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## An Exploration of the Changes in Consumption Expenditure of the Retired Households in South Korea

*This study analyzed the changes in household consumption expenditure of retired households using Korean panel data. We compared the pre and post retirement-consumption levels in different consumption categories using panel data. Paired t-test showed that changes in the consumption patterns before and after retirement were not significant except for the households in the third net worth quartile. Analyzing the effect of retirement on the level of household consumption expenditure, this study found that the effect of retirement was not significant in overall, although retirement had a negative effect on the level of consumption expenditure among households in the lowest net worth distribution. Understanding changes in consumption patterns of retiring households provides important information to design social security policies.*

Owing to the recent increase in the elderly population and the beginning of the baby-boomers' retirements, the proportion of retired households has grown rapidly in South Korea. However, the social security program in Korea has not yet been established concrete which makes the retirees, especially the baby-boomers, to be vulnerable to high risk of financial problems (An & Jeon, 2004;

Park & Shim, 2010). Therefore, it is essential to understand household consumption after retirement in order to develop policies designed to support the retirees.

Regarding spending changes at retirement, previous studies have reported mixed findings. Some of the studies supported the Modigliani and Brumberg's (1954) life-cycle hypothesis which predicts that consumption by an individual remains smooth during the transition from work into retirement, whereas many of the recent studies have indicated spending drops at retirement, which is the retirement-consumption puzzle (Baek *et al.*, 2012). Thus, this study attempts to compare the magnitude of household consumption before and after retirement in order to understand how Korean retired households behave at retirement. Also, using the most recent wave of panel data, this study estimates the effect of retirement on the magnitude of household consumption controlling for characteristics of individuals/households. Based on the findings, this study is expected to contribute to the understanding of the changes in household consumption in Korean households at retirement, and to provide policy implications to support the well-being of the retiring households.

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### LITERATURE REVIEW

The life-cycle hypothesis predicts that the marginal

utility of consumption remains smooth during the transition from work into retirement, and individuals are anticipated to save during employment to maintain the degree of consumption constant after retirement (Modigliani & Brumberg, 1954). However, Banks *et al.* (1998) found that British households reduced consumption at the ages associated with retirement. The declines in spending cannot be explained by the life-cycle model, and have been referred to the retirement-consumption puzzle because it raises questions on the model of rational forward-looking behavior of consumers, such as the life-cycle model (Fisher *et al.*, 2008).

Since the late 1980s, many researchers have revealed that households reduced their consumption level after retirement, supporting the retirement-consumption puzzle. Hamermesh (1984) and Mariger (1987) found that consumption declines sharply as households move into retirement. Using British Family Expenditure Survey over the last 25 years and Banks *et al.* (1998) found that a significant fall in consumption around retirement. Bernheim *et al.* (2001) analyzed the Panel Study on Income Dynamics in the U.S.A. and found that individuals reduced consumption after retirement. Another recent study using Korean panel data from 2005 to 2009 found that retired baby-boomers spend less than working baby-boomers, which support the retirement-consumption puzzle (Park & Shim, 2010).

Although many of the studies have supported the retirement-consumption puzzle, some of the recent studies have provided empirical evidences that support the life-cycle hypothesis. An and Jeon (2005) found that the level of spending does not change significantly after retirement using 2-6 waves of Korean Labor & Income Panel Study (KLIPS), although they observed that the degree of spending is slightly lower among the retired households, when compared with working households. Yoon and Kim (2010) also found that household consumption expenditure did not decrease significantly after retirement using 3-10 waves of KLIPS. Linking two panel data in the U.S.A., the Health and Retirement Study and Consumption and Activities Mail Survey, Hurd and Rohwedder (2008) reported that spending declined at a small rate, 1-6%, and the decline rate

was not large enough to be significant. Some of the studies even found a positive effect of retirement (Nam *et al.*, 2004).

