Does New Rural Social Pension Insurance Relieve Depression of the Elderly in Rural China :Evidence from the China Health and Retirement Longitudinal Study

Xiaodong Zheng[1] Xiangming Fang[1] Brian Barger[2]

[1]*College of Economics and Management, China Agricultural University, Beijng, China*

[2]*School of Public Health, Georgia State University*

E-mail: zhengxd@cau.edu.cn; xmfang@cau.edu.cn

Selected Paper prepared for presentation at the 2017 Agricultural & Applied Economics Association Annual Meeting, Chicago, Illinois, July 30-August 1

Copyright 2017 by [authors]. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Does New Rural Social Pension Insurance Relieve Depression of the Elderly in Rural China?

Xiaodong Zheng[1] Xiangming Fang[1] & Brian Barger[2]

[1]China Agricultural University/ [2]Georgia State University

Background

- The elderly population in China is dramatically increasing (population of aged 60 and above accounted 16.1% in 2015)
- About 40% of the rural elderly population have depression symptoms
- Depression is associated with many mental disorders, as well as reduced physical health
- The Chinese government started piloting the policy of New Rural Social Pension Insurance (NRSPI) in 2009
- Rural Chinese with pension plans can get non-contributory pension (80 RMB / month on average)when they are over 60 years old.
- Few studies have discussed the relationship of NRSPI and elderly depression in China.

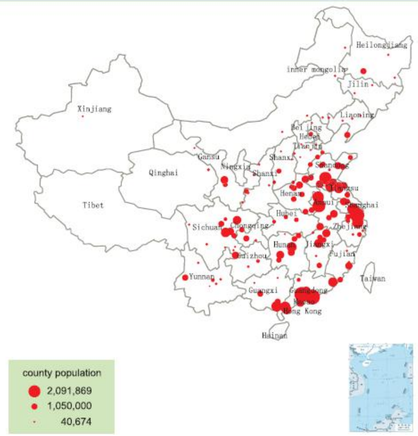
Research Questions

- Did the NRSPI improve has significant impact on the prevalence of depression of the elderly in rural China?
- What is the impact distribution of NRSPI for different levels of depression of the elderly?

Data

- China Health and Retirement Longitudinal Survey (CHARLS) in 2011 and 2013:
- CHARLS is the only large-scale survey of middle-aged and elderly aged (45 years old and above)subjects in China
- The CHARLS is conducted once every two years
- The 2011-2012 CHARLS, its inaugural baseline year, covered 150 counties in 450 villages and about 10 thousand households
- We selected individuals 60 years old and above from rural areas. The sample size is 10558.

Empirical Strategy



National Baseline Sampling (County Distribution)

1. The impact of NRSPI on the depression of the rural elderly:

- Fixed Effect Model

$$D_{it} = \beta_0 + \beta_1 NRSPI_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it}$$

- where D_{it} represents the depression state of elderly Chinese, $NRSPI_{it}$ represents participation state of the elderly, X_{it} is a vector of control variables。
- Instrumental Variable regression (IV)

$$NRSPI_{it} = \alpha_1 + \alpha_2 P_{it} + \alpha_3 X_{it} + \upsilon_{it}$$

$$D_{it} = \beta_0 + \beta_1 \hat{NRSPI}_{it} + \beta_2 X_{it} + \varepsilon_{it}$$

- where P_{it} is the instrumental varible of NRSPI
- Difference-in-Difference-in-Difference(DDD)

$$D_{it} = \beta_0 + \beta_1 t + \beta_2 treat1 + \beta_3 treat2 + \beta_4 (t \times treat1) + \beta_5 (t \times treat2) + \beta_6 (treat1 \times treat2) + \beta_7 (t \times treat1 \times treat2) + \varepsilon_{it}$$

- where treat1 represents whether the elderly participate the project in the first round of investigation, treat2 denotes whether the elderly participate the project in the second round，β7, the coefficient of the interaction term t×treat1×treat2, represents the net difference of depression state of project stayers and leavers

2. The impact distribution of NRSPI:

- Instrumental Quantile Treatment Effect(IVQTE)

$$Q_\theta(D_{it} \mid NRSPI_{it}, X_{it}) = \beta_0^\theta + \beta_1^\theta NRSPI_{it} + \beta_2^\theta X_{it} + \varepsilon_{it}$$

