경제학석사학위논문

Basic Old Age Pension and the Cognitive ability of the Elderly
- 기초노령연금과 고령자의 인지능력

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경제학 전공

정원혁

Abstract

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I estimate the impact of Basic Old Age Pension (BOAP) to seniors on cognitive ability. I use individual level elderly data including the pre and post period of the BOAP (2006-2014). Although crowd out of child transfer occurs, the net effect of pension increases the cognitive ability of the elderly. The net impact of BOAP on cognitive ability of the elderly is analogous to the 71.3 % difference of cognitive ability by 2nd and 1st quantile of households in the age group of 65 to 74. The BOAP enhanced the receiving group 2.415 age gap of cognitive ability during year 2008-2014.

Keywords: cognitive ability; government public transfer program; health outcome; dementia
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Contents

1 Introduction

According to the OECD statistics, the elderly population of developed countries is increasing. This phenomenon is aggrevating in the middle developed countries such as South Korea or China. As the aging of countries magnifies, the productivity of the countries diminishes. The elderly people are in the verge of the dementia or MCI (mild cognitive impairment). Low cognitive ability hinders elderly from learning new knowledge. It is important to increase the cognitive abilities of elderly. The public income transfer is a way to solve the problem.

[Figure 1 here]

The aging and the poverty of elderly are big issues in South Korea. The aging population (65 years or older) accounted 6% of the total population of Korea in 1996, but the rate increased to 12% in 2013. The 52.9% of elderly people in the year 2013 were in the relative poverty. The Korean government adopted a Basic Old Age Pension (BOAP) in year 2008 to solve the problem. The government gave the public transfer to elderly who are 65 year or older at the beginning of the August, year 2008. The amount of BOAP is designed to benefit the elderly who are in lower income level.

Introduction and expansion of BOAP provide exogenous income gain to elderly aged 65 years or older. Figure 2 shows the exogenous increment of BOAP amount from year 2008 to 2014. The income criteria is the sum of income valuation and the asset valuation. The BOAP benefitted the low and middle income seniors aged 65 or older. The range of people who gain from the pension expanded as well as the maximum amount of BOAP amount increased. Also, in year 2010, working income and basic asset are deducted from the income valuation and asset valuation respectively. This increased the take-up rate of BOAP in year 2010. The take-up rate increased 16 percentage point of its total population from year 2008 to year 2010.

[Figure 2 here]

I estimate the introduction of BOAP on cognitive ability of elderly. The estimation strategy is based on the difference-in-difference technique of elderly who are eligible to obtain BOAP. The age cut-off is 65. The treatment group is the elderly aged 65 to 84 and the control group is the elderly who are aged 45 to 64. I use Korean Longitudinal Study of Ageing (KLoSA). This data includes a rich set of social and demographic characteristics and a number of health outcomes including cognitive abilities.

This paper is organized as follows. Section 2 describes the institutional background of BOAP. Section 3 presents the methodology, which is the difference in difference technique. Section 4 describes the data of Korean Longitudinal Study of Ageing (KLoSA). Section 5 presents the result of the regression. Section 6 summarizes the findings.

2 Previous Research

The cognitive ability of elderly is related to a number of factors. Crum et al. (1993) shows that the age is negatively related to the MMSE(Mini-Mental-State-Examination) score, and education is positively related to the score. Michaud and Soest (2008) shows that the husband's health is related to the wife's mental health. But, they find that there is no relationship between the spouse's health and the other's health. Nutrition is associated to the cognitive impairment (Ortega et al., 1997; Shi et al., 2015). They show that the low nutrition is related to the cognitive impairment of the elderly. Verghese et al (2003) shows that the leisure activities related to cognitive-activity are negatively associated to the risk of dementia. But, the activities related to physical-activity are not associated. Huang et al (2013) finds that the height shrinkage is strongly related to cognitive abilities of the elderly using data from China. Collins and Goldman (2007) argue that the perceived social position is not related to the cognitive impairment.

There are some papers that finds the causal impact of pension income of elderly on the health outcome. Ayyagari and Frisvold (2016) find the casual impact of pension income on the cognitive outcome of elderly using HRS (Health and Retirement Study). They show that the increased pension income enhances the cognitive outcome. But, the paper did not find the channel of the improvement of the cognitive ability. Cheng et al (2016) use the Chinese pension system to find the impact of income on health outcomes of elderly. The paper argues that the pension has amount of income from the pension has a positive impact on the physical outcome and the cognitive abilities of the elderly. This paper uses the exogeneous change of the pension system in Korea to examine the causal impact of public pension on the cognitive ability of the elderly for several periods.

3 Methodology

I use the age as the exogenous criteria which the individuals cannot manipulate to receive the pension benefit. The take-up of BOAP is also determined by the income, asset, debt and the enrollment of the pension. Cognitive abilities of seniors depend on the income of household, social and demographic characteristics, and their social activities. Economists regarded cognitive ability as human capital (Cunha and Heckman, 2007; Banks and Mazzonna, 2012). Grossman (1972) theoretically shows the endogenous relationship between income and health. Cognitive ability can be enhanced by investments from life time experiences. (Maguire et al., 2000, Hertzog et al., 2008). This could be explained by cognitive reserve model (Stern, 2002; Stern 2009; Barulli and Stern, 2013; Dekhtyar et al., 2015). The model accounts for the individuals different response to brain damage owning from different education or occupation (Scarmeas and Stern, 2003; Stern, 2006; Stern 2012).

The estimate from the actual take-up of the pension and the cognitive ability can be biased. The higher income and education have positive effect on cognitive

ability, and the individuals with better cognitive ability have higher chance to apply for the BOAP. To control the endogeneity, I use age criteria which individuals cannot control. By using the criteria, I find the change of cognitive ability of the treatment group compared to the control group before and after the policy change. I consider the following difference in difference model :

$$y_{i,t} = \beta_0 + \beta_1 Treat_{i,t} \times Post_t + X_{i,t} + age + age^2 + \mu_t + \varepsilon_{i,t} \tag{1}$$

where i indicate the individual or household head of elderly, t indicate the surveyed year. $y_{i,t}$ indicates the dependent variables such as the amount of BOAP, child transfer, and cognitive abilities. $Treat_{i,t}$ indicates whether the elderly is 65 years or older at year t (if the age is greater than or equal to 65 at the year t, the value is 1, otherwise it is 0). $Post_t$ indicates 1 if year 2010, 2012, 2014 and 0 if year 2006, 2008. $X_{i,t}$ indicates the social and demographic characteristics including gender, education level, marital status, type of region, region in sido level, religion, household size, asset, and household income. In the survey, household member who know the incomes and the assets the most responded the household income. BOAP is not included in the household income since the survey check the sum of individual incomes (BOAP not included) larger than the household income. β_1 indicate the estimate of the interaction term of the impact of policy on the outcome variable. $\varepsilon_{i,t}$ is the error term.

Then, I modify difference in difference technique to find the timing of the effects of BOAP on the amount of BOAP, child transfer, and cognitive ability. The model is as follows :

$$y_{i,t} = \beta_0 + \sum_{t \neq 2006} \beta_t Treat_{i,t} \times Year_t + X_{i,t} + age + age^2 + \mu_t + \varepsilon_{i,t} \tag{2}$$

I assume the same notation as the regression (1). $Year_t$ indicates the calendar

years for the survey. β_t estimates changes of BOAP benefits on outcome variables compared to year 2006.

To identify the heterogeneity of BOAP on cognitive ability, I exploit following triple difference methodology:

$$y_{i,t} = \beta_0 + \beta_1 Treat_{i,t} \times Post_t \times LowEdu_e + \beta_2 Treat_{i,t} \times Post_t + \beta_3 Post_t \times LowEdu_e + \beta_4 \times LowEdu_e \times Treat_{i,t} + X_{i,t} + age + age^2 + \mu_t + \delta_e + \varepsilon_{i,t} \tag{3}$$

The equation exploits same notation in equation (1). Additionally, e is education level. $LowEdu_e$ is a binary variable. $LowEdu_e$ is equal to 1 when the education level of an individual or a head of household is less than middle school graduation. δ_e is the education fixed effect. I interact the $LowEdu_e$ with $Treat_{i,t}$ and $Post_t$. I estimate the additional effect of education of BOAP on outcomes using β_1.

For the robustness check, I include the treatment dummy in equation (1).

$$y_{i,t} = \beta_0 + \beta_1 Treat_{i,t} \times Post_t + Treat_{i,t} + X_{i,t} + age + age^2 + \mu_t + \varepsilon_{i,t} \tag{4}$$

I use the notations used in equation (1).

4 Data

In this section, I describe the characteristics of the KLoSA data and summary statistics of key variables in BOAP.

4.1 KLoSA Data

For the empirical analysis, I use the KLoSA data from Korea Employment Information Service (KEIS). The data is a panel data which was surveyed biannually. The data includes variety of information such as household income, assets, MMSE(Mini-Mental-State-Examination) score, age, and other social and demographic information. Figure 3 shows that receiving rate of BOAP on KLoSA is similar to that on actual receiving rate calculated by the Ministry of Health and Welfare.

[Figure 3 here]

The main dependent variable is MMSE score developed by Folstein(1975). The test takes approximately 5-10 minutes to distinguish the dementia and the MCI (mild cognitive impairment). The result of the test is not exactly identical to the actual medical test, but is a good proxy to the test. The test costs little compared to the actual medical test. For this advantage, the test is done in many elderly panels in countries such as Health and Retirement Study (HRS) in United States, English Longitudinal Study of Aging (ELSA) in United Kingdom, Survey of Health Ageing and Retirement in Europe (SHARE) in Europe, and Japanese Study on Aging and Retirement (JSTAR) in Japan.

In figure 4, MMSE score decreases by ages and increases by household income. The 1st quantile group who are in 65 to 74 age group is at the verge of MCI (Mild Cognitive Impairment, MMSE score is less than or equal to 23). Since the typical retirement age of South Korea is 65, the household income gap is related to cognitive impairment elderly who quit their job.

[Figure 4 here]

4.2 Summary Statistics

[Table 1 here]

The table 1 provides information of BOAP amount, child transfer amount, cognitive ability, amount of money receive, and social and demographic characteristics. In 2006-2014 periods, the average annual BOAP amount is 190,000 KRW and 270,000 KRW for male and female respectively. Child transfer amount is 760,000 KRW and 114,000 KRW for male and female respectiveely which is approximately four times of average annual BOAP amount. Average MMSE score is 25.5 and 23.6 for male and female respectively. This is due to the fact that the average age of female sample is older. Specific cognitive measure such as word recall, serial 7, and mental status show the similar pattern. The average ratio of people who have not graduated middle school is 31.2% and 58.4% for male and female respectively. 4.6% of male live alone and 15.8% female live alone. 40.4% of male live only with his spouse and 30.6% of female live with her spouse. Those who live with 2 household or more is almost half of the sample for each gender.

[Table 2 here]

The table 2 provides information of BOAP amount, child transfer amount, household income, MMSE score for the control group and the treatment group biannually. The annual difference of BOAP amount for treatment group compare to that of control group is 0 KRW at year 2006. This amount increases to 550,000 KRW at year 2010. The annual difference of child transfer for treatment group compare to that of control group is 1,900,000 KRW at year 2006. This amount decreased to 1,310,000 KRW at year 2010. The annual difference of MMSE score for treatment group compare to that of control group is -4.2 at year 2006. This amount increased to -3.5 at year 2010.

5 Results

I estimate the impact of BOAP on the amount of BOAP, child transfers, and cognitive abilities. I also find the possible mechanism and economic significance of

the result.

5.1 The results of the amount of BOAP and Cash Transfer Received

Table 3 and table 4 show the effect of BOAP introduction on the BOAP amount and the cash transfers to seniors respectively using equation (1). In table 3, the column (1) of panel A shows the result of all household for all gender. The amount of BOAP of the treatment group increased 670,000 KRW per year compared to the control group. The result is robust for all household size sample as in column (2) through colum (5). The result is also robust for any gender household head sample as in panel B and panel C.

[Table 3 here]

[Table 4 here]

The BOAP increment is greater than the reduction of private transfer from child. In table 4, the deduction of child transfer of treatment group compared to the control group is insignificant as in panel A of column (1). To identify the crowd out effect more accurately, I used equation (2) to check the trend of coefficient by year. The panel A of table 17 show that the increment of BOAP amount is 400,000 KRW at year 2010 and year 2012. In table 18, the crowd out effect of pension on child transfer is approximately half. Although BOAP amount increases to 1,300,000 KRW at year 2014, the coefficient of child transfer amount is positive at year 2014. This may be due to the cohort effect.

5.2 Cognitive Enhancement

Table 6 reports the impact of BOAP on the cognitive ability of the elderly. The cognitive ability is measured as MMSE score. In Table 5, I report the main result. The maximum score of MMSE is 30 and the minimum is zero.