It appears that spending changes around retirement have not been conclusive at population level. However, most of the studies have agreed that the spending changes after retirement would differ across subcategories of consumption and by the characteristics of households. For example, retired households were observed to reduce food expenses most dramatically among subcategories of consumption (Bernheim *et al.*, 2001; Fisher *et al.*, 2008; Smith, 2006). And, subpopulation with lowest wealth quartile experienced a large drop in spending after retirement, whereas the increase in spending was found in the upper half of the distribution (Hamermesh, 1984; Hurd & Rohwedder, 2008; Yoon & Kim, 2010). Also, a number of studies argued that consumption pattern of the retiring households can differ by age groups because age is a significant factor that affects individuals' retirement planning behaviors and their consumption level (Hira *et al.*, 2009; Malroux & Brandt 1994; Mullis & Metzen 1986).

Therefore, this study attempted to explore changes in consumption expenditure around retirement using recent Korean panel data. This study consists of two studies. In study 1, this study has compared household consumption expenditure before and after retirement. To fully understand consumption changes after retirement and to provide findings comparable to those of previous studies (Bernheim *et al.*, 2001; Fisher *et al.*, 2008; Hamermesh, 1984; Hira *et al.*, 2009; Hurd & Rohwedder, 2008; Malroux & Brandt 1994; Mullis & Metzen 1986; Smith, 2006; Yoon & Kim, 2010), this study explored how consumption changes vary across subcategories of consumption and compared the changes across net worth quartiles and age groups. In study 2, we investigated how retirement affects household consumption expenditure controlling for other household and householder's characteristics. The research questions this study aimed to answer are as follows.

RQ1. What are the changes in household spending at retirement?

- RQ1-1. What are the changes in household spending at retirement across net worth quartiles?
- RQ1-2. What are the changes in household spending at retirement across age groups?
- RQ2. What are the determinants of the household spending at retirement?
- RQ2-1. What are the determinants of the household spending at retirement across net worth quartiles?
- RQ2-2. What are the determinants of the household spending at retirement across age groups?

W1, W2, and W3, which were interviewed in 2005, 2007, and 2009 respectively. As we investigated the changes in household consumption expenditure after retirement, we screened households whose householders were employed in 2005, became unemployed in 2007 or 2009, and remained unemployed until the end of the study period. This resulted in final sample of study 1 comprised of 325 households whose householders are in between fifties and eighties after deleting observations with missing values in all the expense variables as well as those that missed any waves during study period. Characteristics of the sample of the study 1 are presented in Table 1.

For multivariate analysis in study 2, we used the third wave of KReIS which was conducted in 2009, because W3 was the newest wave and KReIS had begun to collect asset information since 2009. All the households regardless of retirement status were used as the study sample for study 2 in order to see the effect of retirement on household consumption expenditure, which comprised 3,761 households.

## RESEARCH METHODS

### *Data*

This study analyzed the Korean Retirement and Income Study (KReIS), a longitudinal panel data that is collected every two years by the Institute of Korean Pension. KReIS collects rich information on employment, retirement, income, assets, and expenses of Koreans aged 50 and above, which comprises a sample of 87,000 individuals in more than 5,000 households.

For study 1, we analyzed three waves of KReIS,

### *Measurements*

We defined retired individuals as those who worked less than 1 hour per week in the second and third waves of the data among individuals aged 50 years and older. Also, this study only focused on the

