Risk-taking Attitude of Retired Seniors: Age versus Cohort Effects

Dong Beom Choi[(1)] and Hyun-Soo Choi

The rapid aging of Korean society poses a significant challenge, necessitating attention due to its potential economic repercussions. This paper investigates the interplay between age, cohort, and risk-taking attitudes, utilizing data from the Survey of Consumer Finance (SCF) issued by the Federal Reserve spanning the period from 1992 to 2019. Our analysis reveals a negative relationship between age and risk-taking tendencies, which aligns with the life-cycle hypothesis. As individuals age, their propensity for risk-taking diminishes. However, when examining cohort effects, we find a notable shift in the association between individual experiences and risk-taking behavior, particularly in light of the Global Financial Crisis. Before the crisis, individual experiences wielded a significant influence on risk-taking behavior, while this association significantly weakened in the aftermath of the crisis.

Keywords: risk preference, risk attitude, portfolio choice, age effect, cohort effect

1. Introduction

The rapid aging of Korean society is a pressing issue that demands attention. As per the latest data from Statistics Korea, the proportion of senior populations, defined as individuals aged 65 years or older, is projected to exceed 20% by the year 2025 and

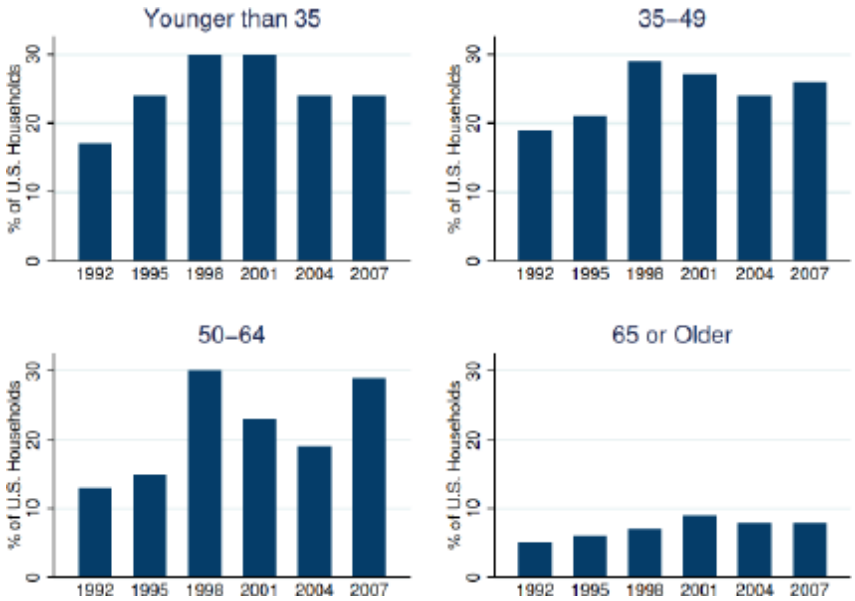
(1) Dong Beom Choi is at Seoul National University (email: dong.choi@snu.ac.kr). Hyun-Soo Choi is at KAIST (email: hschoi19@kaist.ac.kr). We thank two anonymous referees for their comments. Financial support from the Seoul National University Institute for Research in Finance and Economics(SIRFE) is gratefully acknowledged.

is anticipated to reach a staggering 40% by 2050.(2) This imminent demographic shift is poised to exert significant repercussions on the macroeconomy, primarily due to the diminished workforce available to sustain the needs of the growing number of retired seniors. Consequently, proactive measures must be taken to address the multifaceted challenges arising from this demographic transformation.

The demographic transition underway in Korea has implications not only for public finance and the macroeconomy but also for corporations' financing decisions. The life-cycle hypothesis posits that individuals plan their expenditure patterns over their lifetimes, considering their future income prospects (임소연 외 2022). Consequently, younger individuals typically possess a higher capacity to undertake investment risks, as they can rely on future income to recover from potential losses (Okun 1976). However, in an aging society, where a larger proportion of the population consists of older individuals, there is a general trend of increased risk aversion and a greater reliance on accumulated savings. This phenomenon can lead to a constrained aggregate risk capacity, potentially limiting the ability of firms to pursue investments with higher risk profiles.

