The Health Effects of Non-Contributory Pension: Korean Evidence

Tae-Young Pak, University of Alabama[1]

Objective and Significance

Cash transfer through social pension has proved to be an efficient way to alleviate the depth of poverty as well as its incidence. An important, yet underexplored, hypothesis is whether the old-age pension translates into better health outcomes. Previous research examining income-health nexus suggest direct and indirect pathways through which income support could improve population health. First, the decrease in financial strain and psychological distress generates direct health benefits. Financial hardship and feelings of insecurity is a major risk factor for late-life depression (Krause et al., 1991), which leads to higher rates of mortality (Murphy et al., 1988). To the extent of pension program alleviating financial distress and depressive symptoms, beneficiaries will be on significant longevity gains. Second, additional cash benefits would afford an opportunity whereby the desired level of health consumption can be achieved. Pensioners and their family members are more likely than the counterfactual situation to consume medical services and nutritious meals that they need to maintain good health (Lloyd-Sherlock and Agrawal, 2014). Third, pensions could improve health indirectly through retirement. Supplementary income from government discourages labor supply among older adults (Gruber and Wise, 1998), and a transition into retirement lowers exposure to occupational hazards (Gasparini et al., 2010) and work-related stress and strain (Galiani et al., 2016).

Not all agree to the argument that income support will be good for health. The economic theory of obesity predicts a hump-shaped relationship between unearned income and weight (Lakdawalla and Philipson, 2009); as income increases, individuals increase food consumption and become overweight, but beyond a certain threshold, a further increase in income leads to lower weight as individuals pursue quality foods with lower calories per dollar. Indeed, evidence from conditional cash transfer programs reported significant increase in body mass index and blood pressure among beneficiaries after a doubling of cash transfers (Fernald et al., 2008). Moreover, beneficiaries often misuse social assistance to buy “temptation goods” such as alcoholic drinks and tobacco products (see Evans and Popova, 2014, for a review). In Peru, welfare recipients were more likely to buy alcoholic beverages (Perova, 2010) and sugary foods (Dasso and Fernandez, 2014) at the time cash benefits were deposited. Since the consumption of these goods increases mortality risk, the net impact of pension on health depends on the relative sizes of these offsetting mechanisms.

This study examines social pension reform in South Korea and its impact on population health. The elderly poverty rate in South Korea is the highest among OECD countries (OECD, 2011), due in large part to the late introduction of the contributory national

[1] Tae-Young Pak, (tpak@ches.ua.edu), Assistant Professor, Department of Consumer Sciences

pension (Lee, 2017) and high levels of labor market informality (United Nations, 2016). To alleviate high elderly poverty, the South Korean government introduced their first social pension scheme in 2008 and doubled monthly benefits in July 2014. The reform in 2014 represents one of the largest social welfare expansions in South Korean history and provides an excellent opportunity to set up a quasi-experimental study. Using data from the Korean Longitudinal Study of Aging (KLoSA), we estimate a series of difference-in-differences model that compares pre vs. post-expansion changes in health outcomes between the age-eligible and non-eligible groups.

Policy Background

The Basic Old-Age Pension (BOAP) was introduced in January 2008 to complement the contributory pension system. The BOAP is a tax-funded social pension that transfers flat-rate cash benefits to individuals aged 65 years or older. Eligibility is granted to those older than 65 whose recognized household income is in the bottom 70% of the distribution. The maximum benefit was set at 5% of the average monthly income earned by NPS participants for three years before the implementation of the program. In 2008, beneficiaries could receive a maximum of 84,000 KRW ($78) per month if single and 139,000 KRW ($129) if married. The total number of beneficiaries increased to 3.7 million in 2010 and 4.9 million in 2014, which accounts for 67-68% of the age-eligible population (Lee and Wolf, 2014).

The BOAP was replaced by the Basic Pension (BP) in July 2014. Upon implementation, the maximum benefits were increased to 168,000 KRW ($156) for singles and 269,000 KRW ($250) for married couples. This reform was part of former president Park's 2012 campaign pledge to double the basic pension and expand coverage to all seniors above age 65. As implemented, however, asset-testing criteria were retained to exclude the wealthiest 30% of seniors.

