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## **GLOBAL BUSINESS & FINANCE REVIEW**

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# Effect of the elderly on household's financial transactions: Evidence from Japan and Korea

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#### ABSTRACT

Purpose: This study investigates the effect of the elderly on the household's financial transactions in Japan and Korea.

**Design/methodology/approach:** Using financial transactions from Japanese and Korean central banks from 2009 to 2020 on a quarterly basis, this study employ AR (1) for estimation. Financial assets are largely classified into currency, stock, bond, and insurance while the elderly are divided into 60s,70s, and 80s.

**Findings:** The size of those aged over 70 and 80 has a relatively more significant effect on the financial transactions in Japan and Korea. The growth of those aged 60 has a significant effect on the household's financial transactions in Japan while the growth of 80+ has a more significant effect in Korea. The interaction between the size and growth of those in their 60s and 80s+ has the most significant effect on the household's financial transactions in Japan and Korea, respectively. The interaction between the growing elderly population and life expectancy has no effect on the financial transactions in Japan while it has a significant effect in Korea.

**Research limitations/implications:** This study implies that the elderly gives different effect on household's financial transactions. Also, each old age cohort such as 60s, 70s, and 80s has different effect on the transactions.

**Originality/value:** This study proposes that the size and growth of the elderly both gives different effect on risky and non-risky financial transactions.

Keywords: The elderly, household, financial transaction, demography, life expectancy

### I. Introduction

To understand the effect of the elderly on the household's financial transactions has become more important as the elderly population and their need for wealth during retirement and beyond increase. In fact, 146 countries (72.6%) are predicted to face a continuous increase of their population aging during

2019~2067 (United Nation, 2019).

Japan and Korea have similarities in terms of their population aging, but also have differences. Japan has a level (or size) aging population for a long while Korea is experiencing the fastest (growth) aging population in the world. In fact, Japan entered into an aging society in 1970, followed by an aged society in 1994, and a super-aged society in 2005. Korea entered into an aging society in 2000, an aged society in 2017, followed by the super-aged society in 2026.<sup>1</sup>) It is said that Korea's demographic trends seem to track Japan's with a lag of about 20 years, reflecting

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large gains in longevity, low fertility rates, and limited immigration. After peaking at 63 percent in 1995, Japan's working-age population ratio declined to about 56 percent in 2015, while Korea's working-age population ratio is projected to peak at 66.5% in 2017, and then fall quickly to 56% in less than 20 years (Zoli, 2017).

In addition, the elderly in Japan has increased under a continuous total population decline while in Korea the total population has increased under that of the increase. In particular, the increased growth (speed) of the population aging is higher than Japan. Furthermore, life expectancy is expanding in both countries. The life expectancy of Japan has expanded from 72.0 in 1970 to 84.4 in 2019 while that of Korea expanded from 62.3 in 1970 to 83.3 in 2019 (OECD).

As the elderly population has expanded, people aged 65 and over take more than about 89% of income in Japan and 67% in Korea. Table 1 represents the household's asset allocation in both countries. First of all, Japanese households hold more than 50% of their assets as "currency and deposits (currency)" followed by about 27 % as "insurance, pension and standardized guarantees (insurance)" in 2020. In contrast, about 14% and 1% account for "debt securities (bond)" and "equity and investment fund shares

Table 1. Financial Asset Allocation of Households

	Japan		Ko	rea
	2009	2020	2009	2020
Currency and deposits (Currency)	0.5331	0.5422	0.4501	0.4336
Equity and investment fund shares (Stock)	0.1036	0.1414	0.1872	0.2179
Debt securities (Bond)	0.0276	0.0135	0.1121	0.0336
Insurance, pension and standardized guarantees (Insurance)	0.3038	0.2727	0.2428	0.3082

Source: Each country's central banks

(stock)", respectively. On the other hand, Korean households hold about 43% and 30% of their assets as currency and insurance, respectively in 2020. Stock and Bond record around 22%, and 3%, respectively. In spite of the high holdings of safe assets such as currency and insurance in Japan and Korea, holding risky assets such as stock and bond are a little different.