However, the existence of an age-related effect on investors' risk-taking remains inconclusive. Previous studies initially predicted that the retirement of the baby-boomer generation in the United States would have significant implications for asset pricing. These predictions suggested that retirees would exhibit a preference for safer investment options such as bonds over riskier alternatives like stocks (see, e.g., Porterba 2001, Brook 2002, Abel 2003). However, when examining the actual data, it became apparent that the observed trends did not align with these predictions. Surprisingly, the U.S. stock market demonstrated consistent growth despite the retirement of the baby-boomers. Furthermore, the retired baby-boomers appeared to exhibit a higher tolerance for financial risk-taking, as indicated by the figures presented below. Figure 1, based on Choi and Choi (2020), illustrates that the baby-boomer generation born between 1946 and 1964 is more risk-tolerant compared

(2) See https://kostat.go.kr/board.es?mid=a10301010000&bid=10820&tag=&act=view&list_no=420896&ref_bid.

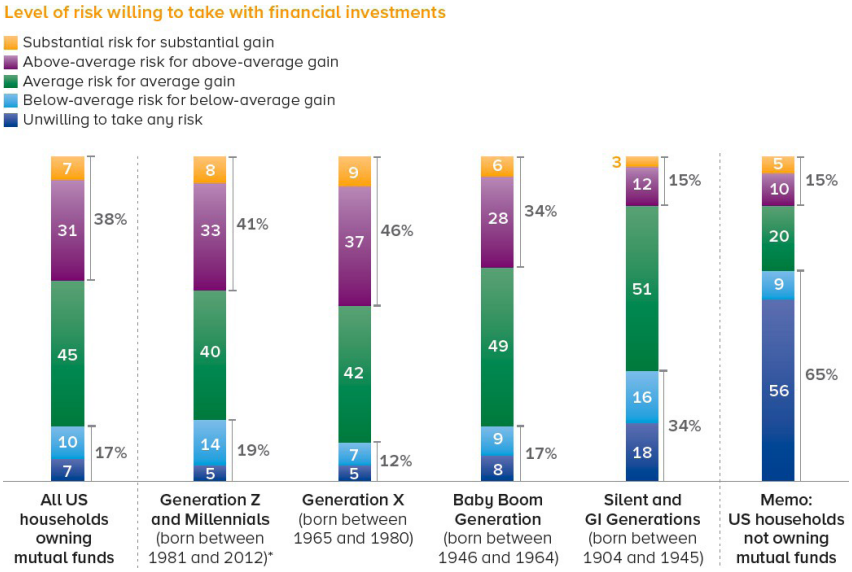


This figure reports the willingness to take above-average or substantial investment risk by age group. We plot the percentage of U.S. households by the age of the head of the household, sourced from the Investment Company Institute (2010). For each age group, we present the fractions for 1992, 1995, 1998, 2001, 2004, and 2007

〈Figure 1〉 Households' willingness to take investment risk.

to earlier generations. In addition, Figure 2, based on a survey taken in 2021, demonstrates that their risk-taking attitude does not differ significantly from that of younger generations even after retirement.

These findings challenge the initial assumptions regarding the relationship between age and risk-taking attitude, suggesting the presence of a possible cohort effect rather than a direct age effect. The figures presented above indicate that individuals born before and after World War II exhibit different attitudes towards risk-taking. It is worth noting that disentangling age, cohort, and time effects simultaneously from the available data is a complex task (Dohmen et al., 2017), as we elaborate below. Recent literature has highlighted the impact of prior experiences on individual risk preferences (Malmendier and Nagel, 2011) and inflation expectations (Malmendier and Nagel, 2016), further suggesting the influence of cohort-specific



This figure presents Households' willingness to take investment risk by generation. Source: Investment Company Institute 2022

〈Figure 2〉 Households' willingness to take investment risk by generation

factors. Consequently, it is plausible that the age effect observed decades ago was, in fact, reflecting a cohort effect driven by specific historical events and circumstances.

When examining risk attitudes across different age groups, it is crucial to acknowledge that observed patterns are influenced by both macroeconomic and financial environments, implying the presence of a time effect. If the life-cycle hypothesis holds true, an age effect would additionally shape the observed risk attitude patterns. Moreover, a cohort effect may emerge, reflecting shared experiences during specific stages of life. However, isolating and studying these effects simultaneously presents an empirical challenge. This challenge arises from the fact that it is not possible to control for age, birth year, and the period of observation simultaneously, as age can be expressed as a perfect linear combination of birth year and survey period (Dohmen et al., 2017).

