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

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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 non-contributory pension (60 RMB/ month on average) when they are over 60 years old.

• Few studies have discussed the relationship of NRSPI and elderly depression in China.

Empirical Strategy

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

   Fixed Effect Model

   \[ D_t = \beta_0 + \beta_1 \text{NRSPI} + \beta_2 \text{X}_i + \mu_i + \epsilon_i \]

   where \( D_t \) represents the depression state of elderly Chinese, NRSPI, represents participation state of the elderly, \( \text{X}_i \) is a vector of control variables.

   Instrumental Variable Regression (IV)

   \[ \text{NRSPI}_i = \alpha_0 + \alpha_1 \text{treat}_1 + \alpha_2 \text{X}_i + \mu_i \]

   \[ D_t = \beta_0 + \beta_1 \text{NRSPI}_i + \beta_2 \text{X}_i + \mu_i + \epsilon_i \]

   where \( \text{P}_i \) is the instrumental variable of NRSPI.

   Difference-in-Difference-in-Difference (DDD)

   \[ D_t = \beta_0 + \beta_1 \text{treat} + \beta_2 \text{treat1} + \beta_3 \text{treat2} + \beta_4 \text{treat1} \times \text{treat2} + \beta_5 \text{treat1} \times \text{treat2} \times \text{X}_i + \epsilon_i \]

   where \( \text{treat} \) represents whether the elderly participate the project in the first round of investigation, \( \text{treat1} \) denotes whether the elderly participate the project in the second round, \( \beta_7 \) is the coefficient of the interaction term \( \text{treat1} \times \text{treat2}, \text{treat2} \), represents the net difference of depression state of project stayers and leavers.

2. The impact distribution of NRSPI:

   • Instrumental Quantile Treatment Effect (IVOTE)

   \[ Q_0 ( \text{D}_t | \text{NRSPI}_i, \text{X}_i ) = \beta_0 + \beta_1 \text{NRSPI}_i + \beta_2 \text{X}_i + \epsilon_i \]

   where \( @0\leq k \leq 1 \) is a given quantile, represents the conditional quantile according to an explanatory variables on \( i \). The corresponding coefficients are estimated by Least Absolute Deviation (LAD).

Empirical Strategy

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 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

Empirical Strategy

Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Depressive index(0-30)</th>
<th>Depression symptoms(0-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRSPI</td>
<td>0.33</td>
<td>0.29</td>
</tr>
<tr>
<td>Control variables</td>
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<td>YES</td>
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<tr>
<td>Observations</td>
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</tr>
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<td>R²</td>
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<td>0.08</td>
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<tr>
<td>DWH test p value</td>
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<td>0.33**</td>
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<td>Panel B: The first stage regression</td>
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<td></td>
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<tr>
<td>Village implementing NRSPI</td>
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<td>(0.18)</td>
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<tr>
<td>Control variables</td>
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<td>Observations</td>
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<tr>
<td>DWH test p value</td>
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<tr>
<td>IVProbit(dy/dx): Depression symptoms(0-1)</td>
<td>929.62</td>
<td>338.92</td>
</tr>
</tbody>
</table>

Conclusions & 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 participation, 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 10-11%.

• 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

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