Since Japan and Korea have similarities and differences in demographic aging and household's risky asset allocation, we investigate the elderly of effect on the household's financial transactions in two countries. We choose Japan and Korea, which are representative countries with different demographic shape: Japan is one of the longest aged country while Korea is the fastest aging country. The evidence from Japan and Korea with different aging populations might give implications to many other countries who are undergoing different demography changes.

The remainder of this paper is organized as follows. Section 2 and Section 3 provide literature and data and model, respectively. Section 4 reports empirical results from the elderly's demographic size and growth to the household's financial transactions. Section 5 provides the results of the interaction between size and growth, as well as life expectancy. Section 6 concludes our investigation.

#### II. Literature Review

Traditional life cycle hypothesis suggest that elderly investors will have a lower demand for risky assets such as stocks compared to middle-aged investors due to risk aversion tending to increase with age (Constantinides et al., 2002; Kim et al., 2013).

The hypothesis is widely accepted in the marketplace. For example, life cycle funds or target-date funds based on this hypothesis have gained popularity (Poterba, 2014; Kim et al., 2019). However, the empirical literature provides mixed evidence on the relationship between age and risky assets holdings. Yoo (1994) find that investors increase the proportion

According to the UN standards, a society having 7% of its population in the 65-or-over group is defined as an aging society. A society standing at over 14% and over 20% is defined as an aged society and a super-aged society, respectively.

of stocks as they age while Poterba (2001) and Heaton and Lucas (2000) insist that the proportion of stocks with age maintains. Moreover, Bakshi and Chen (1994), Bodie and Crane (1997), and Summers et al. (2006) find a negative relationship between age and risk asset holdings.

Meanwhile, Goyal (2004) investigates that the outflows from the stock market are positively correlated with the growth in the fraction of old people (65 and over) and negatively correlated with the growth in the fraction of middle-aged people (45 to 64). Moreover, growth in population age structure add significant explanatory power to stock premium regressions. Kim et al. (2019) find that the old generation's greater demand for stock funds is associated with the size of this population and their increased life expectancy. In particular, they insist that persons who are in their early 60s, that is, who have newly joined the old generation, show less market risk aversion and increased demand for stock funds.

This study contributes to the literature as follows. First, we expand the financial assets from stocks to currency, stock, bond, and insurance. Previous studies mostly investigate the effect of demography only to risky assets such as stocks. However, we include both risky and non-risky financial assets since households consider all of financial assets not just stocks in making decisions. Second, we classify the effect of demography into size (level) and growth (speed) of demography. Two variables have different meaning and we need to look very closely since ageing has become very important issue to all of the world. For this purpose, Japan and Korea are chosen since these are representative countries which have high size (level) and growth of the old, respectively.

#### III. Data and Model

### A. Data

The research period is from 2009 to 2020 on a

quarterly basis, which started from the post-global financial crisis of 2008. The variables are largely composed of three parts: first, we use the fund of household flows as the proxy of the household's financial transactions. They are largely classified into currency and deposits (currency), equity and investment fund shares (stock), debt securities (bond), and insurance, pension and standardized guarantees (insurance). The data are obtained from each country's central bank. The household's financial transactions for each asset are normalized by total financial assets. They are the dependent variables which are not only risky but also non-risky assets. Equation (1) shows details.

$$Gurrency_{t} = \frac{Gurrency \text{ and } deposit_{t}}{Household's \ Total \ financial \ assets_{t}}$$

$$Stock_{t} = \frac{Equity \ \text{and } investment \ fund \ shares_{t}}{Household's \ Total \ financial \ assets_{t}}$$

$$Bond_{t} = \frac{Debt \ securitiets_{t}}{Household's \ Total \ financial \ assets_{t}}$$

Insurance<sub>t</sub>

$$= \frac{Insurance, pension and standardized guaranttee_t}{Household's Total financial assets_t}$$
(1)

Second, financial and economic variables such as the stock return and interest rate and the gross domestic products' (GDP) growth are chosen as the control variables and obtained from each country's central bank. They are independent variables, which are calculated by the following definition (2) (You and Wu, 2019).