Method

Data Description

The data is drawn from the 2008-2016 waves of the Korean Longitudinal Study of Aging (KLoSA). The KLoSA is a biennial longitudinal survey of individuals over 45 years of age and their spouses. The study provides detailed information on demographic characteristics, family structure, health and health behaviors, labor market participation, and economic conditions that are critical to understand living circumstances at later life.

We select data using the following criteria. First, we limit the sample to singles or married couples where the eldest spouse is aged 50 to 80 years in 2014. Second, we exclude individuals who were smoking cigarettes in 2014 to avoid the potentially confounding effects of a cigarette tax increase in January 2015. Third, observations with missing values for the covariates and sampling weights are deleted. The final sample is an unbalanced panel of 22,662 observations for 4,745 individuals.

We use age-based identification to randomize treatment assignment. The treatment group consists of singles and married couples where the eldest spouse is aged 65 years or older (11,988 observations). The control group includes singles and married couples where both spouses are under age 65 (10,674 observations). In the treatment

group, 9,571 observations pertain to households where both spouses are age-eligible, and 1,103 observations concern households with one spouse over 65 and one spouse under 65.

Measures of Health Outcomes

Self-rated health

Self-rated health is based on a survey question, "*How would you rate your health condition at present?*". Answers are scored from 1 to 5, with "poor" health equal to 1 and "excellent" health equal to 5. Though subjective, research has repeatedly found it to be a strong predictor of mortality and correlated with objectively measured health outcomes (Idler and Benyamini, 1997).

Grip strength

Grip strength is measured using a handheld dynamometer – where respondents are asked to press a lever as hard as they can, and recorded in kilograms on a scale of 0-100. Of a total four measurements for each respondent (two measurements for each hand), we use the largest recorded value. This measure has advantages over self-reported health in that its values are independent to reporting style and measured on a clearly defined scale (Decker and Schmitz, 2016).

Cognitive functioning

Cognitive abilities are assessed by the Korean Mini-Mental State Examination (K-MMSE). The K-MMSE consists of 19 items that assess multiple domains of cognitive functioning, including orientation to time, orientation to place, attention and calculation, registration of three words, recall of three words, language, and visual construction. The total K-MMSE score ranges from 0 to 30 point, with a high score representing better cognitive performance.

Mental health

Mental health is measured by the Center for Epidemiologic Studies Depression (CES-D) scale. The test includes questions on negative feelings, positive thoughts, somatic activities, and social contacts. The KLoSA uses CES-D 10 and yields a score of depression on a 0-30 scale.

Estimation Strategy

We estimate a linear difference-in-differences (DD) model in the following form,

$$y_{i,t} = \beta_0 + \beta_1 T_{i,t} + \beta_2 P_t + \beta_3 (T_{i,t} \cdot P_t) + X'_{i,t}\Psi + \tau_t + \varepsilon_{i,t}, \quad (1)$$

where i denotes individual respondent; $t \in \{2008, 2010, 2012, 2014, 2016\}$ indexes survey years; $\varepsilon_{i,t}$ is an error term; and β and Ψ are parameters to be estimated. The dependent variable, $y_{i,t}$, is one of the health indicators for person *i* at time *t*. The covariate vector $X_{i,t}$ includes age, gender, education background, marital status, number of children, whether or not respondent is receiving national pension, whether or not respondent is collecting public welfare benefits, household income, cohort fixed

effects, and month-of-survey fixed effects. $T_{i,t}$ is an indicator for treatment group, and P_t is a dummy for observations surveyed in 2014 and 2016. The year-of-survey dummy is denoted by τ_t and accounts for a secular trend in health. The treatment effect of the reform is identified by β_3 on the interaction term between $T_{i,t}$ and P_t. Regression equations are estimated by the pooled OLS, with standard errors clustered at the individual and age levels.