Table 1. *Characteristics of the Sample in Study 1*

		First wave	Second wave		Third wave
		Non-retired Household (n = 325)	Non-retired Household (n = 196)	Retired Household (n = 129)	Retired Household (n = 325)
Retirement	Freq (%)	325 (100.0)	196 (60.3)	129 (39.7)	325 (100.0)
Total annual household consumption expenditure	Mean (SD)	12,770.7 (9,221.9)	15,456.2 (11,446.9)	12,416.2 (8,876.5)	13,526.4 (12,483.1)
Total annual household income	Mean (SD)	22,866.8 (42,636.1)	21,774.1 (20,336.1)	19,736.9 (27,638.3)	16,745.2 (17,896.5)
Household net worth	Mean (SD)	.	.	.	158,806.0 (313,271.9)
Householder age	Mean (SD)	63.3 (7.14)	65.2 (7.54)	65.6 (6.49)	67.3 (7.14)
Householder gender					
Male	Freq (%)	237 (72.9)	154 (78.6)	83 (64.3)	237 (72.9)
Female		88 (27.1)	42 (21.4)	46 (35.7)	88 (27.1)
Householder education years	Mean (SD)	8.23 (4.64)	8.34 (4.64)	8.07 (4.64)	8.23 (4.64)
Number of household members	Mean (SD)	2.61 (1.25)	2.70 (1.32)	2.24 (1.06)	2.42 (1.15)

Note: Expenditure, income and net worth statistics were provided in the Korean won and were converted to U.S. dollars based on the exchange rate 2009: 1 dollar = 1,220 won.

householders' retirements, because a householder's retirement has a large impact on the household financial status and KReIS collects information on financial resources and expenses at household level. The dependent variable of this study was spending of the retiring households, which was measured using total annual household consumption expenditure. The total household consumption expenditure included expenses for food, housing, fuel and power, clothing and footwear, transportation and communication, recreation and culture, health, household goods and services, and education. To estimate precise effect of retirement, the total household income, total net worth, and spending were adjusted for inflation using consumer price index from Statistics Korea (2010).

In order to investigate different consumption patterns of the households at retirement depending to level of net worth, we manipulated net worth variable to represent four quartiles of the net worth distribution. The total net worth equaled to the amount of total assets minus total debts. Cut-off criteria such as 8,200 dollars, 57,400 dollars and 160,000 dollars were used to divide net worth distribution in to four quartiles. As KReIS did not collect data on assets in the first and second waves, this study only used the total household net worth measured in the third wave in 2009. And net worth quartiles of waves 1 and 2 were imputed using the total household net worth in wave 3. To explore the cohort effect and observe different consumption patterns of the baby-boomers at retirement, this

study manipulated age group of the householders and compared changes in household consumption expenditure at retirement by age groups. The Korean baby-boomer generation comprised those who were born between 1955 and 1963, and were in their fifties in 2009. Thus, we manipulated an age group variable to represent three cohorts of the householders who were in their fifties, sixties, and seventies and above in 2009. The proportion of baby-boomers who were in their fifties in 2009 was 15.7% in the sample for study 1 and 27.2% for study 2 respectively.

In study 2 we estimated the effect of retirement on household spending level. In order to control for the effect of other variables, we included economic characteristics of the household such as total household income and total household net worth as well as age, gender, and education level of householders, and number of household members.

## RESULTS

### *Changes in Household Spending at Retirement*

In study 1, we compared the household consumption level before and after retirement using paired *t*-test.

Changes in household spending around retirement were explored by comparing the magnitude of consumption expenditure across consumption categories before and after retirement using paired *t*-test (Table 2). First of all, the total consumption

Table 2. *Changes in Household Spending at Retirement*

Consumption categories	Pre-retirement	Post-retirement	Paired <i>t</i> statistic
	Mean (SD)	Mean (SD)	
<i>Total consumption expenditure</i>	1057.5 (764.4)	1130.4 (1050.3)	-1.463
Food	290.5 (180.6)	271.9 (166.1)	2.368*
Housing, fuel and power	158.9 (125.5)	146.9 (150.1)	1.156
Clothing and footwear	47.8 (61.8)	52.9 (157.1)	-0.641
Transportation and communication	182.0 (199.9)	178.5 (169.9)	0.346
Recreation and culture	41.2 (76.2)	54.1 (157.6)	-1.554
Health	85.0 (137.0)	153.4 (495.6)	-2.411*
Household goods and services	21.1 (53.2)	23.9 (99.3)	-0.450
Education	104.9 (289.3)	39.3 (152.0)	4.392**