[Table 5 here]

The effect of BOAP on the MMSE score is the 0.483 shown in column (1) of panel A. In figure 6, the enhancement of cognitive ability is different by years. Compare to the year 2006, the increment of MMSE score is 0.165 in year 2008, and statistically significant. In year 2010, the amount increases to the 0.553 in year 2010, and statistically significant. The coefficient increases to 0.594 in year 2012 and statistically significant. This amount decreases to 0.419 in year 2014. This trend is robust for all household size. The trend is mostly driven by female elderly group.

[Table 6 here]

Table 7 reports the impact of BOAP on the MCI (Mild Cognitive Impairment). MCI is measured 1 if the individuals' MMSE score is smaller than or equal to 23. The effect of BOAP on the MCI is the 1.7% percentage point reduction in column (1) of panel A. As the average rate of MCI for the BOAP group in pre period is 28.2%, the impact of BOAP on cognitive enhancement is 6.0%. The reduction of MCI of the treatment group compared to control group is different in years at panel A of table 20. Contrast to the year 2006, the reduction of MCI in treatment group compared to the control group is 3.8 percentage point in year 2012, and statistically significant. But this amount decreases to 2.1% in year 2014.

[Table 7 here]

5.3 Heterogeneity of the Cognitive Enhancement

The cognitive reserve is a concept explaining the individual's diverse response of brain damage. (Stern, 2002; Stern 2009; Barulli and Stern, 2013; Dekhtyar et al., 2015) The life experiences such as educational or occupational activities may enhance cognitive reserve (Scarmeas and Stern, 2003; Stern, 2006; Stern 2012). Mechanism of cognitive reserve is by attention, arousal, and awareness (Robertson, 2014). Education increases the curiosity and novelty which mentally stimulates individuals. Social engagement increases arousal, attention and awareness.

However, later adult education have no effect on fluid cognitive reserve (Thow et al., 2018).

Table 5 shows that the MMSE score of the elderly is approximately 1 point less than that of male groups. In table 6, female sub group improves better than male sub groups when they receive BOAP.

Table 5 shows that the education is positively associated with cognitive ability. Compare to the elderly group who did not have education or graduated only elementary school, the middle school graduate group has 1.64 higher MMSE score. The cognitive ability increases as the educational level increases. The panel B and C in table 10 explores the heterogeneity of education in different gender groups. Both male and female sub samples shows that BOAP effect on cognitive ability of low education group is larger than that of higher educational group. But, this effect is larger for the male group although it is statistically insignificant.

Education and gender affect cognitive enhancement. To identify the effect, I exploit equation (3). Table 8 shows that lower education group earned more BOAP amount. But, table 9 shows that education has no effect on the crowd out of child transfer by pension.

[Table 8 here]

[Table 9 here]

[Table 10 here]

[Table 11 here]

5.4 Possible Mechanism of the Cognitive Enhancement

I find different sources of cognitive abilities using equation 1. Serial 7 measures mathmatical ability of the respondents. The respondents are asked to count backward from 100 and continue subtracting 7. The maximum point for serial 7 is 5

since the question is asked 5 times. In table 12, the result shows that the math ability improved 0.041 score. The percentage increase is 1.1 percentage point compared to the dependent mean. The second ability is word recall which is related to memorizing vocabularies. The respondents are asked to memorize and answer 3 words prior to the serial 7 question and asked to answer those words posterior to the serial 7 questions. The total point of word recall is 6. The table 13 shows that the memorizing ability enhanced 0.105 points, which is 2.26 percentage points compared to the dependent mean. The third ability is mental status. Mental status measures diverse abilities such as knowledge, orientation, serial 7, and drawing skills. The maximum point of mental status is 24. The results in table 14 shows that the mental status is improved 0.287 points. This is 1.37 percentage points compared to the dependent mean. The result is driven by female sample.

[Table 12 here]

[Table 13 here]

[Table 14 here]

In table 15, the labor market participation and expectation for the economic status may explain the cognitive ability of the elderly. In column (2), current working status is positively related to the cognitive ability of the elderly. But the impact is bigger for the male sample.

In column (3), I examine the correlation between the expectation of elderly's own economic status and the cognitive ability. Respondents answered their expectation for their own economic status. The negative expectation is calculated ranged from 0 to 100. 50 point difference indicates 0.25 MMSE score differences.

[Table 15 here]

5.5 Macroeconomic Effect on Cognitive ability

Macro economic may affect cognitive ability of the elderly. Table 16 shows the impact of local suicide rate and unemployment rate on the cognitive ability. I exploit suicide rate and unemployment rate of all age group level and age over 60 group level from KOSTAT (Statistics Korea). Suicide rate per 100,000 population is calculated. Suicide rate is positively related to cognitive ability of the elderly. This effect is mostly driven by male sample. The local unemployment calculated by sido region level. 1 percentage point increase of unemployment rate is negatively associated with 0.16 MMSE score for male sample. But, the local unemployment rate in female shows no relation. Local unemployment rate of aged over 60 is also negatively related to the cognitive ability, but it is insignificant.

[Table 16 here]

5.6 Economic Significance

I examine the economic significance of BOAP. In panel (a) of figure 4, difference of 2nd quantile MMSE score and 1st quantile MMSE score is 1.6 (= 24.4 -22.8). In panel (b) of figure 4, the difference of 2nd quantile household income and 1st quantile household income is 8,990,000 KRW (= 1,252 - 353). MMSE score per 10,000 KRW of 2nd quantile and 1st quantile is $0.0018(= 1.6/899)$. In table 3 and 4, the coefficient of Treat $\times$ Post of net BOAP income (BOAP $+$ child transfer) is 63.4 (= 67.4 + (-4)). Then, the coefficient of Treat $\times$ Post for 6 years (2009-2014) is 380.4 (= 63.4 $\times$ 6). In table 6, the coefficient of Treat $\times$ Post of MMSE score is 0.483. MMSE score per net income of BOAP for 6 years is $0.0013(= 0.483/380.4)$. The effect of BOAP is 71.3% (= 0.0013 / 0.0018) of reducing the cognitive gap between 2nd quantile and 1st quantile of 65-74 aged group. In figure 5, in the age group 60-70, the 1 year increase in age decreases 0.2 MMSE score. Since the coefficient of Treat $\times$ Post of MMSE score is 0.483, the BOAP enhanced the receiving group 2.415 age gap of cognitive ability during year 2008-2014.

[Figure 5 here]

5.7 Robustness Check

The previous result holds under different specification. To exploit the difference and difference strategy, I check the parallel shift assumption using equation (2). The left graph in figure 6 (a) shows the parallel trend of BOAP amount and child transfer amount. The panel A of table 17 and panel A of table 18 show the exact coefficient of figure 6 (a). The right graph in figure 6 (a) shows the parallel trend of MMSE score. Although there is slight increment at year 2008, this might be due to the increment of BOAP amount at year 2008. The scale of the coefficient is less than half of that at year 2010. The panel A of table 19 show the coefficient of the graph.

[Figure 6 here]

[Table 17 here]

[Table 18 here]

[Table 19 here]

[Table 20 here]

I check the sample weight issues at table 21 using pooled OLS. Sample weight may drive biased the result. I compare the result with and without sample weights. Regression results using cross sectional weight, longitudinal weight, and the one without sample weight show no differences.

[Table 21 here]

Although I control the age and its quadratic term, excluding the treatment dummy may have impact on the regression result. I include the treatment dummy

as the equation (4). In table 22, I compare the regressions with and without the treatment dummy. Inserting treatment dummy captures the characteristics that age over 65 can have such as retirement effect. The table shows similar results for the regression with and without treatment dummy. Comparing column (1) and (2), the coefficient difference of Treat $\times$ Post dummy is 0.01 MMSE score. For male subgroups, the coefficient decreases approximately 0.09 MMSE point as shown in column (3) and (4). For female subgroups in column (5) and (6), the coefficient increases from 0.677 to 0.785.

[Table 22 here]

In appendix, I restrict samples to age 55-74. The control group is elderly aged 55-64 and the treatment group is elderly aged 65-74. The results are robust to the previous one.

6 Conclusion

This paper contributes to the research of causal impact of pension on cognitive ability of the elderly. The paper also shows that the cognitive impairment can be improved by the introduction of the pension. Although crowd out of child transfer occurs from the introduction of public pension, the net effect of pension increases the cognitive ability of the elderly. The net impact of BOAP on cognitive ability of the elderly is analogous to the 71.3% of difference of cognitive ability by 2nd and 1st quantile of households at 65 to 74 age group. The BOAP enhanced the receiving group 2.415 age gap of cognitive ability during year 2008-2014.

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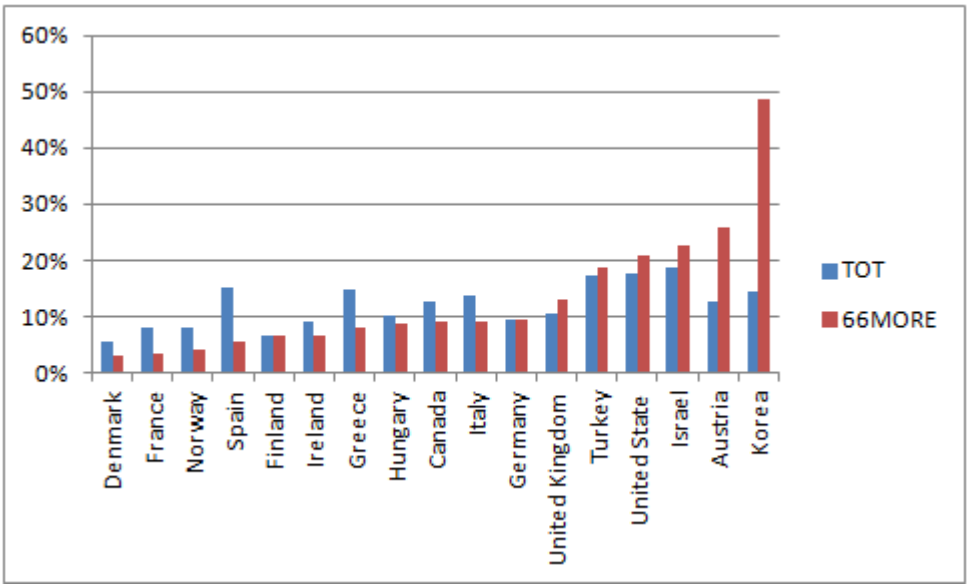
Figure 1: Poverty ratio of OECD Countries



Notes. Data from OECD, 2014. Poverty ratio is measured as relative poverty.