 $GDP \ growth_t = Average \ GDP \ growth \ for$ the quarter,

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Third, another independent variable is demography. In order to investigate the effect of the elderly population, three cohorts are classified into 60s, 70s, and over 80. In addition, since the elderly's population of "size" and its "growth" are different indicators, we employ both variables. Demographic variables are obtained from the Ministry of Internal Affairs and Communications for Japan and Statistics Korea for Korea. They are calculated by the following definitions (3) and (4):

$$60s\_sizet = \frac{Aged \ 60-69 \ of \ Population_t}{Total \ Population_t}$$

$$70s\_sizet_t = \frac{Aged \ 70-79 \ of \ Population_t}{Total \ Population_t}$$

$$80s\_sizet_{t} = \frac{Aged \ over \ 80 \ of \ Population_{t}}{Total \ Population_{t}}$$

(3)

60s\_growtht

$$= \frac{Aged \ 60-69 \ of \ Population_t - Aged \ 60-69 \ of \ Population_{t-1}}{Aged \ 60-69 \ of \ Population_{t-1}}$$

70s\_growtht

$$= \frac{Aged \ 70-79 \ of \ Population_t - Aged \ 70-79 \ of \ Population_{t-1}}{Aged \ 70-79 \ of \ Population_{t-1}}$$

80s\_growtht

$$= \frac{Aged \ over \ 80 \ of \ Population_t - Aged \ over \ 80 \ of \ Population_{t-1}}{Aged \ over \ 80 \ of \ Population_{t-1}}$$
(4)

#### B. Summary statistics and Model

The summary statistics of the variables are shown at Table 2. First, regarding the financial transactions shown at Panel A of Japan, the financial transactions of currency and bond record are positive while those of the stock and insurance are negative. In particular, the transaction for currency is the highest (1.064), which indicate that the money from the household mostly flow into the currency. Meanwhile, in Korea, all transactions for assets, except stock, show a positive flow. The financial transactions for stock in Japan and Korea might be related with a relatively low stock return compared with the interest rate.<sup>2</sup>) In fact, the stock return records are higher than both Japan and Korea's interest rates, as shown in Panel B. Also, the stock return, interest rate, and GDP growth in Japan are lower than those in Korea.

Second, regarding demography, the number of those in their 60s, 70s, and over 80s is higher in Japan compared with Korea. In contrast, the growth is higher in Korea than in Japan. The growth of all the elderly is negative in Japan while positive in Korea. It indicates a distinctive increase in the elderly population in Korea. In particular, the declining speed (growth) of the elderly, except for those in their 80s, is higher in Japan compared with Korea.

Table 3 shows the correlation between variables. As shown in Panel A for Japan, the currency and bond show a negative correlation with the number of elderly while stock and insurance show a negative correlation with that of the growth. Interestingly, stock mostly has negative correlation with the elderly variables. At Panel B of Korea, the bond shows a negative correlation with the elderly variables. Stock has a mostly negative correlation with the growth while insurance is negative with size variables.

Meanwhile, we employ AR (1) model for the estimation with size and growth of the elderly and the specific model are as follows.

$$\begin{split} financial\_transaction_{t,i}^{1} \\ &= a_{0}^{1} + a_{1}^{1} \; financial\_transaction_{t-1}^{1} \\ &+ a_{2}^{1} \; stock\_return_{t-1}^{1} + a_{3}^{1} \; interest\_rate_{t-1}^{1} \\ &+ a_{4}^{1} \; GDP\_growth_{t-1}^{1} + a_{5}^{1} \; 60s\_size_{t-1}^{1} \\ &+ a_{6}^{1} \; 70s\_size_{t-1}^{1} + a_{7}^{1} \; 80 + \_size_{t-1}^{1} + e_{t}^{1} \end{split}$$

<sup>2)</sup> Aoki et al. (2021) explains why Japanese households hold so few stocks that households have a very low level of trust in the stock market. This is due to Japan's history of poor corporate governance and low stock return because of excessive fees and commissions.