Results

Table 1 presents OLS coefficient estimates for the DD models. We first estimate the null model (panel A), and then add covariates to the model as specified in Eq. (1) (panel B). In both panels, the BP expansion is uncorrelated with physical and cognitive health but exerts a significant influence on mental health. Conditioning on covariates, the BP expansion is associated with 0.620 points decline in a CES-D score (or, 9.5%) from the pre-mean among treated persons relative to the comparison group.

Table 2 presents coefficient estimates for a model with year fixed effects. Across all four columns, the coefficient estimates for $\gamma_{3,1}$ and $\gamma_{3,2}$ are not different from zero at the 5% significance level. This shows that there is little difference in health outcomes between the treatment and control groups in 2008 and 2010 relative to 2012 level, and thus the parallel trends assumption holds. In column (4), the estimates for $\gamma_{3,3}$ and $\gamma_{3,4}$ indicate 0.323 points drop in a CES-D score in 2014 over its 2012 average (4.8% decrease evaluated at the mean CES-D in 2012) and 0.794 points fall in 2016 relative to 2012 (11.9% decrease evaluated at the mean CES-D in 2012).

Table 3 explores potential mechanisms through which pension expansion reduces depressive symptoms. The potential mediators examined include labor supply, health behavior, private health insurance ownership, subjective well-being, access to healthcare, food consumption, and leisure expenditures. We estimate a series of regressions that augment with these variables and examine how correlations between the BP reform and CES-D score vary. Since access to healthcare, food consumption, and leisure expenditures capture information between surveys, these variables are led by one survey period and matched with the previous survey's information.

We find that the DD estimate becomes significantly smaller and is no longer different from zero at the 5% level when adding measures for satisfaction with personal finance (column 5, panel A) and food consumption (column 5, panel B). Therefore, we conclude that improved economic security associated with the BP expansion is a primary driver leading to fewer depressive symptoms.

Conclusion

This study has examined the impact of the social pension expansion on population health. There are three main findings. First, we find robust evidence that the 2014 expansion of the BP accompanied significant improvements in mental health. Through a series of empirical modeling we estimated an average of 4.1-9.5% decrease in the count of depressive symptoms attributable to the reform. Second, we show that reduced financial distress is a major pathway through which the BP expansion leads to mental health benefits. Third, we find no significant effect of the BP reform on grip strength,

self-rated health, and cognitive functioning. The estimation results involving physical health are generally insignificant and sensitive to alternative specifications.

Our findings have significant implications for mortality benefits through suicide prevention. South Korea has an alarmingly high rate of elderly suicide - the highest of the OECD countries, and many elderly commit suicide due to economic deprivation (Kwon et al., 2009). Given that depression is a major risk factor for suicidal ideation (Shin et al., 2013), premature death and the related social cost will be significantly reduced to the extent that old-age income support alleviates depressive symptoms and suicidal thought. In the literature, correlations between non-contributory pension and mental health benefits have been a robust finding, reported in different institutional settings (Cheng et al., 2018; Galiani et al., 2016). More study is needed to understand a link between unconditional pension and suicide prevention in distressed seniors.

References

Cheng, L., Liu, H., Zhang, Y., & Zhao, Z. (2018). The health implications of social pensions: Evidence from China's new rural pension scheme. *Journal of Comparative Economics, 46*, 53-77.

Dasso, R., & Fernandez, F. (2014). *Temptation goods and conditional cash transfers in Peru*. Unpublished manuscript.

Decker, S., & Schmitz, H. (2016). Health shocks and risk aversion. *Journal of Health Economics, 50*, 156-170.

Evans, D. K., & Popova, A. (2014). *Cash transfers and temptation goods: A review of global evidence* (Policy Research Working Paper No. 6886). Washington, DC: The World Bank.

Fernald, L. C., Gertler, P. J., & Hou, X. (2008). Cash component of conditional cash transfer program is associated with higher body mass index and blood pressure in adults*. The Journal of Nutrition, 138*, 2250-2257.

Galiani, S., Gertler, P., & Bando, R. (2016). Non-contributory pensions. *Labour Economics, 38*, 47-58.

Gasparini, L., Alejo, J., Haimovich, F., Olivieri, S., & Tornarolli, L. (2010). Poverty among older people in Latin America and the Caribbean. *Journal of International Development, 22*, 176-207.