Figure 2: BOAP Criteria and BOAP Amount for couples

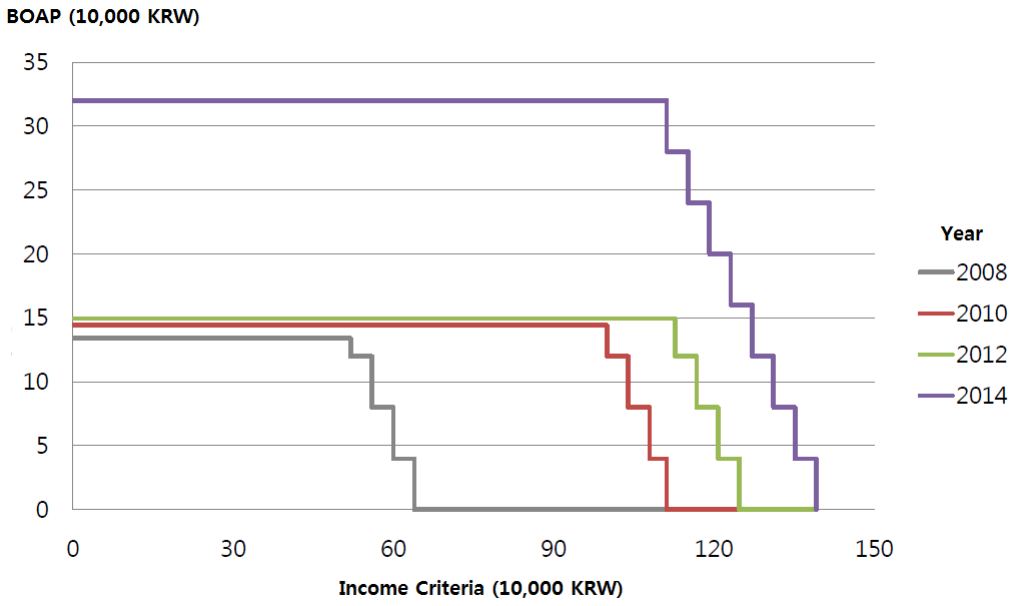
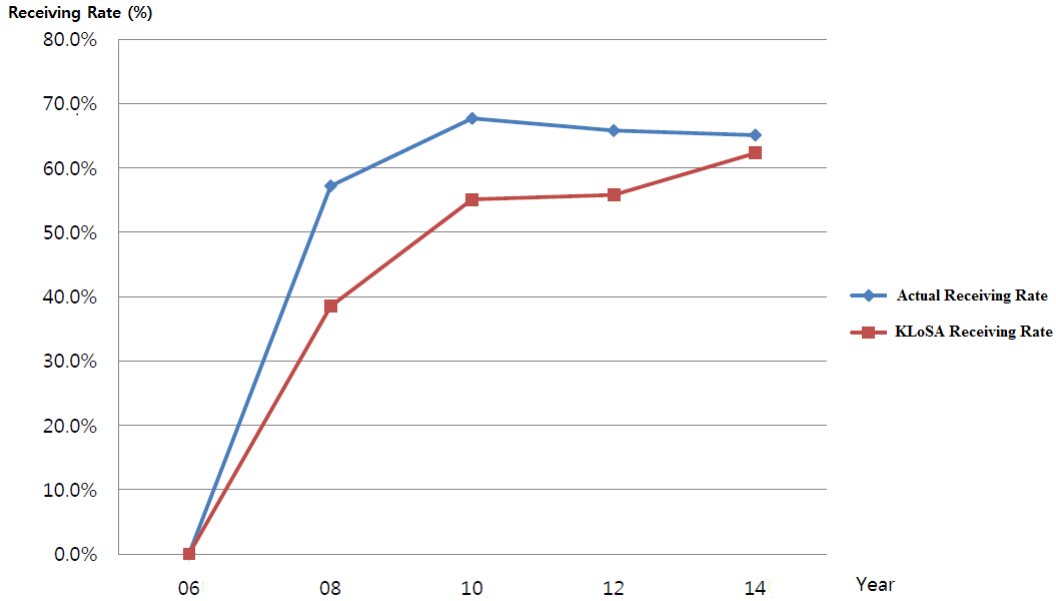
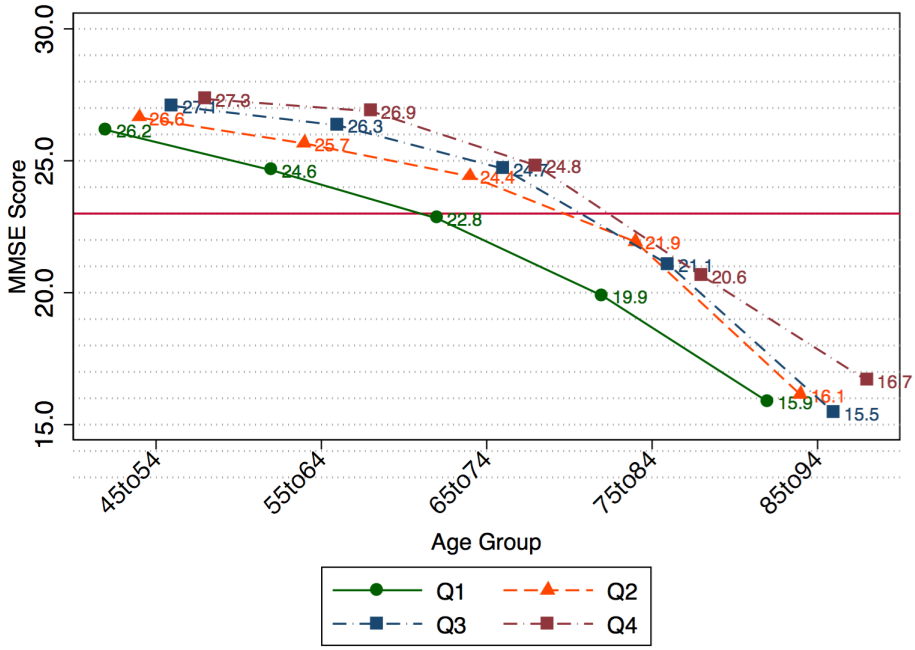


Figure 3: Actual Recieving Rate and KLoSA Receiving Rate

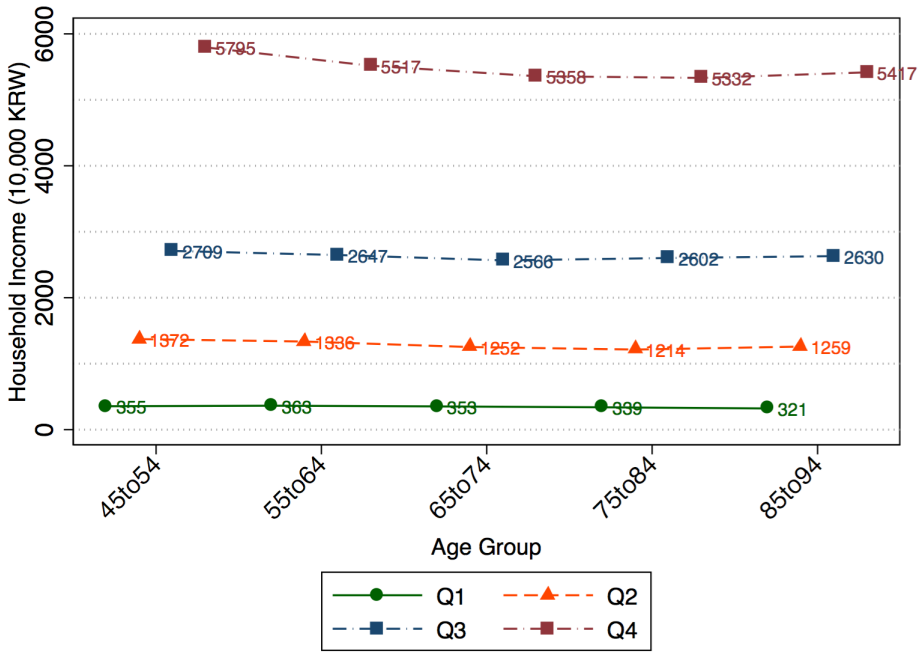


Notes. Actual Receiving Rate is calculated from data by the ministry of Health and Welfare. KLoSA receiving rate is calculated from data by Korean Longitudinal Study of Ageing

Figure 4: MMSE Score by Age group and Household Income Quantile



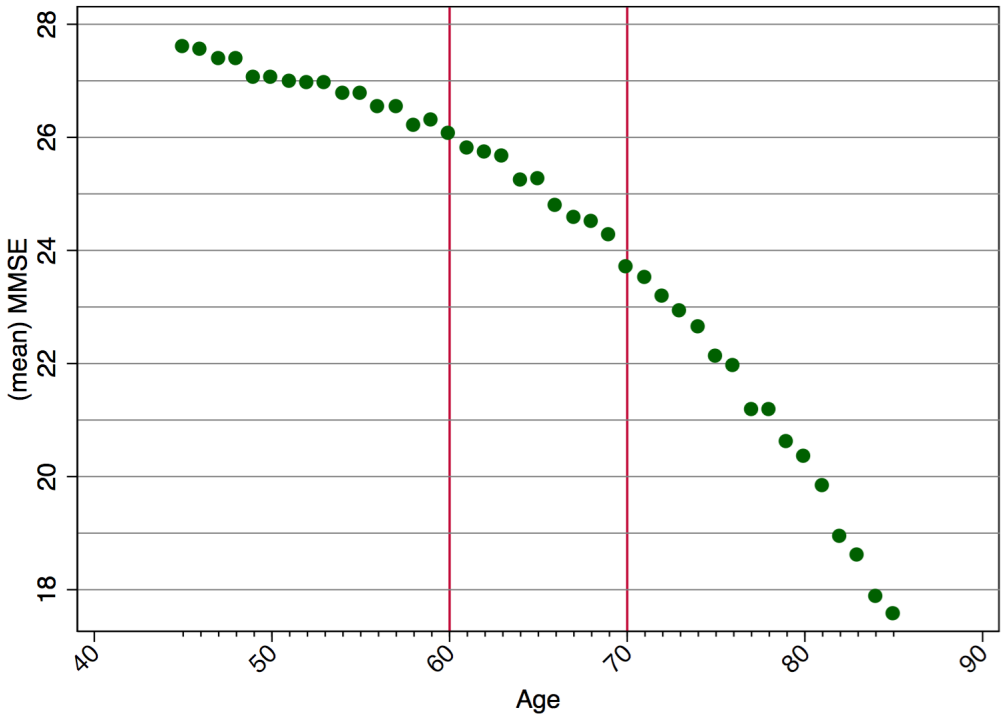
(a)



(b)

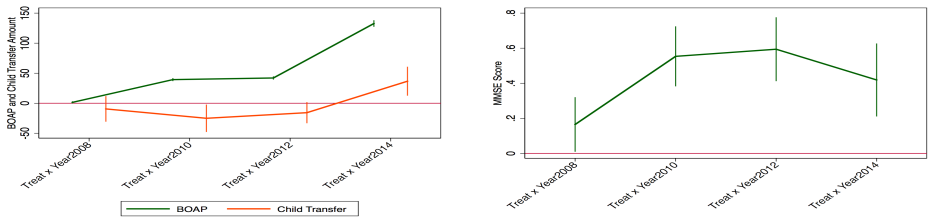
Notes. Quantiles are calculated from the household income of KLoSA data.

Figure 5: MMSE Score by Age

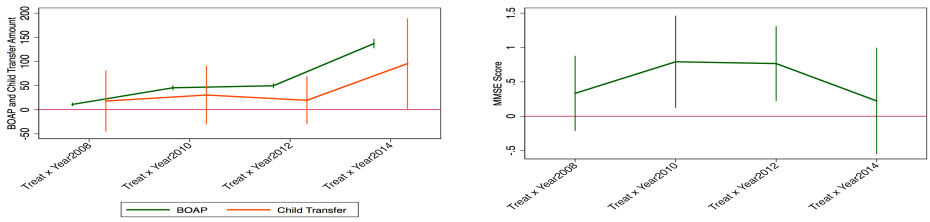


Notes. Data is from KLoSA. MMSE mean for individual age is presented. MMSE score ranges 0-30.

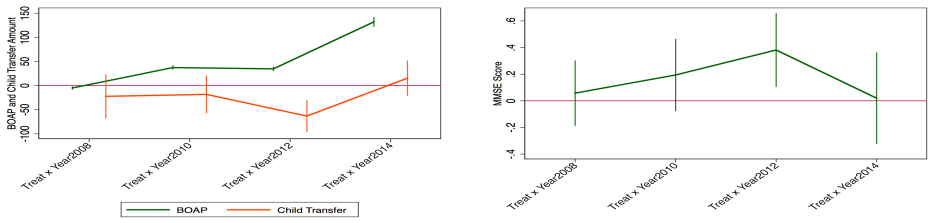
Figure 6: All gender (Age 45-84)



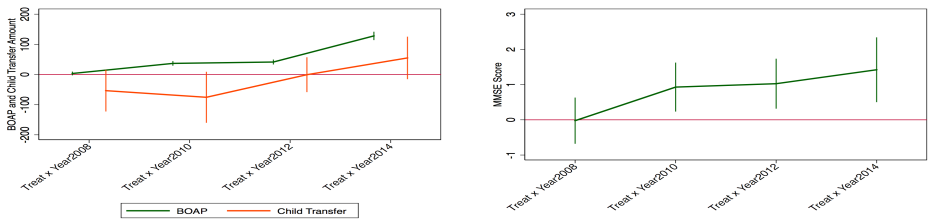
(a) All household size



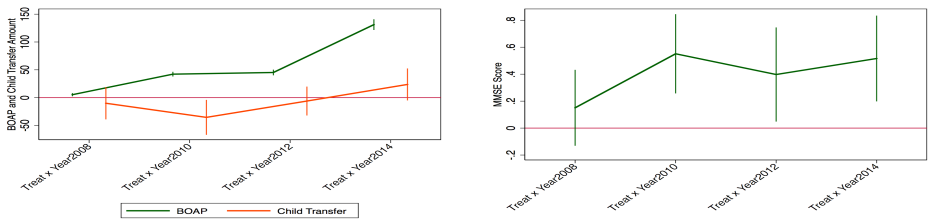
(b) Household 1



(c) Household 2 (with spouse)



(d) Household 2 (without spouse)



(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

Table 1: Summary statistics (Age 45-84)

	Male		**Female**	
	Mean	SD	Mean	SD
BOAP amount	18.782	[45.725]	26.696	[54.966]
Child Transfer	76.127	[213.736]	114.440	[283.920]
MMSE Score	25.496	[4.379]	23.592	[5.585]
Word Recall	4.761	[1.432]	4.417	[1.623]
Serial 7	4.007	[1.464]	3.276	[1.854]
Menal Status	21.635	[3.468]	19.947	[4.597]
MCI	0.210	[0.408]	0.373	[0.484]
Age	64.361	[10.368]	65.199	[11.214]
Not Grad. Mid. School	0.312	[0.463]	0.584	[0.493]
HH size 1	0.046	[0.210]	0.158	[0.365]
HH size 2 with Spouse	0.404	[0.491]	0.306	[0.461]
HH size 2 w.o. Spouse	0.054	[0.227]	0.084	[0.277]
HH size 3 or more	0.495	[0.500]	0.452	[0.498]

Notes. Data are from KLoSA (Korean Longitudinal Study of Ageing). The unit of the amount of BOAP and child transfer are 10,000 KRW. MMSE score is Mini Mental State Examination which measures cognitive ability of the elderly. The maximum score is 30. MCI is mild cognitive impairment which is the binary variable for respondents with MMSE score less than or equal to 23.