To investigate the presence of age and cohort effects on risk attitudes, we analyze data from the Survey of Consumer Finance (SCF) issued by the Federal

Reserve spanning the periods from 1992 to 2019. We first focus on assessing the age effect following the approach outlined by Dohmen et al. (2017). In doing so, we substitute determinants of risk attitudes that are contingent on calendar time with a macroeconomic variable, specifically unemployment rates. This substitution is based on the assumption that risk attitudes are related to calendar time due to the influence of the business cycle. Additionally, we incorporate personal income and wealth variables to more comprehensively account for the temporal effects associated with the business cycle. Furthermore, in order to account for the cohort effect, we include generation dummies in our analysis.

By incorporating these variables, we are able to examine the influence of age on risk attitudes while simultaneously considering generational experiences. This approach allows us to disentangle the effects of age on risk-taking tendencies. The estimation results of our analysis align with the life-cycle hypothesis, suggesting that risk-taking tendencies decrease with advancing age. This finding is in line with the notion that individuals generally become more risk-averse as they progress through different stages of the life cycle.

We next assess the effect of cohort-specific factors following Malmendier and Nagel (2011). Specifically, we examine whether individual experiences of stock market booms affect their attitudes towards risk-taking, or stock holdings.

2. Data

To assess the risk-taking behavior of households, we utilize data from the Survey of Consumer Finance (SCF) provided by the U.S. Federal Reserve System as our primary dataset. Table 1 presents the summary statistics of the SCF for the following waves: 1992, 1995, 1998, 2001, 2004, 2007, 2010, 2013, 2016, and 2019. Our sample consists of 245,460 households. We present the summary statistics in Table 1.

〈Table 1〉 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Risk-Taking Tendency	245,460	0.25	0.43	0.00	1.00
Have Stocks	245,460	0.34	0.48	0.00	1.00
log $ Stocks	245,460	4.14	5.96	0.00	20.73
Have Bonds	245,460	0.14	0.35	0.00	1.00
log $ Bonds	245,460	1.82	4.59	0.00	20.29
Exp: Stock Market	245,460	0.05	0.02	-0.03	0.14
Exp: Bond (1 year)	245,460	0.03	0.00	0.01	0.05
Age	245,460	51.37	16.21	17.00	95.00
log Income	245,460	11.49	1.62	0.54	20.37
log Asset	245,460	12.68	2.87	0.00	21.80
Have Kids	245,460	0.43	0.49	0.00	1.00
Unemployment Rate (3 years average)	245,460	5.89	1.83	3.68	9.61
Gen1: Lost Generation (1883-1900)	245,460	0.00	0.02	0.00	1.00
Gen2: Greatest Generation (1901-1927)	245,460	0.07	0.26	0.00	1.00
Gen3: Silent Generation (1928-1945)	245,460	0.20	0.40	0.00	1.00
Gen4: Baby Boomers (1946-1964)	245,460	0.41	0.49	0.00	1.00
Gen5: Generation X (1965-1980)	245,460	0.23	0.42	0.00	1.00
Gen6: Millenials (1981-1996)	245,460	0.08	0.27	0.00	1.00
Gen7: Generation Z (1997-2012)	245,460	0.00	0.05	0.00	1.00
Male	245,460	0.78	0.41	0.00	1.00
Female	245,460	0.22	0.41	0.00	1.00
Edu1_less Highschool	245,460	0.10	0.30	0.00	1.00
Edu2_Highschool	245,460	0.25	0.43	0.00	1.00
Edu3_College	245,460	0.23	0.42	0.00	1.00
Edu4_PostCollege	245,460	0.42	0.49	0.00	1.00
Race1_White	245,460	0.76	0.43	0.00	1.00
Race2_Black	245,460	0.10	0.30	0.00	1.00
Race3_Hispanic	245,460	0.07	0.25	0.00	1.00
Race4_Others	245,460	0.07	0.26	0.00	1.00
Notmarried	245,460	0.35	0.48	0.00	1.00

The table reports the summary statistics of variables in our analysis. Risk-Taking Tendency is a dummy variable that equals 1 if the household is willing to take significant investment risk and 0 otherwise. Have Stocks is a dummy variable that equals 1 if the household owns any stock and 0 otherwise. Log $ Stocks is the logged dollar amounts of stock ownership. Have Bonds is a dummy variable that equals 1 if the household owns any bond and 0 otherwise. Log
$ Bonds is the logged dollar amounts of bond ownership. Log $ Bonds is the logged dollar amounts of bond holdings. Exp: Stock Market is the experienced real stock market return for each household, and Exp: Bond (1 year) is the experienced real bond return for each household. Age is the age of the household head, log Income is the logged amount of income, and log Asset is the logged amount of wealth. Have Kids is a dummy variable that equals 1 if the household has any kids and 0 otherwise. Unemployment rate is the unemployment rate averaged for the past 3 years of each survey.

