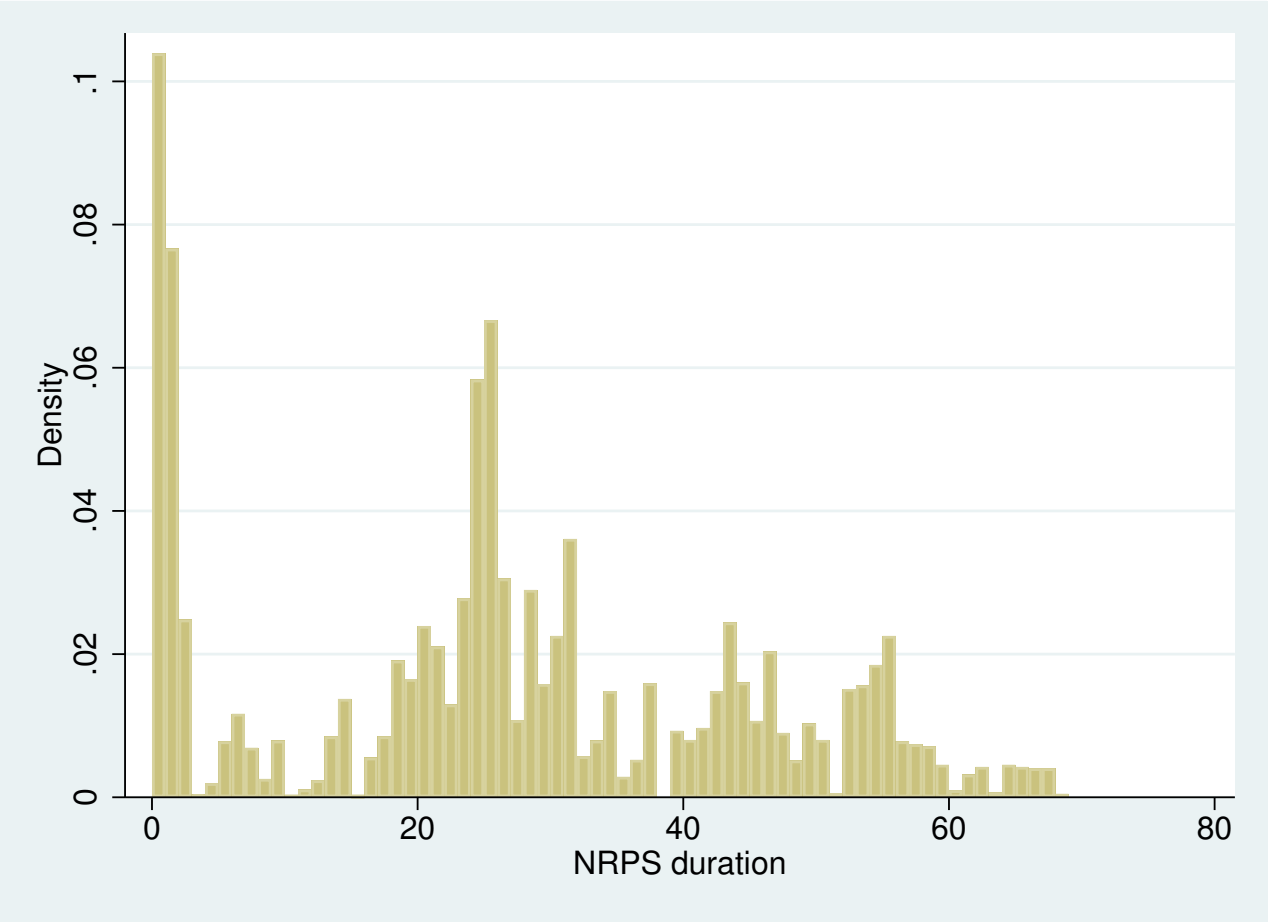
Note: ***, ** and * represent statistical significance at the 1%, 5% and 10% levels, respectively. Covariants include individuals' gender, age, and its square, education, marital status, log total assets of the family, whether living with children under 18, number of children, community size dummies, log mean community per capita income, year dummies and provincial dummies. The estimates are clustered at the community level. Standard errors are reported in the parentheses. Assets and monthly pension income all adjusted to 2011 CNY. The sample is restricted to older adults above 60.

Figure 1: Rollout of New Rural Pension Scheme in China



Notes: The NRPS was rolled out nationwide at the county level during 2009-2012.
Source: Figure 1a in **?**

Figure 2: NRPS roll-out duration (number of months since the NRPS rollout in the county)



Source: CHARLS 2011 and 2013 survey

Note: NRPS duration is defined as number of months between the date of pension roll-out in the individual's county and the individual's survey month.

Appendix

Question about social activities in the questionare.

DA056. Have you done any of these activities in the last month? (Code all that apply)

(1) Interacted with friends

(2) Played Ma-jong, played chess, played cards or went to a community club

(3) Provided help to family, friends, or neighbors who do not live with you and who did not pay you for the help

(4) Went to a sport, social, or other kinds of club

(5) Took part in a community-related organization

(6) Done voluntary or charity work

(7) Cared for a sick or disabled adult who does not live with you and who did not pay you for the help

(8) Attended an educational or training course

(9) Stock investment

(10) Used the Internet

(11) Other

(12) None of these

DA057. The frequency of activity in the last month

How often in the last month [did/have][you] [do voluntary or charity work/cared for a sick or disabled adult/provided help to family, friends or neighbors/attended an educational or training course/ Interacted with friends /go to a sport, social or other kinds of club/taken

part in a community-related organization]? Almost daily, almost every week, or not regularly?

(1) Almost daily

(2) Almost every week

(3) Not regularly

Table A1: The effect of NRPS on non-pensioners

VARIABLES	(1) First stage for non-pensioners	(2) Altruistic activities for non-pensioners	(3) Frequency of altruistic activities for non-pensioners
NRPS duration in the county (years)	0.0487*** (0.011)		
First stage F-stats	20.41		
Community mean pension receipt rate		-0.108 (0.083)	-0.0612 (0.116)
Observations	5,572	5,572	5,572
R-squared	0.58	0.021	0.023

Note: In column (1), we regress community pension receipt rate on NRPS duration at the county level (our instrumental variable) and control for the full set of covariates in our main estimations. In columns (2) and (3) we regress elders' altruistic activities (both yes/no and frequency) on the community pension receipt rate using the subsample of non-pensioners only.

Figure A1: Distribution of monthly pension income (Yuan)