Table 2: BOAP, Child Transfer, Household Income, MMSE Score by Year (Age 45-84)

	BOAP		**Child Transfer**		**HH Income**		**MMSE Score**	
	Control	Treat	Control	Treat	Control	Treat	Control	Treat
2006	0	0	62.376	251.947	2769.13	1345.97	26.663	22.466
2008	0	20.053	65.246	219.512	3504.727	1725.402	26.606	22.626
2010	0	55.384	75.023	206.24	3293.699	1686.996	25.7	22.183
2012	0	54.317	65.586	197.704	3406.8	1711.368	26.803	23.377
2014	0	108.086	63.073	244.101	3606.933	1700.421	26.644	23.168

Notes. Data are from KLoSA (Korean Longitudinal Study of Ageing). The unit of the amount of BOAP, child transfer and household income are 10,000 KRW.

Table 3: BOAP (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	67.388***	65.453***	59.795***	64.028***	73.614***
	(1.370)	(2.616)	(2.440)	(3.744)	(2.469)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	33.93	47.84	40.63	36.11	22.96
B. Male					
Treat x Post	60.195***	53.465***	58.289***	47.729***	63.606***
	(1.898)	(5.654)	(2.558)	(7.405)	(3.440)
N	14,508	755	6,364	730	6,659
Dep. Mean	29.40	34.54	40.79	23.60	18.57
C. Female					
Treat x Post	75.876***	69.520***	66.689***	70.435***	86.199***
	(1.919)	(2.959)	(7.843)	(4.426)	(3.399)
N	9,504	3,337	1,012	1,649	3,506
Dep. Mean	40.84	50.85	39.67	41.64	31.28

Notes. The dependent variable is the amount of BOAP received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 4: Child Transfer (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	-4.033	32.731	-23.291**	3.829	-7.778
	(7.649)	(24.929)	(11.363)	(26.309)	(10.646)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	153.5	219.6	202	166.7	88.63
B. Male					
Treat x Post	-31.581***	-21.718	-27.180**	-46.467	-33.901**
	(8.845)	(32.021)	(12.633)	(48.249)	(13.887)
N	14,508	755	6,364	730	6,659
Dep. Mean	138.4	130.2	202.2	115.7	80.84
C. Female					
Treat x Post	33.084**	51.214	-15.624	20.985	30.510
	(14.548)	(32.028)	(31.023)	(34.452)	(19.634)
N	9,504	3,337	1,012	1,649	3,506
Dep. Mean	176.6	239.9	200.8	189.3	103.4

Notes. The dependent variable is the amount of transfer from child received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 5: MMSE (Age 45-84) All Coefficient

	All	Male	Female
Treat x Post	0.483***	0.235**	0.677***
	(0.068)	(0.099)	(0.091)
Female	-0.986***		
	(0.073)		
Graduate Mid	1.635***	1.470***	1.539***
	(0.094)	(0.156)	(0.112)
Graduate High	1.917***	1.771***	1.892***
	(0.092)	(0.141)	(0.120)
Graduate Uni or over	2.368***	2.347***	2.442***
	(0.111)	(0.147)	(0.181)
Separate	-0.382	-0.333	-0.437
	(0.323)	(0.353)	(0.481)
Divorced	-0.403**	-0.696**	-0.055
	(0.190)	(0.309)	(0.215)
Death or missing	-0.714***	-0.551**	-0.398***
	(0.122)	(0.262)	(0.138)
Never married	-1.773***	-2.009***	-0.958
	(0.515)	(0.670)	(0.811)
Middle or small city	0.320	-0.346	0.832**
	(0.263)	(0.412)	(0.335)
Rural	0.230	-0.037	0.423
	(0.246)	(0.389)	(0.311)
Have a religion	0.382***	0.163**	0.551***
	(0.046)	(0.064)	(0.065)
HH size 2	-0.240*	-0.334	-0.214
	(0.128)	(0.223)	(0.150)
HH size 3	-0.375***	-0.374	-0.365**
	(0.135)	(0.228)	(0.162)
HH size 4 or more	-0.371***	-0.378	-0.308*
	(0.137)	(0.233)	(0.164)
Amount of Asset	0.001	0.001	0.000
	(0.001)	(0.001)	(0.001)
HH income	0.011	0.011	0.015
	(0.007)	(0.010)	(0.009)
Age	0.616***	0.503***	0.710***
	(0.040)	(0.060)	(0.054)
Age squared	-0.006***	-0.005***	-0.007***
	(0.000)	(0.000)	(0.000)
N	37,195	16,249	20,946
Dep. Mean	24.75	25.67	24.04

Notes. The dependent variable is MMSE score. Sido variable is also controlled but not shown in the table. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 6: MMSE (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.483***	0.572**	0.214**	1.091***	0.453***
	(0.068)	(0.238)	(0.106)	(0.271)	(0.112)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	24.75	22.46	24.63	24.06	25.47
B. Male					
Treat x Post	0.235**	0.112	0.227	0.578	0.195
	(0.099)	(0.530)	(0.143)	(0.512)	(0.163)
N	16,249	744	6,549	870	8,086
Dep. Mean	25.67	24.85	25.05	25.57	26.25
C. Female					
Treat x Post	0.677***	0.523**	0.423***	1.117***	0.602***
	(0.091)	(0.256)	(0.157)	(0.315)	(0.153)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	24.04	21.91	24.22	23.30	24.78

Notes. The dependent variable is MMSE score received. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 7: MCI (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	-0.017**	-0.022	-0.006	-0.083***	-0.009
	(0.007)	(0.026)	(0.012)	(0.029)	(0.011)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	0.282	0.487	0.303	0.342	0.210
B. Male					
Treat x Post	-0.008	0.001	-0.011	-0.044	-0.010
	(0.010)	(0.056)	(0.016)	(0.053)	(0.016)
N	16,249	744	6,549	870	8,086
Dep. Mean	0.199	0.305	0.251	0.208	0.145
C. Female					
Treat x Post	-0.026***	-0.020	-0.026	-0.088**	-0.002
	(0.010)	(0.030)	(0.018)	(0.036)	(0.015)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	0.347	0.529	0.353	0.409	0.267

Notes. The dependent variable is MCI(Mild Cognitive Impairment). MCI is a binary variable equal to one if MMSE score is less than or equal to 23. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 8: BOAP by Education (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post x LowEdu	35.889***	40.931***	40.555***	41.894***	35.705***
	(2.695)	(5.357)	(5.011)	(7.138)	(4.878)
Treat x Post	50.705***	38.496***	45.257***	41.083***	56.678***
	(2.160)	(4.764)	(3.246)	(5.798)	(3.991)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	33.93	47.84	40.63	36.11	22.96
B. Male					
Treat x Post x LowEdu	40.928***	17.725	40.453***	35.951**	47.957***
	(3.866)	(12.615)	(5.463)	(15.506)	(7.174)
Treat x Post	47.211***	42.758***	45.755***	38.423***	51.806***
	(2.471)	(9.036)	(3.317)	(8.380)	(4.358)
N	14,508	661	5,999	574	4,616
Dep. Mean	29.40	39.45	43.27	30.02	26.80
C. Female					
Treat x Post x LowEdu	36.570***	53.592***	49.883***	45.255***	17.895*
	(4.649)	(7.009)	(18.631)	(10.386)	(9.462)
Treat x Post	50.200***	30.298***	41.328***	44.308***	76.479***
	(4.281)	(6.420)	(15.214)	(8.827)	(8.869)
N	9,504	3,178	894	1,430	2,612
Dep. Mean	40.84	53.39	44.90	48.02	41.98

Notes. The dependent variable is the amount of BOAP received (10,000 KRW) for each household. Edu is binary variable indicating individual's education is lower than middle school graduation. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 9: Child Transfer by Education (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post x LowEdu	9.336	57.486	35.509	21.851	-28.937
	(22.115)	(42.601)	(35.319)	(69.583)	(34.015)
Treat x Post	-13.360	0.075	-33.829**	3.906	-6.146
	(9.745)	(28.417)	(15.275)	(40.093)	(12.711)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	153.5	219.6	202	166.7	88.63
B. Male					
Treat x Post x LowEdu	6.486	49.572	66.137	176.487*	-56.338
	(30.360)	(50.141)	(43.452)	(96.684)	(59.557)
Treat x Post	-35.413***	-43.317	-48.202***	-85.596	-28.649*
	(11.012)	(35.233)	(17.432)	(73.843)	(15.482)
N	14,508	661	5,999	574	4,616
Dep. Mean	138.4	145.4	212.6	146.1	111.8
C. Female					
Treat x Post x LowEdu	-12.511	93.304	-31.502	-10.261	-39.139
	(37.242)	(61.124)	(144.107)	(108.814)	(65.399)
Treat x Post	31.706	-15.235	-7.820	33.260	1.279
	(22.673)	(43.740)	(100.414)	(61.211)	(27.702)
N	9,504	3,178	894	1,430	2,612
Dep. Mean	176.6	247.7	221.5	208.9	132.9

Notes. The dependent variable is the amount of transfer from child received (10,000 KRW) for each household. Edu is binary variable indicating individual's education is lower than middle school graduation. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 10: MMSE by Education(Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post x LowEdu	0.060	-0.460	0.115	-0.666	0.255
	(0.145)	(0.535)	(0.222)	(0.565)	(0.240)
Treat x Post	0.368***	0.760***	0.098	1.197***	0.324**
	(0.083)	(0.285)	(0.125)	(0.338)	(0.140)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	24.75	22.46	24.63	24.06	25.47
B. Male					
Treat x Post x LowEdu	0.358	1.163	0.043	-0.180	0.803*
	(0.263)	(1.876)	(0.369)	(1.133)	(0.419)
Treat x Post	0.131	-0.219	0.186	0.647	0.015
	(0.106)	(0.474)	(0.153)	(0.540)	(0.180)
N	16,249	744	6,549	870	8,086
Dep. Mean	25.67	24.85	25.05	25.57	26.25
C. Female					
Treat x Post x LowEdu	0.064	-0.874	0.496	-0.657	0.154
	(0.194)	(0.561)	(0.313)	(0.680)	(0.312)
Treat x Post	0.465***	1.005***	0.042	1.204***	0.382*
	(0.136)	(0.368)	(0.226)	(0.443)	(0.215)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	24.04	21.91	24.22	23.30	24.78

Notes. The dependent variable is MMSE score received. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Edu is binary variable indicating individual's education is lower than middle school graduation. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 11: MCI by Education (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post x LowEdu	-0.023	0.040	-0.019	0.044	-0.049*
	(0.016)	(0.058)	(0.026)	(0.064)	(0.026)
Treat x Post	-0.006	-0.038	0.005	-0.090**	0.004
	(0.009)	(0.034)	(0.014)	(0.038)	(0.014)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	0.282	0.487	0.303	0.342	0.210
B. Male					
Treat x Post x LowEdu	-0.075***	-0.100	-0.049	-0.064	-0.103**
	(0.029)	(0.156)	(0.041)	(0.123)	(0.045)
Treat x Post	0.003	0.036	-0.002	-0.050	0.004
	(0.011)	(0.058)	(0.017)	(0.057)	(0.018)
N	16,249	744	6,549	870	8,086
Dep. Mean	0.199	0.305	0.251	0.208	0.145
C. Female					
Treat x Post x LowEdu	-0.010	0.083	-0.036	0.097	-0.047
	(0.022)	(0.067)	(0.037)	(0.079)	(0.035)
Treat x Post	-0.010	-0.068	0.004	-0.114**	0.025
	(0.015)	(0.043)	(0.024)	(0.053)	(0.024)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	0.347	0.529	0.353	0.409	0.267

Notes. The dependent variable is MCI(Mild Cognitive Impairment). MCI is a binary variable equal to one if MMSE score is less than or equal to 23. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Edu is binary variable indicating individual's education is lower than middle school graduation. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 12: Serial 7 (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.041	0.075	-0.059	0.170*	0.062
	(0.025)	(0.092)	(0.042)	(0.098)	(0.040)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	3.676	2.875	3.620	3.397	3.946
B. Male					
Treat x Post	-0.005	-0.158	-0.023	0.174	0.030
	(0.036)	(0.178)	(0.056)	(0.156)	(0.056)
N	16,249	744	6,549	870	8,086
Dep. Mean	4.052	3.767	3.865	3.992	4.236
C. Female					
Treat x Post	0.084**	0.096	0.011	0.145	0.068
	(0.035)	(0.110)	(0.062)	(0.126)	(0.055)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	3.385	2.670	3.383	3.099	3.692