To measure respondents' risk-taking tendency, we utilize item X3014 from the SCF. This item captures whether respondents "take substantial financial risks expecting to earn substantial returns" or "take above-average financial risks expecting to earn above-average returns." We find that 25% of the sampled households exhibit a significant risk appetite for higher returns.

The variable "Have Stocks" is a binary indicator that equals 1 if households have directly- held stocks or stock mutual funds, and 0 otherwise. Our analysis reveals that 34% of households hold positive quantities of stocks. We also calculate the logarithm of the dollar amount of stock holdings, denoted as "Log $ Stocks," by aggregating the value of directly-held stocks and stock mutual funds.

Similarly, "Have Bonds" is a binary variable that equals 1 if households possess directly- held bonds or bond mutual funds. Approximately 14% of households have positive bond holdings. The logarithm of the dollar amount of bond holdings is represented by "Log $ Bonds."

We construct the variable "Exp: Stock Market" following the methodology of Malmendier and Nagel (2011). Real annual returns of the S&P 500 index and real bond returns from Shiller (2005) are utilized for this purpose. We adopt the discount factor "lambda" of 1.5, consistent with Malmendier and Nagel (2001). "Exp: Stock Market" exhibits an average of 0.05, indicating that households, on average, experienced a real stock market return of 5% per year. Additionally, "Exp: Bond (1 year)" has an average of 0.03, signifying that households experienced an average real bond return of 3% per year.

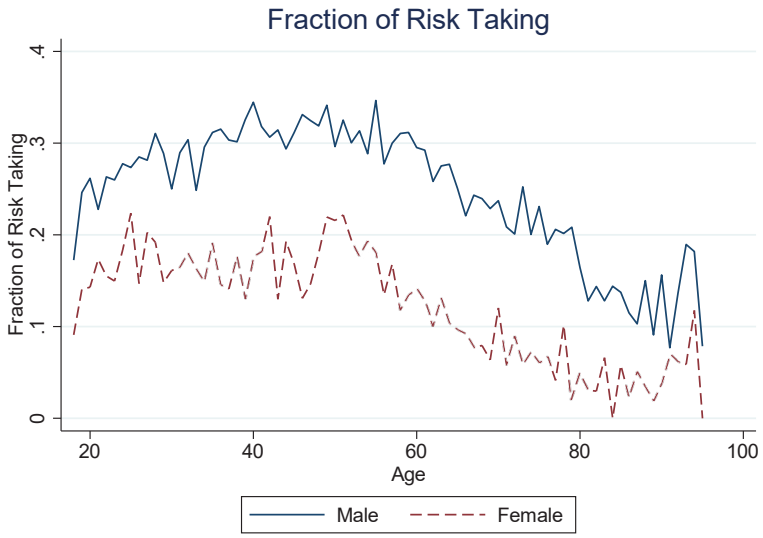
On average, households in our sample display an income of $97,734 and a net wealth of $321,258. The average age of the household heads is 51.37. We categorize the generations of household heads based on the Pew Research Center's definitions: 7% fall into the Greatest Generation (born from 1901 to 1927), 20% belong to the Silent Generation (born from 1928 to 1945), 41% are categorized as Baby Boomers (born from 1946 to 1964), 23% are part of Generation X (born from 1965 to 1980), and 8% are identified as Millennials (born from 1981 to 1996). Among the household heads, 78% are male, 65% are married, and 43% have children. Regarding educational

attainment, 25% have a high school degree, 23% hold a college degree, and 42% possess a post-graduate degree. The sample is comprised of 72% white individuals, 10% black individuals, and 7% Hispanic individuals.