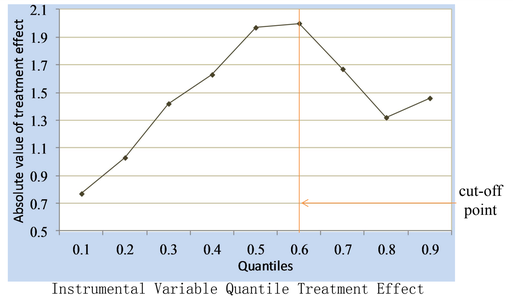
- where θ(0<θ<1) is a given quantile, represents the conditional quantile according to an explanatory variables on θ.The corresponding coefficients are estimated by Least Absolute Deviation (LAD)

Results

	Depression index(0-30)		Depression symptoms(0-1)	
Variables	(1)OLS	(2)FE	(5)Probit(dy/dx)	(6)FE
NRSPI	-0.38**	-0.51**	-0.04***	-0.05***
	(0.12)	(0.13)	(0.01)	(0.01)
Control variables	YES	YES	YES	YES
observations	10558	10558	10558	10558
R2 / Pseudo R2	0.09	0.13	0.06	0.13

Panel A: The second stage regression				
	2SLS：Depression index(0-30)		IVProbit(dy/dx):Depression symptoms(0-1)	
Variables	2011-2013 Panel	2013	2011-2013 Panel	2013
NRSPI	-1.52***	-1.33*	-0.08***	-0.10*
	(0.43)	(0.74)	(0.03)	(0.06)
Control variables	YES	YES	YES	YES
Observations	9444	4995	9444	4995
R^2	0.08	0.05	—	—
DWH test p value/ Wald test p value	0.00	0.00	0.00	0.01
Panel B: The first stage regression				
Village implementing NRSPI	0.29***	0.33***	0.29***	0.33***
	(0.01)	(0.18)	(0.01)	(0.18)
Control variables	YES	YES	YES	YES
Observations	9444	4995	9444	4995
R^2	0.14	0.08	—	—
F statistics/ Wald2 statistics	929.62	338.92	602.65	271.21

Variables	DDD: Depression index(0-30)	DDD: Depression symptoms(0-1)
t	-0.51*** (0.17)	-0.05*** (0.01)
treat1	-0.76** (0.38)	-0.07** (0.03)
treat2	0.69*** (0.15)	0.05*** (0.01)
t×treat1	0.63 (0.53)	0.07* (0.04)
t×treat2	0.19 (0.23)	0.01 (0.02)
treat1×treat2	0.35 (0.43)	0.04 (0.03)
t×treat1×treat2	-1.08* (0.62)	-0.09** (0.05)
Observations	6535	6535
R^2	0.01	0.01



Instrumental Variable Quantile Treatment Effect

Notes: standard errors in the brackets; *, * * *, * * * are significant level of 10%, 5% and 1% respectively.

Conclusion & Relevance to Policy

Depression measures

- Depression index(0-30): derived from a short version of Center for Epidemiological Survey,Depression Scale (CES-D10) . The total score is ranging from 0-30 points.
- Depressive symptoms(Yes=1):10 points the cut-off point of depressive symptoms.

Instrumental variable measures:

- Whether the village implemented the NRSPI policy in the current year
- Whether the village implemented the NRSPI policy for two rounds' survey

Conclusions

- In spite of low level of pension, NRSPI did relieve the depression of the elderly in rural China
- Instrumental Variable and DDD regression analyses showed participating in NRSPI decreased the probability of depression score ratings of rural elderly citizens by 8~10%
- The impact of NRSPI on depression symptoms is largest for elderly citizens with scores close to clinical depression cutoff points.

Limitations

- In the DDD process, the “leavers” should be voluntary and have no selection bias.
- Amount and the time of receiving pension vary in different regions

Contact & Funding

This work was not supported by any funding source.

Xiaodong Zheng, Ph.D.

College of Economics and Management（CEM）

China Agricultural University（CAU）

No.17 Qinghua Dong Road, Haidian District

Beijing 100083, P.R.China

Tel: +86 18811723977

E-mail: zhengxd@cau.edu.cn