Notes. The depedent variable is serial 7. Serial 7 measures mathmatical ability of the respondents. The respondents are asked to count backward from 100 and continue subtracting 7. The maximum point for serial 7 is 5 since the question is asked 5 times. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 13: Word Recall (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.105***	0.071	0.093**	0.235**	0.075**
	(0.024)	(0.084)	(0.038)	(0.092)	(0.037)
N	37,191	3,973	13,326	2,604	17,288
Dep. Mean	4.642	4.079	4.572	4.492	4.849
B. Male					
Treat x Post	0.071**	-0.088	0.107**	0.079	0.053
	(0.035)	(0.180)	(0.054)	(0.172)	(0.054)
N	16,245	744	6,545	870	8,086
Dep. Mean	4.805	4.448	4.611	4.768	4.999
C. Female					
Treat x Post	0.132***	0.072	0.115**	0.259**	0.077
	(0.032)	(0.097)	(0.055)	(0.110)	(0.052)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	4.516	3.993	4.535	4.354	4.717

Notes. The dependent variable is word recall. The word recall is related to memorizing vocabularies. The respondents are asked to memorize and answer 3 words prior to the serial 7 question sand asked to answer those words posterior to the serial 7 questions. The total point of word recall is 6. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 14: Mental Status (Age 45-84)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.287***	0.411**	0.082	0.785***	0.267***
	(0.055)	(0.193)	(0.085)	(0.217)	(0.091)
N	37,191	3,973	13,327	2,604	17,287
Dep. Mean	20.95	19.06	20.89	20.37	21.52
B. Male					
Treat x Post	0.107	0.214	0.078	0.463	0.097
	(0.079)	(0.418)	(0.114)	(0.396)	(0.131)
N	16,245	744	6,546	870	8,085
Dep. Mean	21.77	21.24	21.32	21.70	22.20
C. Female					
Treat x Post	0.431***	0.331	0.266**	0.765***	0.358***
	(0.075)	(0.207)	(0.128)	(0.256)	(0.127)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	20.32	18.56	20.48	19.71	20.93

Notes. The dependent variable is Mental statuss. Mental status measures divers abilities such as knowledge, orientation, serial 7, and drawing skills. The maximum point of mental status is 24. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 15: Mechanism of Cognitive Ability (Age 45-84)

	(1)	(2)	(3)	(4)
A. All				
Treat x Post	0.483***	0.501***	0.471***	0.490***
	(0.068)	(0.067)	(0.067)	(0.067)
Currently Working		0.503***		0.499***
		(0.051)		(0.051)
My Economic Status will Worsen			0.005***	0.005***
			(0.001)	(0.001)
N	37,195	37,195	37,186	37,186
Dep. Mean	24.75	24.75	24.75	24.75
B. Male				
Treat x Post	0.235**	0.256***	0.214**	0.235**
	(0.099)	(0.099)	(0.099)	(0.098)
Currently Working		0.754***		0.747***
		(0.082)		(0.081)
My Economic Status will Worsen			0.006***	0.006***
			(0.001)	(0.001)
N	16,249	16,249	16,243	16,243
Dep. Mean	25.67	25.67	25.67	25.67
C. Female				
Treat x Post	0.677***	0.697***	0.672***	0.691***
	(0.091)	(0.091)	(0.091)	(0.091)
Currently Working		0.443***		0.443***
		(0.064)		(0.064)
My Economic Status will Worsen			0.005***	0.005***
			(0.001)	(0.001)
N	20,946	20,946	20,943	20,943
Dep. Mean	24.04	24.04	24.04	24.04

Notes. The dependent variable is MMSE score. I additionally control current working status or respondents' expectation of own economic status. Currently working is a binary variable. My economic status will worsen ranges from 0 to 100. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 16: Macroeconomic Effect on Cognitive Ability (Age 45-84)

	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.483***	0.482***	0.484***	0.482***	0.483***
	(0.068)	(0.068)	(0.067)	(0.067)	(0.067)
Suicide		0.024*			0.023*
		(0.014)			(0.014)
Unemp rate			-0.076		-0.071
			(0.051)		(0.051)
Unemp rate (over 60)				-0.046	
				(0.033)	
N	37,195	37,195	37,195	37,195	37,195
Dep. Mean	24.75	24.75	24.75	24.75	24.75
B. Male					
Treat x Post	0.235**	0.234**	0.239**	0.235**	0.238**
	(0.099)	(0.099)	(0.099)	(0.099)	(0.099)
Suicide		0.038*			0.035*
		(0.020)			(0.020)
Unemp rate			-0.159**		-0.149**
			(0.070)		(0.071)
Unemp rate (over 60)				-0.054	
				(0.049)	
N	16,249	16,249	16,249	16,249	16,249
Dep. Mean	25.67	25.67	25.67	25.67	25.67
C. Female					
Treat x Post	0.677***	0.677***	0.678***	0.677***	0.677***
	(0.091)	(0.091)	(0.091)	(0.091)	(0.091)
Suicide		0.014			0.014
		(0.018)			(0.018)
Unemp rate			-0.008		-0.005
			(0.072)		(0.072)
Unemp rate (over 60)				-0.038	
				(0.045)	
N	20,946	20,946	20,946	20,946	20,946
Dep. Mean	24.04	24.04	24.04	24.04	24.04

Notes. The dependent variable is MMSE score. I additionally control regional suicide rate, regional unemployment rate, or regional unemployment rate of age over 60. Suicide indicates suicide rate per 100,000 population collected at Sido region level. Unemployment rate is the unemployment rate at Sido region level. Both data are collected by KOSTAT (Statistics Korea). Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 17: BOAP (Age 45-84, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	1.423	10.967***	-5.009***	3.404	5.286***
	(0.900)	(1.984)	(1.747)	(3.155)	(1.453)
Treat x 2010	39.302***	45.446***	37.298***	36.837***	42.199***
	(1.291)	(2.623)	(2.399)	(3.910)	(2.160)
Treat x 2012	42.034***	49.650***	34.646***	41.415***	45.196***
	(1.355)	(2.687)	(2.308)	(4.153)	(2.603)
Treat x 2014	132.676***	136.962***	132.005***	127.982***	131.217***
	(2.801)	(5.025)	(5.270)	(7.066)	(4.917)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	33.93	47.84	40.63	36.11	22.96
B. Male					
Treat x 2008	-6.007***	2.105	-5.319***	7.228	-5.057**
	(1.297)	(5.060)	(1.857)	(4.787)	(2.393)
Treat x 2010	32.299***	32.016***	36.134***	25.160***	33.041***
	(1.800)	(6.568)	(2.537)	(7.240)	(3.113)
Treat x 2012	30.674***	35.253***	33.720***	30.542***	28.580***
	(1.824)	(5.882)	(2.417)	(7.480)	(3.530)
Treat x 2014	122.554***	121.385***	130.639***	107.367***	113.878***
	(3.965)	(12.359)	(5.592)	(14.705)	(6.639)
N	14,508	755	6,364	730	6,659
Dep. Mean	29.40	34.54	40.79	23.60	18.57
C. Female					
Treat x 2008	11.048***	12.178***	-2.398	0.896	17.781***
	(1.301)	(2.264)	(5.771)	(4.142)	(1.925)
Treat x 2010	48.495***	48.544***	45.098***	40.955***	53.095***
	(1.848)	(2.951)	(7.875)	(4.900)	(2.982)
Treat x 2012	56.217***	54.124***	38.770***	45.608***	65.584***
	(2.041)	(3.091)	(7.902)	(5.231)	(3.849)
Treat x 2014	145.566***	142.574***	138.692***	136.239***	154.989***
	(3.786)	(5.470)	(15.807)	(8.147)	(6.844)
N	9,504	3,337	1,012	1,649	3,506
Dep. Mean	40.84	50.85	39.67	41.64	31.28

Notes. The dependent variable is the amount of BOAP received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 18: Child Transfer (Age 45-84, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	-9.484	17.976	-22.295	-53.473	-10.066
	(10.864)	(32.382)	(23.343)	(35.250)	(14.789)
Treat x 2010	-25.065**	30.438	-18.215	-75.496*	-35.470**
	(11.635)	(31.139)	(19.937)	(43.135)	(16.030)
Treat x 2012	-15.720*	19.479	-63.170***	-0.630	-6.135
	(8.981)	(25.400)	(16.746)	(29.470)	(13.247)
Treat x 2014	36.646***	95.488**	15.382	54.972	23.709
	(12.298)	(47.819)	(18.604)	(35.951)	(14.658)
N	24,012	4,092	7,376	2,379	10,165
Dep. Mean	153.5	219.6	202	166.7	88.63
B. Male					
Treat x 2008	-5.533	49.085	-8.480	7.957	-12.244
	(15.482)	(31.559)	(25.862)	(55.213)	(25.130)
Treat x 2010	-30.077**	13.064	-6.184	-46.637	-48.964**
	(14.707)	(32.431)	(21.612)	(53.032)	(20.976)
Treat x 2012	-55.546***	-6.012	-65.978***	-40.624	-57.763***
	(11.843)	(38.250)	(18.495)	(60.236)	(18.438)
Treat x 2014	-8.877	-53.704	0.552	-46.585	-5.225
	(12.756)	(49.763)	(20.688)	(73.662)	(18.804)
N	14,508	755	6,364	730	6,659
Dep. Mean	138.4	130.2	202.2	115.7	80.84
C. Female					
Treat x 2008	-13.871	6.378	-114.623**	-90.318*	1.207
	(16.288)	(42.079)	(50.944)	(46.354)	(15.620)
Treat x 2010	-20.132	43.795	-97.579*	-97.666*	-16.016
	(21.122)	(40.123)	(50.458)	(58.471)	(30.969)
Treat x 2012	38.675***	27.952	-54.358	12.871	78.312***
	(14.268)	(32.071)	(43.563)	(36.390)	(18.544)
Treat x 2014	99.705***	127.450**	90.894*	90.341**	67.988***
	(23.562)	(60.356)	(49.435)	(44.742)	(25.003)
N	9,504	3,337	1,012	1,649	3,506
Dep. Mean	176.6	239.9	200.8	189.3	103.4

Notes. The dependent variable is the amount of transfer from child received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 19: MMSE Score (Age 45-84, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	0.165**	0.333	0.058	-0.024	0.151
	(0.079)	(0.279)	(0.126)	(0.335)	(0.144)
Treat x 2010	0.553***	0.793**	0.194	0.930***	0.551***
	(0.087)	(0.342)	(0.139)	(0.355)	(0.150)
Treat x 2012	0.594***	0.767***	0.382***	1.026***	0.398**
	(0.093)	(0.278)	(0.141)	(0.362)	(0.178)
Treat x 2014	0.419***	0.223	0.019	1.422***	0.516***
	(0.106)	(0.395)	(0.176)	(0.469)	(0.162)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	24.75	22.46	24.63	24.06	25.47
B. Male					
Treat x 2008	0.044	0.075	0.140	0.360	0.071
	(0.115)	(0.553)	(0.171)	(0.497)	(0.206)
Treat x 2010	0.322**	0.674	0.248	0.531	0.297
	(0.129)	(0.829)	(0.190)	(0.644)	(0.213)
Treat x 2012	0.202	-0.156	0.424**	0.092	0.062
	(0.134)	(0.535)	(0.194)	(0.653)	(0.256)
Treat x 2014	0.170	-0.390	-0.013	2.100**	0.228
	(0.155)	(0.695)	(0.254)	(0.912)	(0.229)
N	16,249	744	6,549	870	8,086
Dep. Mean	25.67	24.85	25.05	25.57	26.25
C. Female					
Treat x 2008	0.255**	0.301	0.033	-0.149	0.187
	(0.109)	(0.327)	(0.182)	(0.443)	(0.199)
Treat x 2010	0.738***	0.583*	0.324	1.057**	0.710***
	(0.118)	(0.343)	(0.203)	(0.433)	(0.209)
Treat x 2012	0.900***	0.852***	0.608***	1.302***	0.611**
	(0.127)	(0.324)	(0.208)	(0.437)	(0.248)
Treat x 2014	0.615***	0.232	0.341	0.767	0.654***
	(0.145)	(0.480)	(0.252)	(0.516)	(0.228)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	24.04	21.91	24.22	23.30	24.78