\**p* < .05, \*\**p* < .001

Table 3. *Changes in Household Spending at Retirement by Net Worth Quartiles*

		First quartile		Second quartile		Third quartile		Fourth quartile	
		Mean (SD)	Paired t	Mean (SD)	Paired t	Mean (SD)	Paired t	Mean (SD)	Paired t
<i>Total consumption expenditure</i>	Pre	676.6 (483.4)		832.0 (544.8)		1078.3 (666.1)		1669.7 (915.0)	
	Post	602.0 (487.1)	1.247	842.9 (697.0)	-0.168	1328.6 (1110.7)	2.111*	1774.3 (1310.7)	-0.778
Food	Pre	185.8 (111.6)		240.6 (127.9)		308.1 (160.3)		429.6 (210.0)	
	Post	160.2 (96.8)	2.318*	233.9 (122.5)	0.501	296.9 (119.8)	0.640	398.7 (205.7)	1.578
Housing, fuel and power	Pre	163.3 (207.7)		137.9 (82.0)		145.9 (64.5)		188.8 (87.7)	
	Post	116.4 (88.9)	1.981	144.3 (237.9)	-0.230	137.1 (81.6)	0.849	190.7 (128.2)	-0.129
Clothing and footwear	Pre	22.6 (24.9)		35.9 (52.0)		48.3 (52.8)		86.4 (84.5)	
	Post	17.4 (22.0)	2.084*	29.0 (37.2)	0.948	70.8 (251.6)	0.836	96.5 (176.7)	-0.576
Transportation and communication	Pre	107.3 (143.7)		145.0 (167.1)		169.1 (131.1)		310 (269.7)	
	Post	86.2 (85.8)	1.717	132.4 (128.6)	0.919	218.9 (203.6)	-2.473*	280 (169.8)	1.009
Recreation and culture	Pre	22.1 (77.6)		22.6 (41.7)		35.8 (44.9)		85.0 (105.0)	
	Post	13.5 (29.8)	0.939	21.8 (34.0)	0.283	43.9 (75.5)	0.906	138.3 (288.8)	-1.756
Health	Pre	50.5 (55.8)		75.1 (95.3)		78.8 (114.5)		136.9 (217.1)	
	Post	100.9 (345.7)	-1.357	80.6 (100.7)	-0.382	257.9 (805.2)	1.989	176.1 (443.3)	-0.692
Household goods and services	Pre	10.9 (35.6)		17.8 (40.9)		23.9 (54.5)		32.1 (72.8)	
	Post	10.2 (25.9)	0.136	24.9 (163.0)	-0.386	15.6 (24.3)	1.237	45.0 (104.8)	-0.917
Education	Pre	34.5 (150.4)		53.7 (155.8)		140.2 (392.0)		195.1 (352.0)	
	Post	11.7 (46.4)	1.451	14.2 (55.1)	2.285*	48.0 (168.8)	2.362*	84.9 (239.4)	2.796**

\*p &lt; .05, \*\*p &lt; .001

expenditure remained constant around retirement. This finding supports for the for the life-cycle hypothesis that retired households do not change consumption level after retirement (An & Jeon, 2005; Park & Shim, 2010; Yoon & Kim, 2010). With regard to spending changes across consumption categories, spending for food and education fell significantly, while expenses for health increased significantly after retirement. These findings are consistent with those of the previous studies (Hurst, 2008; Hurd & Rohwedder, 2008; Yoon & Kim, 2010). Given that expenses for health functional foods were categorized as food expenses in second and third waves in this data, the magnitude of increases in expenses for health after retirement might be underestimated in second and third wave data. Yoon and Kim (2010) explained that households reduced food expenses after retirement because individuals eat less as they get old and some of the food expenses are substituted with home production. The education expenses reduced after retirement because

most of the retired parents do not have to pay for their children's education any more. The increase in the expenses for health offset the reduction in the expenses for food and education; and the magnitude of total consumption did not change significantly after retirement.