Gruber, J., & Wise, D. (1998). Social security and retirement: An international comparison. *The American Economic Review, 88*, 158-163.

Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior, 38*, 21-37.

Krause, N., Jay, G., & Liang, J. (1991). Financial strain and psychological well-being among the American and Japanese elderly. *Psychology and Aging, 6*, 170-181.

Kwon, J. W., Chun, H., & Cho, S. I. (2009). A closer look at the increase in suicide rates in South Korea from 1986–2005. *BMC Public Health, 9*, 72.

Lakdawalla, D., & Philipson, T. (2009). The growth of obesity and technological change. *Economics & Human Biology, 7*, 283-293.

Lee, S. (2017). Population ageing and retirement security in Korea. In C. Martinez, T. Weyman, & J. van Dijk (Eds.), *Demographic transition, labour markets and regional resilience* (pp. 199-215). Cham, Switzerland: Springer.

Lee, H. S., & Wolf, D. A. (2014). An evaluation of recent old-age policy innovations in South Korea. *Research on Aging, 36*, 707-730.

Lloyd-Sherlock, P., & Agrawal, S. (2014). Pensions and the health of older people in South Africa: is there an effect?. *The Journal of Development Studies, 50*, 1570-1586.

Murphy, E., Smith, R., Lindesay, J., & Slattery, J. (1988). Increased mortality rates in late-life depression. *The British Journal of Psychiatry, 152*, 347-353.

OECD (2011). *Pensions at a glance 2011: Retirement-income systems in OECD and G20 countries*. Paris, France: OECD Publishing.

Perova, E. (2010). *Three essays on intended and not intended impacts of conditional cash transfers* (Unpublished doctoral dissertation). University of California, Berkeley, US.

Shin, K. M., Cho, S. M., Hong, C. H., Park, K. S., Shin, Y. M., Lim, K. Y., & Koh, S. H. (2013). Suicide among the elderly and associated factors in South Korea. *Aging & Mental Health, 17*, 109-114.

United Nations (2016). *Income security for older persons in the Republic of Korea*. New York, NY: The United Nations.

Tables

Table 1. Regressions for Health Outcomes

Outcome:	Grip (1)	SR health (2)	MMSE (3)	CES-D (4)
Panel A:				
I(Age ≥ 65)	-2.451***	-0.084***	-0.414***	0.580***
	(0.529)	(0.022)	(0.110)	(0.171)
Post	1.328***	-0.600***	0.349***	-0.029
	(0.413)	(0.035)	(0.131)	(0.251)
***I*(Age ≥ 65) × Post**	**0.068**	**-0.027**	**0.137**	**-0.577*** **
	(0.375)	**(0.028)**	**(0.126)**	**(0.186)**
Panel B:				
I(Age ≥ 65)	0.174	0.016	-0.033	0.392**
	(0.173)	(0.022)	(0.095)	(0.161)
Post	1.928***	-0.705***	-0.239*	0.273
	(0.252)	(0.037)	(0.140)	(0.259)
***I*(Age ≥ 65) × Post**	**-0.085**	**-0.033**	**0.101**	**-0.620*** **
	(0.233)	**(0.028)**	**(0.118)**	**(0.184)**
Age	0.202	-0.029*	0.372***	-0.170
	(0.128)	(0.016)	(0.078)	(0.122)
Age squared	-0.004***	0.001	-0.004***	0.002*
	(0.001)	(0.001)	(0.001)	(0.001)
Female	-12.030***	-0.137***	-0.435***	0.410***
	(0.199)	(0.024)	(0.098)	(0.131)
Middle school graduate	0.539***	0.135***	1.286***	-0.520***
	(0.151)	(0.025)	(0.128)	(0.175)
High school graduate	0.681***	0.272***	1.796***	-0.920***
	(0.165)	(0.027)	(0.123)	(0.167)
Married	1.677	0.402**	0.182	-1.964
	(1.171)	(0.162)	(0.970)	(1.536)
Separated	2.109*	0.334*	0.192	-0.405
	(1.248)	(0.172)	(1.016)	(1.574)
Widowed	2.017*	0.482***	-0.080	-1.221
	(1.188)	(0.166)	(0.971)	(1.537)
Number of children	0.029	0.014*	-0.210***	-0.145***
	(0.065)	(0.008)	(0.049)	(0.056)
National pension beneficiary	-0.068	0.006	0.112	-0.263*
	(0.184)	(0.021)	(0.113)	(0.157)
Social welfare beneficiary	0.044	-0.161***	-0.167	-0.029
	(0.212)	(0.027)	(0.196)	(0.217)
Log(HH income)	0.517***	0.133***	0.335***	-0.434***
	(0.058)	(0.011)	(0.045)	(0.066)
Observations	20,360	22,662	21,796	22,576

