<Supplementary material>

Figure S1. DD-ES Estimates of the Effects of the Basic Pension Scheme on Relative Poverty

|  |  |
| --- | --- |
| A graph with black lines and red dots  Description automatically generatedRelative income poverty rate | A graph with red and black lines  Description automatically generatedRelative consumption poverty rate |
| 1. Phasing-in the Basic Pension in 2008-2009 | |
| A graph with red and black lines  Description automatically generated Relative income poverty rate | A graph with lines and dots  Description automatically generated Relative consumption poverty rate |
| (B) Benefit Increase in the Basic Pension in 2014 | |
| A graph with red and black lines and points  Description automatically generated Relative income poverty rate | A graph with lines and dots  Description automatically generated Relative consumption poverty rate |
| (C) Benefit Increase in the Basic Pension in 2019-2021 | |

Table S1. Main Parameters of the Basic Pension Scheme

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2008.1 | 2008.7 | 2009.1 | 2014.7 | 2018.9 | 2019.4~2020.1 | 2021.1 |
| Benefit eligibility | Age 70+ | Age 65+ | | | | | |
|  | Bottom 60% in the joint distribution of income and assets | | Bottom 70% in the joint distribution of  income and assets | | | | |
| Assessment of income and assets of applicants | Income formula  (labour income - deduction) + business income + property income + public transfer  Asset formula  (Assets - debt) income conversion rate 12 months | | | Income formula  0.7 (labour income - deduction) + business income + property income + public transfer + free rental income  Asset formula  [{(General assets – basic deductions) + (financial assets - 20 million KRW) - debt} income conversion rate 12] + P\* | | | |
| Maximum benefit (thousand KRW) | 84 | | | 200 | 250 | 250~  300 | 300 |
| Annual adjustment of maximum benefit (thousand KRW) | Wage increase rate (88 in April 2009 to 99.9 in April 2014) | | | Inflation rate (202.6 in April 2015 to 209.96 in April 2018) | | | |
| Benefit reduction |  | | |  | | | |
| 1) reduction for pensioners | n/a | | | If the National Pension benefit exceeds 150% of the maximum benefit, reduce the BPS benefit up to a half of the maximum benefit | | | |
| 2) reduction for couple recipients | Reduce the benefit for each recipient by 20% | | | | | | |
| 3) reduction for recipients with high income | If (recognized income + BP benefit) the income eligibility threshold, reduce the benefit by the difference | | | | | | |

*Note*: P stands for the prices of luxury cars and other expensive luxury goods.

*Source*: Korean Ministry of Health and Welfare (2009, 2014), https://basicpension.mohw.go.kr(2020)

Table S2. DD-ES Estimates of the Effects of the Basic Pension Reform in 2008

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Income poverty | | Consumption poverty | |
|  | (1) | (2) | (3) | (4) |
| Group | 0.064\*\*\*(0.021) | 0.041\*\*(0.017) | 0.028\*(0.017) | 0.025\*(0.015) |
| group × 2006q1 | -0.009(0.027) |  | -0.014(0.022) |  |
| group × 2006q2 | -0.028(0.028) |  | 0.025(0.024) |  |
| group × 2006q3 | -0.021(0.028) |  | 0.015(0.023) |  |
| group × 2006q4 | -0.041(0.026) |  | -0.033(0.022) |  |
| group × 2007q1 | -0.011(0.027) |  | -0.029(0.022) |  |
| group × 2007q2 | -0.013(0.027) |  | 0.015(0.023) |  |
| group × 2007q3 | -0.046\*(0.027) |  | 0.009(0.023) |  |
| group × 2008q1 | -0.003(0.028) | 0.016(0.026) | -0.015(0.023) | -0.015(0.021) |
| group × 2008q2 | -0.007(0.029) | 0.012(0.028) | 0.015(0.024) | 0.014(0.024) |
| group × 2008q3 | -0.025(0.028) | -0.007(0.029) | -0.022(0.023) | -0.022(0.024) |
| group × 2008q4 | -0.042(0.028) | -0.025(0.031) | -0.030(0.023) | -0.031(0.026) |
| group × 2009q1 | -0.076\*\*\*(0.027) | -0.059\*(0.033) | -0.049\*\*(0.023) | -0.050\*(0.028) |
| group × 2009q2 | -0.059\*\*(0.026) | -0.043(0.034) | -0.045\*(0.023) | -0.046(0.030) |
| group × 2009q3 | -0.070\*\*\*(0.027) | -0.054(0.037) | -0.065\*\*\*(0.023) | -0.067\*\*(0.032) |
| group × 2009q4 | -0.113\*\*\*(0.026) | -0.097\*\*(0.039) | -0.093\*\*\*(0.022) | -0.095\*\*\*(0.033) |
| group ×  linear trend |  | 0.000(0.003) |  | 0.000(0.003) |
| *N* | 56440 | 56440 | 56440 | 56440 |