#### Table 2. Basic Statistics

		Japan		Korea
	Mean	Standard Deviation	Mean	Standard Deviation
Currency	1.0647	1.0998	0.5265	0.1931
Stock	-0.0245	0.4378	-0.0104	0.1557
Bond	0.0294	0.1516	0.0202	0.1094
Insurance	-0.1625	0.5493	0.4614	0.1939
Panel B : Variables rela	ted with financial m	arket and economy		
Stock_return	0.0004	0.0017	0.0146	0.0458
Interest_rate	0.0003	0.2005	0.0255	0.0103
GDP_growth	0.0015	0.0186	0.0076	0.0088
Panel C: Variables relate	ed with demography			
60s_size	0.1394	0.0064	0.0980	0.0153
70s_size	0.1115	0.0088	0.0607	0.0064
80+_size	0.0768	0.0100	0.0266	0.0065
60s_growth	-0.0213	0.1309	0.0113	0.0057
70s_growth	-0.0139	0.1320	0.0094	0.0053
80+_growth	-0.0103	0.1321	0.0188	0.0065

It indicates that each variable's quarterly average between 2009 and 2020. Panel A: Variables related with financial transactions

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares Bond: Debt securities, Insurance: Insurance, pension, and standardized guarantees

#### Table 3. Correlation between Variables

It indicates that each variable's quarterly average between 2009 and 2020.

Panel A : Japan

	Currency	Stock	Bond	Insurance
60s_size	0.1293	0.0916	0.2788	-0.2240
70s_size	-0.0950	-0.0748	-0.2516	0.1453
80+_size	-0.0572	-0.0443	-0.2472	0.0963
60s_growth	0.0294	-0.0867	0.1339	-0.0335
70s_growth	0.0167	-0.0944	0.1170	-0.0217
80+_growth	0.0221	-0.0882	0.1231	-0.0312
Panel B : Korea				
60s_size	0.1826	0.4693	-0.3628	-0.4254
70s_size	0.0377	0.4357	-0.3780	-0.2389
80+_size	0.1396	0.4654	-0.3845	-0.3643
60s_growth	0.2160	0.3553	-0.4453	-0.2927
70s_growth	-0.0158	-0.3708	0.1869	0.2682
80+_growth	0.1246	-0.2281	-0.1140	0.1877

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares

Bond: Debt securities, Insurance: Insurance, pension, and standardized guarantees

 $financial\_transaction_{t,i}^2$ 

$$\begin{split} &= a_0^2 + a_1^2 ~financial\_transaction_{t-1}^2 \\ &+ a_2^2 ~stock\_return_{t-1}^2 + a_3^2 ~interest\_rate_{t-1}^2 \\ &+ a_4^2 ~GDP\_growth_{t-1}^2 + a_5^2 ~60s\_growth_{t-1}^2 \\ &+ a_6^2 ~70s\_growth_{t-1}^2 + a_7^2 ~80+\_growth_{t-1}^2 + e_t^2 \end{split}$$

Where *i*=currency, stock, bond, insurance, 60s size=aged 60-69 of population/total population, 70s size=aged 70-79 of population/total population, 80+ size=aged over 80 of population/total population,

60s growth=aged 60-69 of population of growth 70s growth=aged 70-79 of population of growth, 80+ growth=aged over 80 of population of growth transactions in Japan and Korea.<sup>3)</sup> As shown in Panel A for Japan, the size of those aged over 80 has a significant effect on currency, stock, and insurance. It has a negative effect on currency and stock while it has a positive effect on insurance. The size of the 60s only had a positive effect on bond. It implies that those aged over 80s outflow their money from currency for living expenses while money such as public transfers inflows into insurance. In fact, Table 5 shows that the main income source of older people (65+) is public transfer, including pension.

Table 5. Income Source of elderly People (65+) (Unit: %)

		Jap	Japan		rea	
		2014	2016	2014	2016	
IV. Estimation Results	Income from public transfers	51.3	49.2	30.2	25	
A. Effect of elderly demographic size	Income from occupational transfers	0	0	0	0	
	Income from capital	10	10.6	19.1	22.5	
Table 4 shows the estimation results from the effect	Income from work	38.7	40.2	50.8	52.5	
of elderly demographic size on the household's financial	Source: OECD					

Source: OECD

Table 4. Effect of elderly Demographic Size on a Household's Financial Transactions