Notes: Robust standard errors in parentheses are clustered at the individual and age levels. Regressions control for cohort fixed effects, month-of-survey fixed effects, and year-of-survey fixed effects. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table 2. Regressions for Health Outcomes, with Year Fixed Effects

Outcome:	Grip	SR health	MMSE	CES-D

	(1)	(2)	(3)	(4)
I(Age ≥ 65)	0.412*	0.007	0.043	0.297*
	(0.224)	(0.023)	(0.111)	(0.160)
Year 2008	-0.293	0.012	0.231**	-0.853***
	(0.205)	(0.022)	(0.111)	(0.150)
Year 2010	-0.858***	0.011	-0.204**	0.010
	(0.182)	(0.021)	(0.094)	(0.119)
Year 2014	0.909***	0.004	-0.117**	-0.313***
	(0.171)	(0.014)	(0.058)	(0.103)
Year 2016	1.528***	-0.673***	-0.032	-0.414*
	(0.218)	(0.026)	(0.141)	(0.214)
$\gamma_{3,1}$: *I*(Age ≥ 65) × Year 2008	-0.388*	0.055	-0.094	0.150
	(0.216)	(0.034)	(0.088)	(0.183)
$\gamma_{3,2}$: *I*(Age ≥ 65) × Year 2010	-0.405*	-0.013	-0.156*	0.180
	(0.219)	(0.034)	(0.091)	(0.129)
$\gamma_{3,3}$: *I*(Age ≥ 65) × Year 2014	**-0.351**	**-0.022**	**0.015**	**-0.323*** **
	(0.268)	**(0.022)**	**(0.089)**	**(0.122)**
$\gamma_{3,4}$: *I*(Age ≥ 65) × Year 2016	**-0.209**	**-0.036**	**0.055**	**-0.794*** **
	(0.325)	**(0.037)**	**(0.170)**	**(0.240)**
Observations	20,360	22,662	21,796	22,576

Notes: Robust standard errors in parentheses are clustered at the individual and age levels. Regressions control for a full set of covariates. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

Table 3. Evaluating Potential Mechanisms

Outcome:	CES-D						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A:							
β_3: ***I*(Age ≥ 65) × Post**	-0.383**	-0.418***	-0.347**	-0.391**	-0.250	-0.259*	-0.257
	(0.157)	(0.152)	(0.163)	(0.156)	(0.161)	(0.157)	(0.158)
Full-time employee		X					X
Regular exercise			X				X
Own private health insurance				X			X
Economic satisfaction					X		X
Life satisfaction						X	X
Observations	22,576	22,576	22,576	22,576	22,574	22,573	22,572
Panel B:							
β_3: ***I*(Age ≥ 65) × Year 2014**	-0.515***	-0.530***	-0.534***	-0.484***	-0.353	-0.551***	-0.295
	(0.169)	(0.174)	(0.174)	(0.178)	(0.247)	(0.174)	(0.249)
Number of medical service use		X					X
OOP medical expenditures			X				X
OOP drug expenditures				X			X
Food expenditures					X		X
Leisure expenditures						X	X
Observations	18,282	17,646	17,646	17,382	11,328	17,646	11,164

Notes: Robust standard errors in parentheses are clustered at the individual and age levels. Regressions control for a full set of covariates. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.