Notes. The dependent variable is MMSE score received. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 20: MCI (Age 45-84, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	0.001	0.017	0.003	0.011	0.005
	(0.009)	(0.031)	(0.015)	(0.036)	(0.015)
Treat x 2010	0.002	-0.039	0.019	-0.054	0.024
	(0.010)	(0.038)	(0.017)	(0.042)	(0.017)
Treat x 2012	-0.038***	-0.021	-0.026	-0.100***	-0.034*
	(0.010)	(0.031)	(0.016)	(0.037)	(0.017)
Treat x 2014	-0.021**	0.028	-0.008	-0.087*	-0.027*
	(0.011)	(0.045)	(0.020)	(0.046)	(0.016)
N	37,195	3,973	13,330	2,604	17,288
Dep. Mean	0.282	0.487	0.303	0.342	0.210
B. Male					
Treat x 2008	-0.003	0.053	-0.017	0.002	-0.003
	(0.013)	(0.072)	(0.020)	(0.055)	(0.022)
Treat x 2010	0.018	-0.027	0.014	0.028	0.039
	(0.015)	(0.086)	(0.024)	(0.080)	(0.025)
Treat x 2012	-0.026*	0.037	-0.042**	-0.022	-0.036
	(0.014)	(0.065)	(0.021)	(0.061)	(0.024)
Treat x 2014	-0.029*	0.046	-0.016	-0.178**	-0.051**
	(0.016)	(0.084)	(0.027)	(0.085)	(0.022)
N	16,249	744	6,549	870	8,086
Dep. Mean	0.199	0.305	0.251	0.208	0.145
C. Female					
Treat x 2008	0.006	0.009	0.023	0.003	0.016
	(0.012)	(0.035)	(0.023)	(0.046)	(0.020)
Treat x 2010	-0.010	-0.032	0.012	-0.096*	0.019
	(0.014)	(0.043)	(0.025)	(0.051)	(0.022)
Treat x 2012	-0.048***	-0.032	-0.042*	-0.136***	-0.023
	(0.014)	(0.037)	(0.024)	(0.049)	(0.024)
Treat x 2014	-0.018	0.037	-0.036	-0.018	0.001
	(0.015)	(0.055)	(0.029)	(0.053)	(0.023)
N	20,946	3,229	6,781	1,734	9,202
Dep. Mean	0.347	0.529	0.353	0.409	0.267

Notes. The dependent variable is MCI(Mild Cognitive Impairment). Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 21: MMSE (Age 45-84) Sample Weight

	BOAP	Child Transfer	MMSE	MCI
A. No Weight				
Treat x Post	68.838***	4.239	0.618***	-0.023***
N	24,012	24,012	37,195	37,195
Dep. Mean	33.93	153.5	24.75	0.282
B. Croseectional Weight				
Treat x Post	64.630***	7.210	0.726***	-0.028***
N	22,707	22,707	37,195	37,195
Dep. Mean	32.50	151.2	24.75	0.282
C. Longitudinal Weight				
Treat x Post	64.630***	7.210	0.726***	-0.028***
N	22,707	22,707	37,195	37,195
Dep. Mean	32.50	151.2	24.75	0.282

Notes. The dependent variable is MMSE score. The regressions are not random effect model but pooled OLS model. The unit of observation for BOAP and Child Transfer is household and for MMSE and MCI is individuals. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

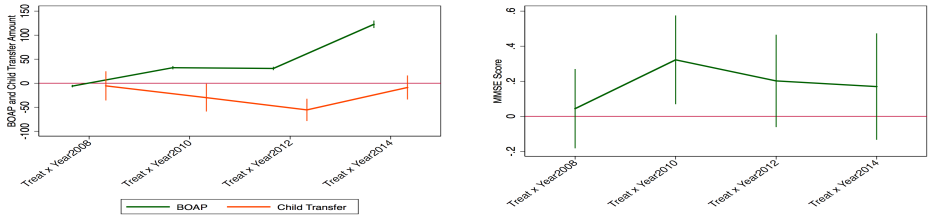
Table 22: MMSE (Age 45-84) Treatment Dummy Included

	All	All	Male	Male	Female	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treat x Post	0.483***	0.499***	0.235**	0.148	0.677***	0.785***
	(0.068)	(0.081)	(0.099)	(0.119)	(0.091)	(0.110)
Treat		-0.032		0.170		-0.216*
		(0.087)		(0.123)		(0.123)
age	0.616***	0.621***	0.503***	0.477***	0.710***	0.744***
	(0.040)	(0.039)	(0.060)	(0.058)	(0.054)	(0.052)
age squared	-0.006***	-0.006***	-0.005***	-0.005***	-0.007***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	37,195	37,195	16,249	16,249	20,946	20,946
Dep. Mean	24.75	24.75	25.67	25.67	24.04	24.04

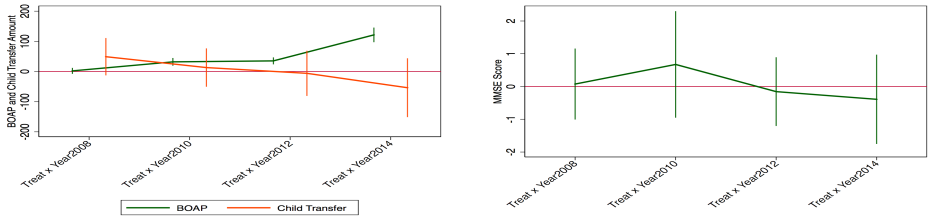
Notes. The dependent variable is MMSE score. The odd columns are the equation 1 without treatment dummy and the even columns are the ones that additionally include treatment dummy. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Appendix

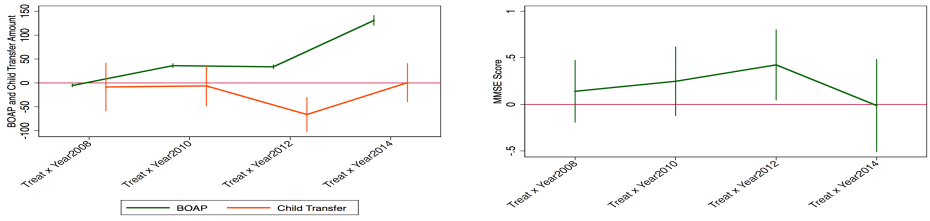
Figure 7: Male (Age 45-84)



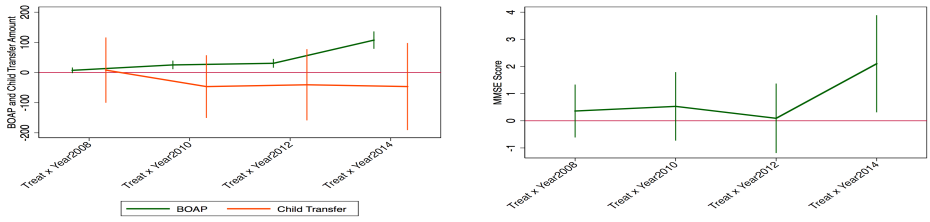
(a) All household size



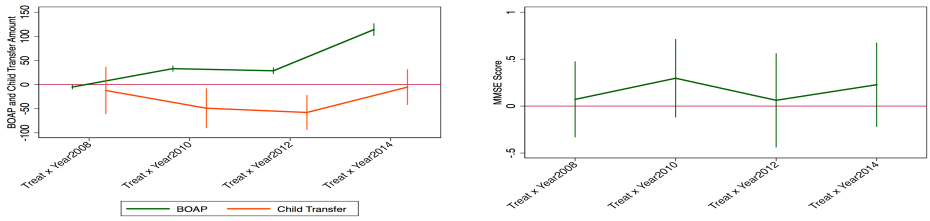
(b) Household 1



(c) Household 2 (with spouse)



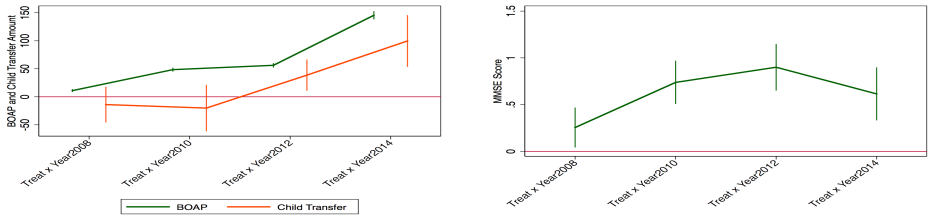
(d) Household 2 (without spouse)



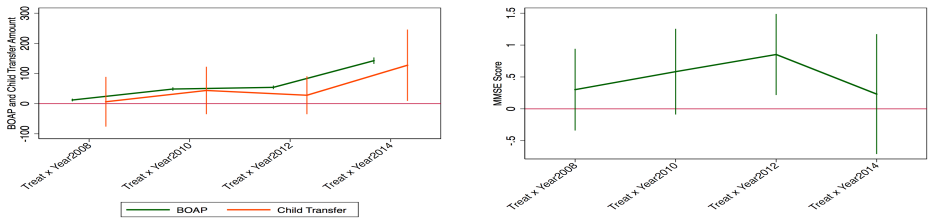
(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW. MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

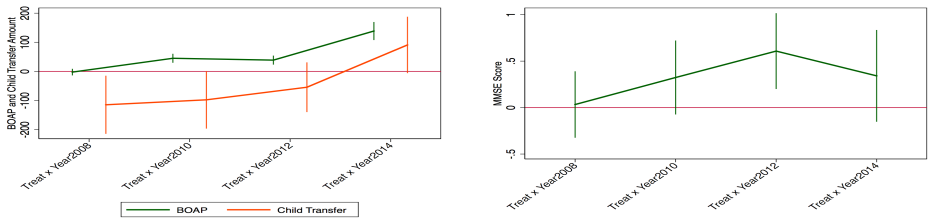
Figure 8: Female (Age 45-84)



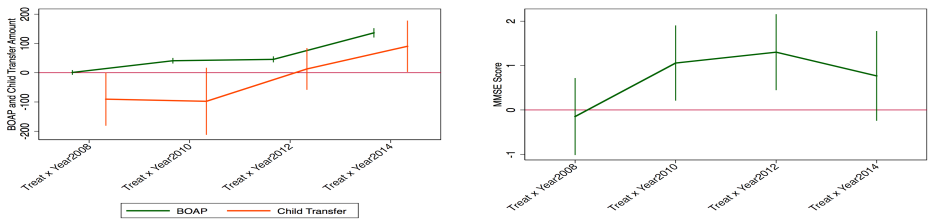
(a) All household size



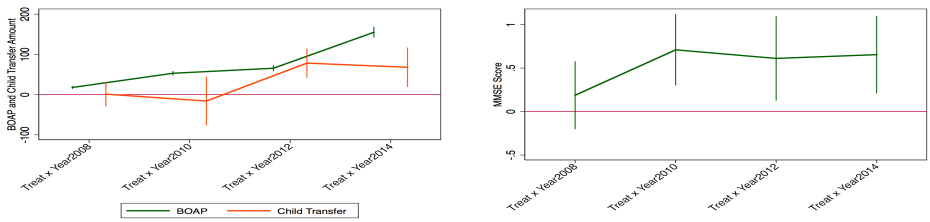
(b) Household 1



(c) Household 2 (with spouse)



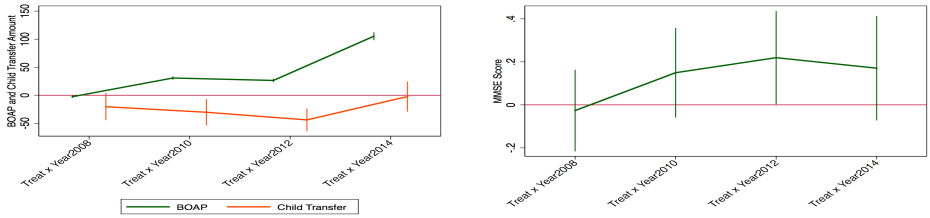
(d) Household 2 (without spouse)



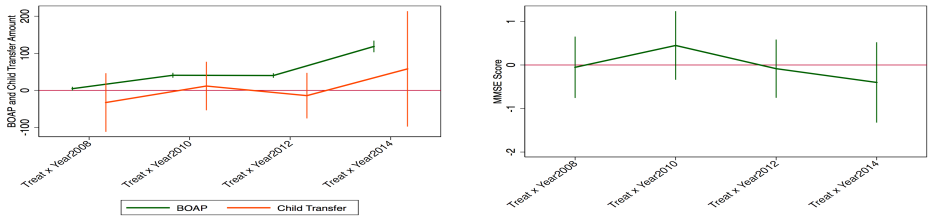
(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW. MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

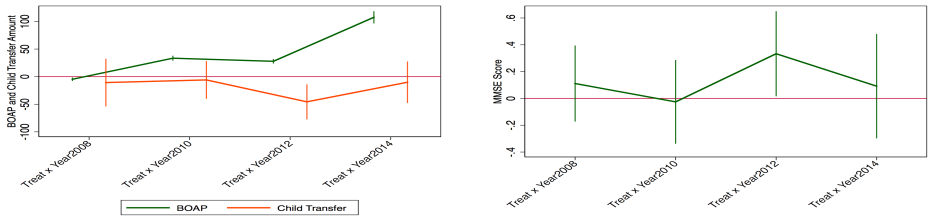
Figure 9: All gender (Age 55-74)