3. Empirical Results

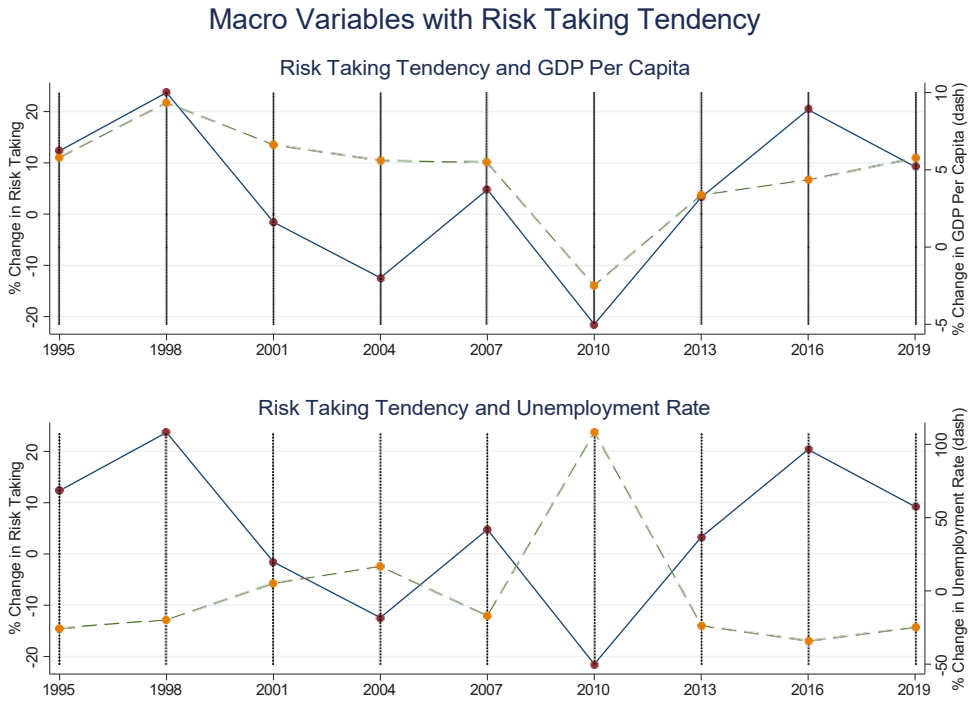
We proceed to examine how the risk-taking tendency of households varies with age. Figure 3 demonstrates a clear pattern of decreasing risk-taking tendency with age. By averaging the risk- taking tendency of all households according to their age at the time of the survey, we observe a consistent downward trend. Approximately 30% of households exhibit a propensity for investment risks during their 40s and 50s, but this fraction gradually diminishes over time. We also find that females, across all age groups, engage in risk-taking behavior significantly less than their male counterparts.

However, it is crucial to acknowledge that risk-taking behavior can be influenced



The figure presents households' willingness to take investment risk by age and gender, using the Survey of Consumer Finance.

〈Figure 3〉 Fraction of Households with Risk-Taking by Age



The figure presents households' willingness to take investment risk and the variables on the macroeconomic condition by survey year. The top panel uses the GDP per capita, and the bottom panel uses the unemployment rate for the macro variable.

〈Figure 4〉 Approximating Contemporaneous Risk Behavior with Macro Variables

by cohort and time effects, which are inherently intertwined with respondents' age. Consequently, disentangling the pure age effect from these factors becomes challenging. To address this, we adopt the approach employed by Dohmen et al. (2017). Instead of attempting to simultaneously account for age, cohort, and time effects, we substitute the time effect with a macroeconomic variable—in our case, the unemployment rate.

While Dohmen et al. (2017) utilized GDP per capita as a macro variable to capture time effects, we find that the unemployment rate serves as a more appropriate predictor for risk-taking behavior in the SCF surveys. This discrepancy can be attributed to the differing labor market dynamics between the Netherlands

and Germany (examined by Dohmen et al., 2017) and the United States (our focus of study). Given the relatively greater labor market flexibility in the U.S., risks associated with employment are likely to have a more direct impact on households' risk appetites compared to broader economic growth.

Figure 4 provides additional evidence supporting our choice of using the unemployment rate as a replacement for time effects. The top figure compares risk-taking behavior with GDP per capita, while the bottom figure compares risk-taking behavior with the unemployment rate. Both measures exhibit a correlation with the average risk-taking tendency: GDP per capita shows a positive association with risk-taking tendency, while the unemployment rate demonstrates a negative association. However, our unreported regression analysis confirms that the unemployment rate serves as a statistically stronger determinant for capturing time effects, leading us to adopt it as our primary measure for replacing time effects in subsequent analyses.