Panel	А	:	Japan
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	Currency	Stock	Bond	Insurance
60s_size (-1)	-2.9549	-8.6596	5.4940**	-1.1231
	(0.6154)	(0.6506)	(0.0189)	(0.6639)
70s_size (-1)	4.3759	6.5364	1.1573	-2.6536
	(0.6239)	(0.6155)	(0.3414)	(0.4781)
80+_size (-1)	-2.0134**	-8.2683**	-0.3455	3.3854**
	(0.0298)	(0.0347)	(0.7653)	(0.0296)
Panel B : Korea				
60s_size (-1)	-5.3392	-1.9299	4.0102**	2.1065
	(0.1231)	(0.5321)	(0.0227)	(0.5332)
70s_size (-1)	-1.0441***	-1.9947	5.3951**	7.6300*
	(0.0056)	(0.7072)	(0.0454)	(0.0998)
80+_size (-1)	2.6207**	5.4744	-1.174**	-1.0000
	(0.0381)	(0.5218)	(0.021)	(0.2924)

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares

Bond: Debt securities, Insurance: Insurance, pension, and standardized guarantees \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively. P-statistics are reported in parenthesis.

<sup>3)</sup> Full estimation results are omitted due to limited space. They are provided on request.

Meanwhile, Panel B of Korea in Table 4 shows that the size of those in their 70s has a significant effect on currency, insurance, and bond. It has a negative effect on currency while there is a positive effect on insurance and bond, respectively. The size of those aged over 80 has a positive effect on the inflow of currency while it has a negative effect on that of bond.

In summary, the size of those aged over 80 and in their 70s has a relatively more significant effect on the fund flows in Japan and Korea, respectively. Interestingly, those aged over 80 have a negative effect on currency in Japan while it has a positive

 Table 6. Elderly Income in Japan and Korea
 (Unit: %)

Panel A: Income of elderly people aged 66-75, percent of population incomes

	Japan	Korea
2014	92.8	68.8
2016	89.7	72.2
Panel B: Income of elderly of population incomes	people aged	over 75, percent
2014	86.2	56.4
2016	85.5	54.6

effect in Korea. It indicates that the inflow into currency is negative in Japan while positive in Korea. How can we explain this? It might be related with the fact that the income of those in their 70s in Korea is relatively higher than other elderly age groups, as shown in Table 6.

#### B. Effect of elderly demographic growth

The effect of elderly demographic growth on the household's financial transactions in Japan and Korea is shown in Table 7. In Panel A of Japan, the growth of those in their 60s has significant effects on the financial transactions such as currency, stock, and insurance. It has a positive effect on currency and stock while it had a negative effect on insurance. The growth of those in their 70s has a significant effect only on currency. The growth of those in their 80s does not have an effect on the financial transaction. These empirical results might be related with the fact that the growth of those in their 60s is the highest among the elderly. In fact, Table 2 on page 7 shows that growth of those in their 60s is -0.0213 while the growth for those in their 70s and 80+ is -0.0139, -0.0103, respectively.

Table 7. Effect of elderly Demographic	Growth on	Household's	Financial	Transactions
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Panel	А	:	Japan
	••	•	v ap an

	Currency	Stock	Bond	Insurance
60s_growth (-1)	6.3584**	3.9810***	-0.6234	-3.5312**
	(0.0357)	(0.0063)	(0.8700)	(0.0202)
70s_growth (-1)	-3.6105*	-1.4917	-2.4508	1.7436
	(0.084)	(0.1911)	(0.4058)	(0.1944)
80+_growth (-1)	-2.3250	-2.0335	3.0318	1.7620
	(0.4693)	(0.1493)	(0.5204)	(0.2691)
Panel B : Korea				
60s_growth (-1)	-6.2068	-2.9786	4.1622	4.9373
	(0.5684)	(0.6267)	(0.4782)	(0.5822)
70s_growth (-1)	-5.3827	2.7166	-0.4795	8.3581
	(0.1312)	(0.5933)	(0.9201)	(0.2546)
80+_growth (-1)	3.3693	6.9525*	-1.7973	-5.2133*
	(0.5790)	(0.0582)	(0.5782)	(0.0576)

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares Bond: Debt securities, Insurance: Insurance, pension, and standardized guarantees

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

p-statistics are reported in parenthesis.

Meanwhile, Panel B of Korea shows that the growth of 80+ has a significant effect on the household's financial transactions. It has a positive effect on currency and stock while a negative effect on insurance. The results might be related with the fact that the growth of 80+ was the highest among the elderly. The growth of 80+ is 0.0188 while the growth for those in their 60s and 70s is 0.0113, 0.0094, respectively (refer to Table 2).