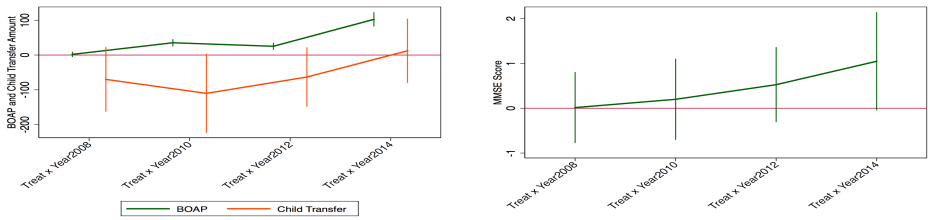
(a) All household size



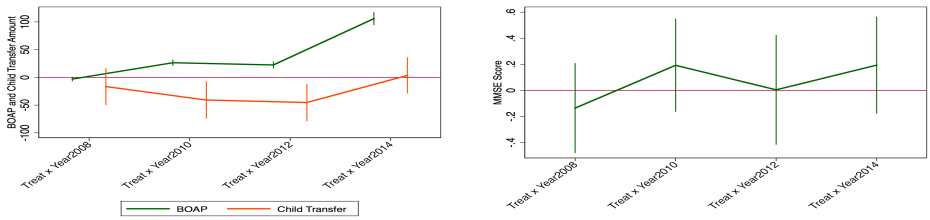
(b) Household 1



(c) Household 2 (with spouse)



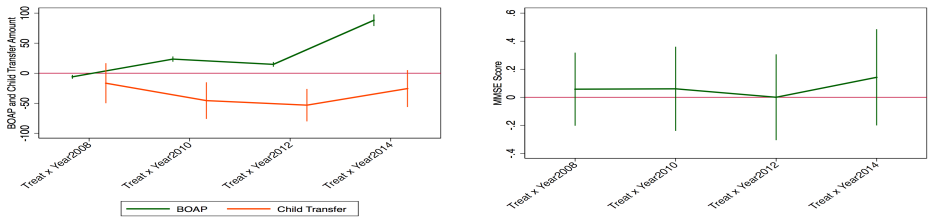
(d) Household 2 (without spouse)



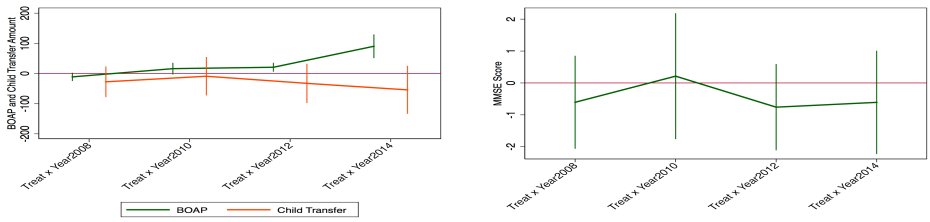
(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW. MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

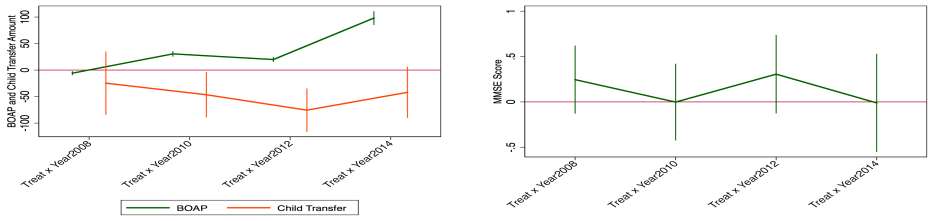
Figure 10: Male (Age 55-74)



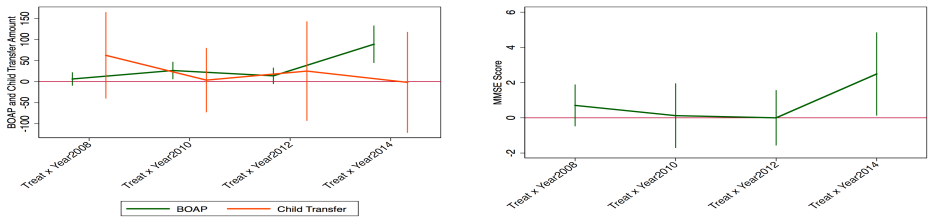
(a) All household size



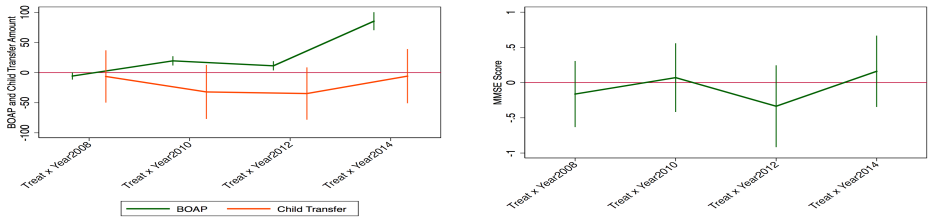
(b) Household 1



(c) Household 2 (with spouse)



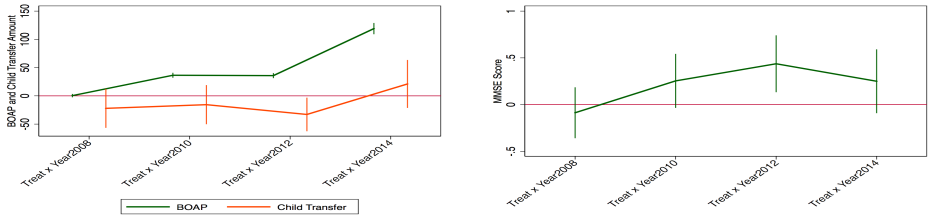
(d) Household 2 (without spouse)



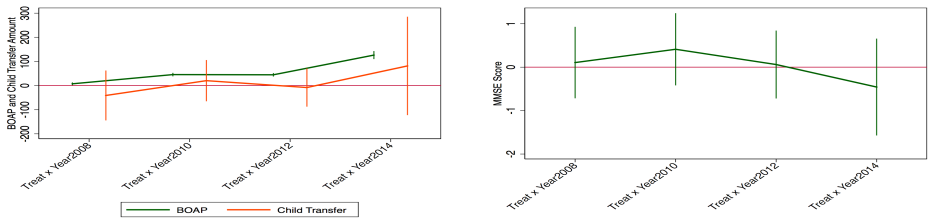
(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW. MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

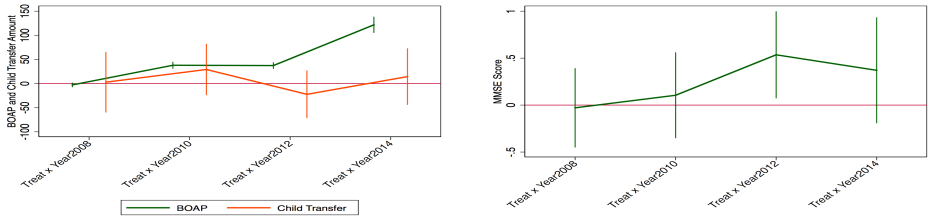
Figure 11: Female (Age 55-74)



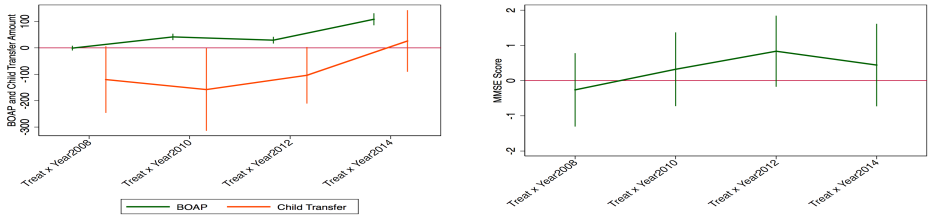
(a) All household size



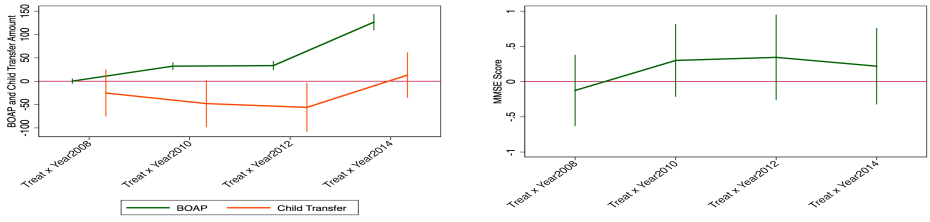
(b) Household 1



(c) Household 2 (with spouse)



(d) Household 2 (without spouse)



(e) Hosehold 3 or more

Notes. Dependent variables are BOAP, child transfer amount and MMSE score. BOAP and child transfer amount is household level data from KLoSA. The unit of BOAP and child transfer is 10,000 KRW. MMSE score is from individual level data from KLoSA. Treat x Year2006 is ommitted.

Table 23: Summary statistics (Age 55-74)

	Male		**Female**	
	Mean	SD	Mean	SD
BOAP amount	18.782	[45.725]	26.696	[54.966]
Child Transfer	76.127	[213.736]	114.440	[283.920]
MMSE Score	25.496	[4.379]	23.592	[5.585]
Word Recall	4.761	[1.432]	4.417	[1.623]
Serial 7	4.007	[1.464]	3.276	[1.854]
Menal Status	21.635	[3.468]	19.947	[4.597]
MCI	0.210	[0.408]	0.373	[0.484]
Age	64.361	[10.368]	65.199	[11.214]
Not Grad. Mid. School	0.312	[0.463]	0.584	[0.493]
HH size 1	0.046	[0.210]	0.158	[0.365]
HH size 2 with Spouse	0.404	[0.491]	0.306	[0.461]
HH size 2 w.o. Spouse	0.054	[0.227]	0.084	[0.277]
HH size 3 or more	0.495	[0.500]	0.452	[0.498]

Notes. Data are from KLoSA (Korean Longitudinal Study of Ageing). The unit of the amount of BOAP and child transfer are 10,000 KRW. MMSE score is Mini Mental State Examination which measures cognitive ability of the elderly. The maximum score is 30. MCI is mild cognitive impairment which is the binary variable for respondents with MMSE score less than or equal to 23.

Table 24: BOAP, Child Transfer, Household Income, MMSE Score by Year (Age 55-74)

	BOAP		**Child Transfer**		**HH Income**		**MMSE Score**	
	Control	Treat	Control	Treat	Control	Treat	Control	Treat
2006	0	0	105.922	257.541	2214.761	1376.197	25.908	23.659
2008	0	16.175	105.344	210.93	3113.878	1717.48	26.055	23.747
2010	0	47.637	101.957	185.087	2922.846	1711.407	25.397	23.264
2012	0	40.473	81.91	182.71	3139.452	1892.49	26.598	24.647
2014	0	90.52	71.229	201.164	3469.812	1978.992	26.513	24.633

Notes. Data are from KLoSA (Korean Longitudinal Study of Ageing). The unit of the amount of BOAP, child transfer and household income are 10,000 KRW.