#### *Changes in Household Spending at Retirement Across Net Worth Quartiles*

This study investigated the differences in changes in household spending at retirement by net worth quartiles (Table 3). Exploration of the consumption change across net worth quartiles revealed that slightly different changes in the consumption level after retirement across net worth quartiles; however, in overall, the level of consumption were constant after retirement except for the household in the third quartile which showed increase in consumption expenditure after retirement. We also compared the consumption expenditure level across various consumption categories by net worth quartiles. In

Table 4. Changes in Household Spending at Retirement by Age Groups

		Fifties		Sixties		Seventies and over	
		Mean (SD)	Paired t	Mean (SD)	Paired t	Mean (SD)	Paired t
<i>Total consumption expenditure</i>	Pre	1580.2 (827.9)		1178.9 (801.1)		700.5 (476.1)	
	Post	1729.0 (1332.5)	-0.871	1246.7 (1131.0)	-0.833	748.1 (574.9)	-0.927
Food	Pre	356.8 (166.5)		336.5 (203.1)		209.8 (118.8)	
	Post	331.9 (165.1)	1.072	298.9 (169.8)	3.268**	216.1 (145.9)	-0.553
Housing, fuel and power	Pre	187.2 (200.0)		184.8 (151.4)		116.9 (72.7)	
	Post	200.0 (84.3)	-0.481	143.0 (89.6)	3.101**	129.9 (191.9)	-0.711
Clothing and footwear	Pre	84.3 (79.5)		55.2 (68.8)		24.0 (24.3)	
	Post	90.9 (211.9)	-0.268	61.1 (190.9)	-0.381	27.9 (41.1)	-1.129
Transportation and communication	Pre	309.9 (293.0)		202.6 (183.4)		105.9 (128.0)	
	Post	285.7 (162.5)	0.596	208.1 (181.6)	-0.385	100.4 (116.9)	0.477
Recreation and culture	Pre	61.1 (67.6)		48.9 (83.1)		24.1 (67.7)	
	Post	92.4 (171.4)	-1.296	68.2 (204.4)	-1.267	21.9 (39.8)	0.335
Health	Pre	83.7 (130.0)		88.1 (123.1)		81.8 (155.2)	
	Post	128.2 (338.1)	-0.864	190.7 (672.0)	-1.843	119.8 (238.2)	-1.485
Household goods and services	Pre	25.0 (49.2)		24.3 (64.7)		15.6 (37.0)	
	Post	56.1 (207.9)	-1.055	20.9 (50.0)	0.517	14.2 (68.9)	0.209
Education	Pre	326.8 (68.8)		97.9 (303.5)		21.8 (137.4)	
	Post	68.8 (196.9)	4.948***	39.7 (167.9)	2.497*	26.7 (103.1)	-0.439

\*p < .05, \*\*p < .01, \*\*\*p < .001

every net worth quartiles, except for the lowest quartile, education expenses decreased after retirement and expense for transportation and communication increased significantly in the third quartile. Noticeably, only in the lowest quartile, decreases in the expenses for food and clothing were significantly large.

#### *Changes in Household Spending at Retirement Across Age Groups*

Again, we compared the pre and post retirement-consumption level in different consumption categories across age groups of the householders using paired *t*-test (Table 4). Across all age groups, the level of household consumption expenditure remained constant after retirement supporting for the life-cycle hypothesis. In particular, households headed by householders in their fifties and sixties exhibited significant decrease in education expense; and households whose householders were in their seventies and above did not change education

expenses significantly because they would have already had low education spending before retirement. As well as education expenses, these households did not lower consumption expenditure in all the consumption components after retirement, because they would have already spent little before retirement. On the contrary, the households whose householders are in their sixties significantly reduced spending for food and housing, fuel and power. The findings indicated that the changes in household spending at retirement were not significantly different across age groups, and that baby-boomer generation also did not show noticeable spending pattern features, when compared with other generations. Park and Shim (2010) also found no significant differences in the composition of spending components of the baby-boomers, when compared with other generations.