In summary, we find that the growth of those in their 60s has a significant effect on household's financial transactions in Japan while those in their 80+ has a significant effect in Korea. It is assumed to be related with the high growth of that cohort in each country. Therefore, we interpret that the higher the growth of demography is, the more effect is significant. The estimation results represent that size as well as growth of the elderly demography have a significant effect on household of financial transactions.

#### V. Further Study

# A. Effect of the interaction between the elderly size and growth

Since the growth has an effect on the household's financial transactions, we employ the interaction between the elderly size and growth. It indicates the number of people who just joined the elderly (Kim et al, 2019).

Table 8 represents the estimation results. Panel A of Japan shows that the interaction of those in their 60s between size and growth has a significant effect on financial transactions. It has a positive effect on currency and stock while it has a negative effect on insurance. In addition, the interaction of those in their 70s and 80s+ has a significant effect on currency and stock, respectively. Meanwhile, Panel B of Korea shows that the interaction of those in their 80s+ has a significant effect on financial transaction. It has a positive effect on stock and a negative effect on insurance. It is interesting that the interaction of those in their 80s+ has a negative effect on the transaction of stock in Japan while it has a positive effect in Korea.

Then, how can we interpret this phenomenon that

**Table 8.** Effect of Interaction between Size and Growth on Household's Financial TransactionsPanel A : Japan

Tunor II Toupun				
	Currency	Stock	Bond	Insurance
60s_size* growth (-1)	4.9534**	2.0430***	-0.4754	-2.8365**
	(0.0212)	(0.0038)	(0.8010)	(0.0120)
70s size $*$ growth (-1)	-3.5237*	-1.4124	-2.5470	1.3183
	(0.0707)	(0.1354)	(0.3555)	(0.1438)
80+_size * growth (-1)	-4.8361	-3.6525*	0.49357	3.1516
	(0.3101)	(0.0966)	(0.4637)	(0.1883)
Panel B : Korea				
(0:*	-1.0814	-1.6534	3.7459	8.2789
60s_size* growth (-1)	(0.8926)	(0.7696)	(0.5197)	(0.9252)
70	-2.8339	5.1168	-2.6787	1.7820
/0s _size * growth (-1)	(0.1373)	(0.4821)	(0.7777)	(0.2761)
	1.2898	2.9694*	-1.0477	-3.3119*
$\delta 0+$ _size $\ast$ growth (-1)	(0.5043)	(0.0803)	(0.4087)	(0.0755)

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares Bond: Debt securities, Insurance; Insurance, pension, and standardized guarantees

Bond: Debt securities, insurance: insurance, pension, and standardized guarantees \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

p-statistics are reported in parenthesis.

the interaction of those in their 60s and 80s mostly has an effect on household's financial transactions in Japan and Korea, respectively? It might be explained by the fact that size effect of 60s+ is greater than the growth effect in Japan. In contrast, the growth effect is greater than the size effect in Korea. In fact, both the size and growth of 60s+ are the highest in Japan. The size of 80s+ is the lowest, but its growth is the highest in Korea.

In summary, we find that the interaction between the size and growth of 60s and 80s+ has the most significant effect in Japan and Korea, respectively. It might be related with the greater growth effect than the size effect.

# B. Effect of interaction between the elderly growth and life expectancy

The interaction between the elderly growth and life expectancy indicates that the total years of life was extended for each elderly group (Kim et al., 2019). Since the aging population is related with expanded life expectancy, the life expectancy might be another driving force in determining the financial transactions. Table 9 represents the effect of interaction between the growth of the elderly and life expectancy on the household's financial transactions. We find that the interaction does not have any effect on the elderly in Japan while it has a significant effect in Korea. How can this be explained? As shown in Table 10, the average life expectancy during the period is higher in Japan compared with Korea. However, its growth is higher in Korea than Japan.

In summary, the interaction between the growth of the elderly and life expectancy on the household's financial transaction is found only in Korea. It might be related with the fact that the growth of the elderly is higher in Korea than in Japan. Again, it provides that the growth of demography with life expectancy has a significant effect on household's financial behavior.