Table 25: BOAP (Age 55-74)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	55.024***	58.356***	45.980***	59.357***	56.234***
	(1.548)	(3.079)	(2.405)	(4.551)	(2.913)
N	14,427	2,354	5,131	1,434	5,508
Dep. Mean	24.57	33.84	25.99	28	18.40
B. Male					
Treat x Post	47.295***	42.346***	43.884***	48.149***	46.535***
	(1.945)	(6.909)	(2.491)	(8.670)	(3.504)
N	9,272	460	4,439	444	3,929
Dep. Mean	21.16	26.26	25.71	21.13	15.41
C. Female					
Treat x Post	68.565***	62.467***	59.711***	64.959***	76.600***
	(2.510)	(3.499)	(7.777)	(5.521)	(5.269)
N	5,155	1,894	692	990	1,579
Dep. Mean	30.71	35.68	27.75	31.09	25.82

Notes. The dependent variable is the amount of BOAP received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 26: Child Transfer (Age 55-74)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	-33.091***	23.600	-45.771***	-22.344	-36.833**
	(11.076)	(34.579)	(14.021)	(38.466)	(16.706)
N	14,427	2,354	5,131	1,434	5,508
Dep. Mean	155.9	214.8	184.1	168.2	101.3
B. Male					
Treat x Post	-45.905***	-16.215	-50.252***	28.438	-42.954**
	(11.429)	(23.484)	(15.341)	(38.009)	(19.576)
N	9,272	460	4,439	444	3,929
Dep. Mean	135.4	92.28	182.3	108.1	90.52
C. Female					
Treat x Post	-3.650	36.770	-33.450	-29.761	-18.069
	(24.112)	(47.139)	(38.201)	(50.213)	(36.672)
N	5,155	1,894	692	990	1,579
Dep. Mean	192.7	244.5	195.3	195.2	128

Notes. The dependent variable is the amount of transfer from child received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 27: MMSE (Age 55-74)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	0.184**	0.129	0.097	0.518	0.188
	(0.080)	(0.288)	(0.120)	(0.344)	(0.134)
N	22,796	2,301	9,580	1,556	9,359
Dep. Mean	25.04	23.79	24.99	24.61	25.47
B. Male					
Treat x Post	0.045	-0.124	0.044	0.381	0.046
	(0.113)	(0.703)	(0.157)	(0.672)	(0.185)
N	10,242	456	4,577	498	4,711
Dep. Mean	25.82	25.25	25.61	25.54	26.12
C. Female					
Treat x Post	0.335***	0.112	0.320*	0.593	0.321*
	(0.113)	(0.309)	(0.180)	(0.397)	(0.193)
N	12,554	1,845	5,003	1,058	4,648
Dep. Mean	24.41	23.43	24.43	24.18	24.82

Notes. The dependent variable is MMSE score received. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 28: MCI (Age 55-74)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
	(1)	(2)	(3)	(4)	(5)
A. All					
Treat x Post	-0.010	-0.020	-0.012	-0.040	0.006
	(0.009)	(0.034)	(0.014)	(0.040)	(0.015)
N	22,796	2,301	9,580	1,556	9,359
Dep. Mean	0.265	0.389	0.274	0.314	0.217
B. Male					
Treat x Post	-0.004	-0.019	-0.004	-0.014	-0.003
	(0.013)	(0.077)	(0.019)	(0.073)	(0.020)
N	10,242	456	4,577	498	4,711
Dep. Mean	0.184	0.257	0.204	0.213	0.154
C. Female					
Treat x Post	-0.022	-0.019	-0.040*	-0.053	0.016
	(0.013)	(0.039)	(0.022)	(0.049)	(0.022)
N	12,554	1,845	5,003	1,058	4,648
Dep. Mean	0.331	0.422	0.338	0.362	0.281

Notes. The dependent variable is MCI(Mild Cognitive Impairment). MCI is a binary variable equal to one if MMSE score is less than or equal to 23. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 29: BOAP (Age 55-74, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	-2.657**	4.463*	-4.728***	1.937	-3.004
	(1.113)	(2.586)	(1.612)	(3.987)	(2.016)
Treat x 2010	30.715***	40.627***	33.457***	35.334***	26.428***
	(1.586)	(3.397)	(2.320)	(5.357)	(2.832)
Treat x 2012	26.349***	39.934***	27.844***	25.223***	22.426***
	(1.556)	(3.181)	(2.125)	(5.235)	(3.149)
Treat x 2014	105.217***	118.406***	107.554***	102.559***	105.914***
	(3.606)	(7.989)	(5.668)	(10.537)	(5.949)
N	23,599	2,362	9,911	1,604	9,722
Dep. Mean	32.60	34.08	33.13	32.38	31.74
B. Male					
Treat x 2008	-6.061***	-11.143	-5.875***	6.343	-5.700*
	(1.637)	(6.968)	(1.982)	(8.125)	(3.026)
Treat x 2010	23.464***	16.131	30.499***	26.465**	19.509***
	(2.234)	(9.878)	(2.679)	(10.555)	(3.945)
Treat x 2012	14.689***	20.730***	19.869***	13.803	11.285***
	(2.035)	(7.517)	(2.383)	(9.937)	(3.896)
Treat x 2014	88.156***	90.291***	98.082***	88.916***	85.339***
	(4.937)	(20.040)	(6.623)	(22.662)	(7.639)
N	10,657	463	4,746	521	4,927
Dep. Mean	26.57	26.61	26.11	31.89	26.45
C. Female					
Treat x 2008	0.422	7.351**	-2.744	-0.922	0.298
	(1.522)	(2.895)	(2.429)	(4.593)	(2.805)
Treat x 2010	36.457***	45.530***	37.957***	41.558***	32.274***
	(2.242)	(3.686)	(3.645)	(6.167)	(4.176)
Treat x 2012	35.820***	44.705***	37.331***	29.203***	33.468***
	(2.279)	(3.671)	(3.425)	(6.524)	(5.003)
Treat x 2014	119.038***	126.334***	121.706***	108.356***	126.536***
	(5.075)	(8.490)	(8.520)	(11.624)	(9.019)
N	12,942	1,899	5,165	1,083	4,795
Dep. Mean	37.57	35.90	39.58	32.61	37.18

Notes. The dependent variable is the amount of BOAP received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 30: Child Transfer (Age 55-74, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	-20.457*	-32.908	-10.697	-69.993	-16.544
	(12.312)	(40.367)	(22.016)	(47.356)	(16.976)
Treat x 2010	-30.391**	11.590	-5.908	-110.095*	-40.835**
	(11.974)	(33.397)	(17.430)	(57.925)	(17.068)
Treat x 2012	-44.000***	-14.334	-45.612***	-63.176	-45.338***
	(10.341)	(31.355)	(16.205)	(43.503)	(17.127)
Treat x 2014	-2.422	57.851	-10.109	12.123	3.586
	(13.728)	(79.442)	(19.201)	(47.006)	(16.680)
N	23,599	2,362	9,911	1,604	9,722
Dep. Mean	168.3	214.6	197.7	178.6	125.3
B. Male					
Treat x 2008	-16.663	-27.470	-24.716	62.567	-6.409
	(17.001)	(26.006)	(30.403)	(52.310)	(22.153)
Treat x 2010	-45.638***	-8.993	-46.545**	3.656	-32.084
	(15.552)	(32.488)	(21.839)	(38.993)	(22.876)
Treat x 2012	-53.217***	-32.676	-75.624***	25.133	-34.764
	(13.788)	(33.250)	(20.873)	(60.293)	(22.166)
Treat x 2014	-25.591	-54.197	-41.995*	-1.702	-5.868
	(15.692)	(40.582)	(24.696)	(61.191)	(22.956)
N	10,657	463	4,746	521	4,927
Dep. Mean	142.2	92.75	184	120.9	108.8
C. Female					
Treat x 2008	-22.107	-40.953	2.907	-120.035*	-25.260
	(17.624)	(52.728)	(31.995)	(64.414)	(25.681)
Treat x 2010	-15.597	20.380	29.207	-157.948**	-47.863*
	(17.668)	(43.590)	(27.188)	(79.771)	(25.663)
Treat x 2012	-32.939**	-8.078	-22.259	-103.849*	-56.010**
	(15.174)	(40.453)	(25.185)	(54.663)	(26.731)
Treat x 2014	21.072	81.448	14.448	26.094	13.109
	(21.653)	(104.027)	(29.927)	(59.538)	(24.850)
N	12,942	1,899	5,165	1,083	4,795
Dep. Mean	189.7	244.3	210.2	206.4	142.2

Notes. The dependent variable is the amount of transfer from child received (10,000 KRW) for each household. Panel A indicates all household. Panel B indicates household with only male household head.Panel C indicates household with only female household head. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 31: MMSE Score (Age 55-74, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	-0.026	-0.053	0.111	0.015	-0.136
	(0.097)	(0.360)	(0.145)	(0.404)	(0.176)
Treat x 2010	0.150	0.448	-0.026	0.199	0.192
	(0.106)	(0.402)	(0.159)	(0.462)	(0.182)
Treat x 2012	0.220**	-0.085	0.333**	0.526	0.005
	(0.110)	(0.341)	(0.162)	(0.427)	(0.215)
Treat x 2014	0.171	-0.401	0.091	1.048*	0.194
	(0.124)	(0.471)	(0.199)	(0.559)	(0.190)
N	22,796	2,301	9,580	1,556	9,359
Dep. Mean	25.04	23.79	24.99	24.61	25.47
B. Male					
Treat x 2008	0.058	-0.606	0.245	0.706	-0.162
	(0.133)	(0.744)	(0.191)	(0.607)	(0.240)
Treat x 2010	0.060	0.213	-0.002	0.124	0.071
	(0.153)	(1.007)	(0.216)	(0.936)	(0.249)
Treat x 2012	0.000	-0.759	0.306	0.000	-0.335
	(0.156)	(0.690)	(0.221)	(0.802)	(0.297)
Treat x 2014	0.142	-0.609	-0.011	2.490**	0.161
	(0.175)	(0.826)	(0.276)	(1.207)	(0.258)
N	10,242	456	4,577	498	4,711
Dep. Mean	25.82	25.25	25.61	25.54	26.12
C. Female					
Treat x 2008	-0.087	0.106	-0.029	-0.263	-0.126
	(0.139)	(0.420)	(0.215)	(0.532)	(0.258)
Treat x 2010	0.254*	0.412	0.105	0.322	0.300
	(0.147)	(0.424)	(0.233)	(0.534)	(0.263)
Treat x 2012	0.437***	0.060	0.535**	0.834	0.344
	(0.155)	(0.399)	(0.236)	(0.515)	(0.310)
Treat x 2014	0.250	-0.458	0.370	0.442	0.219
	(0.174)	(0.569)	(0.288)	(0.598)	(0.277)
N	12,554	1,845	5,003	1,058	4,648
Dep. Mean	24.41	23.43	24.43	24.18	24.82

Notes. The dependent variable is MMSE score received. Panel A indicates all respondents. Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

Table 32: MCI (Age 55-74, Treat × Year)

		Household size			
		1	**2**		**3 or more**
	All		with spouse	w.o. spouse	
A. All					
Treat x 2008	0.004	0.020	-0.009	0.013	0.018
	(0.012)	(0.040)	(0.019)	(0.049)	(0.020)
Treat x 2010	0.019	-0.044	0.021	0.002	0.052**
	(0.014)	(0.049)	(0.021)	(0.060)	(0.022)
Treat x 2012	-0.029**	0.008	-0.044**	-0.052	-0.007
	(0.013)	(0.043)	(0.019)	(0.051)	(0.023)
Treat x 2014	-0.027**	0.004	-0.024	-0.068	-0.022
	(0.014)	(0.057)	(0.023)	(0.058)	(0.020)
N	22,796	2,301	9,580	1,556	9,359
Dep. Mean	0.265	0.389	0.274	0.314	0.217
B. Male					
Treat x 2008	-0.007	0.114	-0.032	-0.011	0.020
	(0.016)	(0.097)	(0.024)	(0.071)	(0.027)
Treat x 2010	0.030	0.009	0.025	0.049	0.058*
	(0.019)	(0.112)	(0.027)	(0.116)	(0.030)
Treat x 2012	-0.024	0.053	-0.051**	0.032	-0.008
	(0.017)	(0.094)	(0.025)	(0.079)	(0.030)
Treat x 2014	-0.039**	-0.041	-0.013	-0.175	-0.050*
	(0.019)	(0.111)	(0.031)	(0.114)	(0.026)
N	10,242	456	4,577	498	4,711
Dep. Mean	0.184	0.257	0.204	0.213	0.154
C. Female					
Treat x 2008	0.014	-0.001	0.018	0.015	0.018
	(0.018)	(0.045)	(0.028)	(0.064)	(0.031)
Treat x 2010	0.005	-0.052	0.007	-0.038	0.051
	(0.019)	(0.055)	(0.030)	(0.070)	(0.033)
Treat x 2012	-0.038**	-0.006	-0.062**	-0.093	-0.005
	(0.019)	(0.049)	(0.029)	(0.066)	(0.035)
Treat x 2014	-0.027	0.021	-0.059*	-0.015	0.005
	(0.020)	(0.066)	(0.034)	(0.068)	(0.031)
N	12,554	1,845	5,003	1,058	4,648
Dep. Mean	0.331	0.422	0.338	0.362	0.281

Notes. The dependent variable is MCI(Mild Cognitive Impairment). Panel B indicates only male respondents.Panel C indicates female respondents. Column (1) indicates all household size sample. Column (2) indicates household size one. Column (3) indicates household size 2 who live with spouse. Column (4) indicates household size 2 without spouse. Column (5) indicates household size 3 or more. Standard errors are in the parentheses. ***, **, * indicates significance level as 1%, 5%, 10%.

초록

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본 연구에서는 기초노령연금이 고령자의 인지능력에 미치는 영향을 추정한다. 기초노령연금의 도입 전후 시기인 2006년부터 2014년까지 고령의 개인 자료를 사용한다. 비록 연금으로 인해 사적이전소득의 구축효과가 발생하지만, 기초노령연금의 순수효과는 고령자의 인지능력을 향상시킨다. 기초노령연금의 인지능력에 대한 순수효과는 65-74세 그룹의 소득 1분위 가구와 2분위 가구의 인지능력 차이의 71.3 % 와 유사하다. 기초노령연금의 연금의 도입 시기인 2008-2014년 동안 약 2.415 년의 인지능력을 개선시킨다.

주요어: 인지능력; 연금; 건강; 치매
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