In study 2, we implemented multivariate regression model to examine the effect of retirement on the spending of retiring households accounting

Table 5. *Effect of Retirement on Household Spending*

	Coefficient	Beta	Standard error
Retirement (retired = 1)	0.003	0.002	0.022
Logarithm of total annual income	0.354*	0.455	0.014
Logarithm of total net worth	0.056*	0.131	0.006
Householder age	-0.006*	-0.068	0.001
Gender of householder (male = 1)	0.021	0.013	0.024
Householder education years	0.023*	0.142	0.003
Number of household members	0.110*	0.170	0.010

F = 590.624\*, R<sup>2</sup> = 0.601

\* p &lt; .001

Table 6. *Effect of Retirement on Household Spending by Net Worth Quartiles*

	First quartile	Second quartile	Third quartile	Fourth quartile
	Coefficient Beta (Standard error)	Coefficient Beta (Standard error)	Coefficient Beta (Standard error)	Coefficient Beta (Standard error)
Retirement (retired = 1)	-0.108* -0.072 (0.044)	0.011 0.008 (0.037)	0.042 0.031 (0.042)	0.033 0.025 (0.041)
Logarithm of total annual income	0.385*** 0.458 (0.027)	0.435*** 0.534 (0.026)	0.331*** 0.439 (0.025)	0.276*** 0.387 (0.024)
Householder age	-0.009*** -0.108 (0.002)	-0.003 -0.031 (0.002)	-0.007* -0.082 (0.003)	-0.014*** -0.176 (0.003)
Gender of householder (male = 1)	0.066 0.045 (0.044)	0.035 0.025 (0.038)	0.031 0.020 (0.048)	-0.006 -0.003 (0.052)
Householder education years	0.014** 0.090 (0.005)	0.018*** 0.115 (0.004)	0.019*** 0.123 (0.005)	0.035*** 0.226 (0.005)
Number of household members	0.126*** 0.178 (0.023)	0.136*** 0.210 (0.019)	0.110*** 0.197 (0.018)	0.075*** 0.141 (0.017)
	F = 153.148*** R <sup>2</sup> = 0.551	F = 182.108*** R <sup>2</sup> = 0.571	F = 104.282*** R <sup>2</sup> = 0.437	F = 110.006*** R <sup>2</sup> = 0.463

\*p &lt; .05, \*\*p &lt; .01, \*\*\*p &lt; .001

for the effects of other confounding variables. Among 3,761 households, about 44.6% of the household were retired. The retired households had lower consumption expenditure, lower total annual household income, lower household net worth, lower education level, and less household members compared to non-retired households had. The householders of retired households are older than those of non-retired households are, and retired households are more likely to be headed by female

householders compared to the non-retired households. The specific characteristics of the sample of the study 2 can be provided upon request.

#### *Determinants of the Household Spending at Retirement*

As shown in Table 5, the binary retirement variable did not have a significant effect on the total household consumption expenditure controlling for the characteristics of the households. Thus, the life-cycle hypothesis was again supported using

multivariate regression model. The multivariate regression model showed that the total annual income and total net worth had significant positive effects on household consumption expenditure level, and annual income was the primary determinant that had a largest influence on the magnitude of household consumption expenditure. Besides income and assets, the education level of the householder and number of household members were also positively related to household consumption expenditure level, while the householders' age was negatively associated with household consumption expenditure level.

*Determinants of the Household Spending  
at Retirement Across Net Worth Quartiles*

Next, we analyzed the effect of retirement on household consumption expenditure across net worth quartiles. We also found that retirement did not significantly influence the level of household consumption across net worth quartiles except for the lowest net worth quartile (Table 6). In particular, retirement had a significant negative effect on household consumption expenditure in the lowest net worth quartiles; however, the effect was not significant in the rest of the net worth distribution generally supporting for the life-cycle hypothesis. Among the control variables, income, age of the householder, education level of the householder, and number of household members significantly influenced the magnitude of spending of the retiring households. We also examined the effect of retirement on the spending of retiring households across age groups. However, retirement did not have a significant effect on the level of household consumption expenditure across all age groups<sup>1</sup>.