 Table 10.
 Life Expectancy between Japan and Korea for 2009~2019

	Japan	Korea
Average	83.6196	81.6455
Growth of the elderly	0.0017	0.0041
Source: OECD		

Table 9. Effect of Interaction between the Growth of the elderly and Life Expectancy

Panel	А	:	Japan
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	Currency	Stock	Bond	Insurance
60s_ growth*life	0.5146 (0.2309)	0.0560	0.0436	-0.1254
expectancy (-1)		(0.6678)	(0.4082)	(0.5488)
70s_ growth*life	-0.3500	-0.1050	-0.0023	0.2074
expectancy (-1)	(0.2492)	(0.2694)	(0.9521)	(0.1718)
80+_ growth*life	-0.1618	0.0455	-0.0390	-0.0821
expectancy (-1)	(0.7456)	(0.7696)	(0.5379)	(0.7401)
Panel B : Korea				
60s_ growth*life	0.2390*	0.0006	-0.1356***	-0.1055
expectancy (-1)	(0.0629)	(0.9941)	(0.0286)	(0.3611)
70s_ growth*life	0.1196	-0.0510	-0.0830***	0.0190
expectancy (-1)	(0.2639)	(0.4533)	(0.0992)	(0.8434)
80+_ growth*life	-0.0544	-0.0338	0.0452	0.0472
expectancy (-1)	(0.4820)	(0.5280)	(0.2297)	(0.5200)

Note: Currency: Currency and deposits, Stock: Equity and investment fund shares Bond: Debt securities, Insurance: Insurance, pension, and standardized guarantees

\*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

(p-statistics are reported in parenthesis)

### VI. Conclusions

#### A. Discussion

The aging population is an important topic since it is one of the major factors on the economy such as potential growth and domestic demand. At the same time, it is a global phenomenon. Most of the countries in the world are experiencing an increase in the elderly population. There are 703 million persons aged 65 years or over in the world in 2019. The number of older persons is projected to double to 1.5 billion in 2050. Globally, the share of the population aged 65 years or over increased from 6% in 1990 to 9% in 2019. That proportion is projected to rise further to 16 % by 2050, so that one in six people in the world will be aged 65 years or over (United Nations, 2019). With the elderly population increasing, it is necessary to better understand the financial transactions of the elderly since they need to manage money for the expenses such as for living and medical care.

Although Japan and Korea are both countries with aging populations, they are in different stages of their elderly population in terms of size and growth (speed). Therefore, we investigate the elderly demographic effect on the household's financial transactions. Our main findings are as follows. First, the size of those aged of over 80 and 70s has a relatively more significant effect on the household's financial transactions in Japan and Korea, respectively. It might be related with the fact that the income of the cohort is relatively higher than other elderly age groups. Second, the growth of those in their 60s has significant effects on the household's financial transactions in Japan while those 80+ has a significant effect in Korea. It is assumed to be related with the high growth of that cohort. Third, we find that the interaction between the size and growth of 60s and 80s+ mostly has an effect in Japan and Korea, respectively. It might be related with the greater growth effect than the size effect. Fourth, the interaction effect between the elderly growth and life expectancy on the household's financial transaction

is found only in Korea. It is assumed to be related with the fact that the growth of the elderly and life expectancy is higher in Korea than in Japan.

#### **B.** Implications

This study implies that that elderly demography structure such as size and growth both gives different effect on risky and non-risky financial transactions. It shows the importance of demography structure on household's financial behaviors.

In addition, we find that each old age cohort such as 60s, 70s, 80s has different effect on the transactions. Since life expectancy has expanded nowadays, it implies that more sophisticated analysis about the effect of each age cohort is required rather than clump together. From this perspective, financial products based on life cycle hypothesis might require more fine-tuned design since each old age cohort gives different and significant effect on financial transactions.

Meanwhile, this study calls for future research about what makes the elderly have financial behaviors. It could be related with cognitive ability and bequest motives (Horioka et al., 2018; Kim et al., 2012). For example, Kim et al. (2012) points out a bequest motive is positively related to a stock holding of older people. They suggest that financial transaction including investment with a bequest motive differ to a person whose financial needs are limited to lifetime consumption. Those with bequest motives may need to hold a greater portion of stocks to maintain wealth.

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