*Notes*: 1. Year-fixed effects, quarter-fixed effects, sex, age, age squared, education, and receipt of public pension benefits are also included in all the models. 2. \**p*<.10, \*\**p*<.05, \*\*\**p*<.01

*Source*: Household Income and Expenditure Survey

Table S3. IV Estimates of the Effects of the Basic Pension Reform in 2014

|  |  |  |  |
| --- | --- | --- | --- |
|  | Income poverty | Consumption poverty | 1st stage |
|  | IV | IV |
| group × 2012q3 |  |  | -0.037\* (0.021) |
| group × 2012q4 |  |  | -0.038\* (0.021) |
| group × 2013q1 |  |  | -0.033 (0.021) |
| group × 2013q2 |  |  | 0.002 (0.021) |
| group × 2013q3 |  |  | -0.003 (0.021) |
| group × 2013q4 |  |  | -0.010 (0.021) |
| group × 2014q1 |  |  | -0.023 (0.021) |
| group × 2014q3 |  |  | 0.620\*\*\* (0.032) |
| group × 2014q4 |  |  | 0.617\*\*\* (0.032) |
| group × 2015q1 |  |  | 0.615\*\*\* (0.031) |
| group × 2015q2 |  |  | 0.773\*\*\* (0.032) |
| group × 2015q3 |  |  | 0.807\*\*\* (0.031) |
| group × 2015q4 |  |  | 0.764\*\*\* (0.032) |
| group × 2016q1 |  |  | 0.780\*\*\* (0.031) |
| group × 2016q2 |  |  | 0.735\*\*\* (0.033) |
| BP amount | -0.058\*\*\* | -0.005 |  |
|  | (0.010) | (0.008) |  |
| R squared | 0.116 | 0.125 |  |
| F for IV |  |  | 284.811 |
| *N* | 77480 | 77480 | 77480 |

*Notes*: 1. The BPS benefit amount received is instrumented by interactions between a treatment group indicator and year-quarter dummies. The reference point is the second quarter of 2014 before the benefit increase in the BPS. 2.The first-stage model includes the benefit amount received, year-fixed effects, quarter-fixed effects, sex, age, age squared, education, receipt of public pension benefits, a treatment group indicator and year-quarter dummies. 3. All monetary values are expressed in a hundred thousand KRW converted to 2006 values.

Significance levels: \**p*<.10, \*\**p*<.05, \*\*\**p*<.01

Table S4. RD Estimates of the Effects of the Basic Pension

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Basic Pension in 2009 | | | | | |
|  | Anchored Income Poverty | | | Anchored Consumption Poverty | | |
|  | 55-74 | 60-69 | 62-67 | 55-74 | 60-69 | 62-67 |
| Estimates | 0.016 | -0.001 | 0.069 | -0.033 | -0.070 | -0.082 |
|  | (0.026) | (0.044) | (0.088) | (0.023) | (0.040) | (0.075) |
| *N* | 14996 | 5989 | 4472 | 14996 | 5989 | 4472 |
|  | Basic Pension in 2015 | | | | | |
|  | Anchored Income Poverty | | | Anchored Consumption Poverty | | |
|  | 55-74 | 60-69 | 62-67 | 55-74 | 60-69 | 62-67 |
| Estimates | 0.000 | -0.056 | -0.182\*\*\* | -0.020 | -0.071\*\* | -0.055 |
|  | (0.022) | (0.039) | (0.069) | (0.018) | (0.030) | (0.062) |
| *N* | 17065 | 8156 | 4742 | 17065 | 8156 | 4742 |
|  | Basic Pension in 2019 | | | | | |
|  | Anchored Income Poverty | | | Anchored Consumption Poverty | | |
|  | 55-74 | 60-69 | 62-67 | 55-74 | 60-69 | 62-67 |
| Estimates | 0.005 | 0.000 | -0.081 | 0.008 | -0.002 | -0.035 |
|  | (0.018) | (0.029) | (0.053) | (0.009) | (0.015) | (0.024) |
| *N* | 11695 | 5869 | 3494 | 11695 | 5869 | 3494 |

*Notes*: 1. RD coefficients are estimated using the pooled sample of all four quarters in 2009. 2. Age is centred at the cut-off (65). 3. Covariates are not included. 4. The functional form of the model is based on a quadratic interaction regression.

Significance levels: \**p*<.10, \*\**p*<.05, \*\*\**p*<.01