## DISCUSSION AND CONCLUSION

This study explored Korean households' consumption behaviors at retirement. In order to explore changes in household consumption expenditure around retirement, we explored the four-year-consumption

expenditure of the retired households around retirement using three waves of KReIS data in study 1. In study 2, the effect of retirement on household consumption expenditure was estimated controlling for other confounding variables using wave 3 of KReIS data.

The life-cycle hypothesis implies that individuals are rational and they plan both their consumption and savings behaviors over the long-term and attempt to keep their consumption levels approximately the same during lifetime. Findings from study 1 showed that in overall the retiring households did maintain approximately same magnitude of consumption expenditure after retirement supporting for life-cycle hypothesis, although households behaved slightly differently between net worth quartiles such that we exceptionally found increased post-retirement consumption among households in the third quartile. In study 2, we also found that generally the effect of retirement on household expenditure was not significant which again supporting for the life-cycle hypothesis, except for the households in the lowest net worth quartiles where we found significant negative effect of retirement. Thus, we can conclude that the behaviors of consumption and saving of the retiring households in Korea are generally consistent with what the life-cycle hypothesis suggested and Korean households successfully smooth out their consumption level after retirement although there are slight inconsistencies in findings across net worth quartiles.

This study has contributed to the understanding of the consumption pattern of the households after retirement and identifying the household groups vulnerable to retirement. The findings provide foundations to design social security programs and education programs on retirement planning. The households in the lowest net worth quartile showed significant decrease in food and clothing expenses in the paired t-test and they are the only group whose consumption level was negatively affected by retirement in the multivariate regression analysis. The findings suggest that the retired households in the lowest net worth quartile go through difficulties in meeting basic needs after retirement. The estimates from the multivariate regression analyses also

<sup>1</sup>The specific estimates are not provided in this paper and can be available upon request.

showed that the retired households with lower income and lower net worth, as well as those with old and less educated householders were more likely to reduce household consumption expenditure after retirement. It is likely that those groups that reduce the consumption expenditure after retirement have unmet need and are most vulnerable to drastic fall in income after retirement. Therefore, social security system should focus on the households in the low income bracket and low net worth bracket with old and less educated elderly householders.

This study analyzed the changes in consumption expenditure of households after retirement using panel data in study 1. However, this study had to explore only four years around retirement during 2005 and 2009 and explored consumption changes after retirement among the households that were in early-period of retirement, and the findings of this study should be discussed with caution. We proposed that baby-boomers may show distinct consumption pattern after retirement because they have twofold burden of supporting both parents and old children and involuntary retirement has increased among the baby-boomers. However, this study did not find significant differences in the consumption pattern among the baby-boomers. These unexpected findings may be due to the short period of study data. With regard to net worth effect, some of the previous studies demonstrated that sufficient net worth raises the level of consumption expenditure after retirement by reporting a decline in the spending in the lowest net worth quartile and increases in the rest of the net worth distribution after retirement (Hurd & Rohwedder, 2008; Yoon & Kim, 2010). This study also found that household expenditure slightly decreased after retirement in the lowest net worth quartile and increased in the rest of the households although were not significant. Therefore, it may be possible for future studies to find significant differences in post-retirement consumption across net worth distribution and age groups analyzing longer period of data.

Also, this study imputed net worth quartiles of wave 1 and 2 using total household net worth in wave 3 due to lack of information in wave 1 and 2. Therefore, caution should be given to the presence of

potential bias in the net worth variables due to ignoring the changes in net worth throughout the waves. Finally, this study could not include all of variables that are relevant to householder's retirement or post-retirement consumption such as spouse's retirement or composition of household. Therefore, future studies can contribute to the literature explaining complex relation between retirement and consumption decision by employing more precise measures and new relevant factors in the model.

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