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

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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 noncontributory 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 middleaged 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



elderly:

- Fixed Effect Model
- vector of control variables
- Instrumental Variable regression (IV)

$$D_{it} = \beta_0 + \beta_0$$

$$D_{it} = \beta_0 + \beta_1 t + \beta_2 treat + \beta_1 (treat 1 \times treat)$$

- 2. The impact distribution of NRSPI:
- corresponding coefficients are estimated by Least Absolute Deviation (LAD)



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

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

where D_{it} represents the depression state of elderly Chinese, NRSPI_{it} represents participation state of the elderly, X_{it} is a

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

 $-\beta_1 NRSPI_{it} + \beta_2 X_{it} + \varepsilon_{it}$

where P_{it} is the instrumental varible of NRSPI

Difference-in-Difference(DDD)

 $at1 + \beta_3 treat2 + \beta_4 (t \times treat1) + \beta_5 (t \times treat2)$ + $\beta_6(treat1 \times treat2) + \beta_7(t \times treat1 \times treat2) + \varepsilon_{it}$

 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, β 7, the coefficient of the interaction term t×treat1×treat2, represents the net difference of depression state of project stayers and leavers

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 $\theta(0 < \theta < 1)$ is a given quantile, represents the conditional

quantile according to an explanatory variables on θ . The

Results

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

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:		DDD:				
	Depression ind	lex(0-30)	Depression sy	mptoms(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)				

\times treat1 \times treat2	-1.08* (0.62)	-0.09** (
Observations	6535	6535
R ²	0.01	0.01
2.1		



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

ms(0-1)(6)FE -0.05*** (0.01)YES 10558 0.13

(0.05)



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

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