3.1. Assessing Age Effects

We now proceed to analyze the exclusive effect of age on risk-taking attitudes. Our main estimation regresses *Risk Taking Tendency*, a dummy variable that equals 1 if the household is willing to take significant investment risk and 0 otherwise, on *Age*, cohort dummies, and other relevant controls. All standard errors are clustered at the year level.

Table 2 presents our findings, examining the impact of age on risk-taking tendencies while controlling for cohort and the unemployment rate. In Column (1), we observe a significant decrease in risk-taking tendency with age. Specifically, as individuals age by 10 years, their risk-taking tendency decreases by approximately 10% of one standard deviation. Our model includes various controls that are potentially determinants of risk-taking tendency, and their signs align with expectations. Notably, the unemployment rate exhibits a negative and significant effect on risk- taking behavior, indicating that respondents are less inclined to take risks during periods of macroeconomic weakness, thus highlighting the role of the

〈Table 2〉 Age Effect on Risk-Taking after Controlling Unemployment Rate

	(1)	(2)	(3)
Variables	Risk Taking Tendency		
Age	-0.004***	-0.004***	-0.004***
	(-6.92)	(-6.62)	(-6.66)
Gen2: Greatest Generation (1901-1927)	-0.040**	-0.041*	-0.044*
	(-2.44)	(-2.25)	(-2.16)
Gen3: Silent Generation (1928-1945)	-0.054**	-0.055**	-0.064**
	(-2.57)	(-2.49)	(-2.54)
Gen4: Baby Boomers (1946-1964)	-0.027	-0.027	-0.043
	(-1.10)	(-1.08)	(-1.57)
Gen5: Generation X (1965-1980)	-0.009	-0.009	-0.029
	(-0.29)	(-0.29)	(-0.84)
Gen6: Millenials (1981-1996)	-0.016	-0.016	-0.052
	(-0.42)	(-0.41)	(-1.28)
Gen7: Generation Z (1997-2012)	0.092**	0.092*	0.040
	(2.27)	(2.23)	(0.91)
Unemployment Rate (3 years average)	-0.011***	-0.011***	-0.011***
	(-4.32)	(-4.33)	(-4.06)
log Asset	0.020***	0.020***	0.020***
	(13.66)	(12.92)	(10.38)
log Income	0.050***	0.050***	0.043***
	(10.78)	(9.73)	(10.15)
Male		0.012*	0.076***
		(1.86)	(11.52)
Edu_2_Highschool			0.001
			(0.26)
Edu3_College			0.046***
			(15.57)
Edu4_PostCollege			0.107***
			(14.74)
Race2_Black			0.002
			(0.34)
Race3_Hispanic			-0.014*
			(-2.04)
Race4_Others			0.007
			(1.70)
Not Married			0.075***
			(17.19)
Have Kids			-0.016***
			(-3.28)
Constant	-0.317***	-0.308***	-0.286***
	(-6.34)	(-5.99)	(-6.25)
Observations	245,460	245,460	245,460
R-squared	0.074	0.074	0.092

The table reports the regression results of the effect of age on risk-taking tendency. Dependent variable is Risk Taking Tendency, which is a dummy variable that equals 1 if the household is willing to take significant investment risk and 0 otherwise. Main independent variable is Age. Column (1) includes Generation dummies, Unemployment Rate, log Asset, and log Income. Column (2) additionally include Male. Column (3) adds education dummies, race dummies, marital status, and kids dummy. Reported coefficient estimates have t-statistics in parentheses based on standard errors clustered by year, with ***, **, and * respectively denoting statistical significance at the 1%, 5%, and 10% levels.

time effect. Moreover, we find a positive and significant effect of log Asset and log Income, indicating that wealthier households exhibit a higher propensity for risk-taking.

It is important to highlight that we control for cohort effects using various generation dummies based on the definitions provided by the Pew Research Center. We observe that older generations, such as the Greatest Generation (1901-1927) and the Silent Generation (1928-1945), tend to have lower risk-taking tendencies even after accounting for their age. However, we find that Generation Z tends to display a higher risk-taking tendency.

In Column (2) of Table 2, we introduce an additional control for gender and find that males exhibit a higher inclination for risk-taking compared to females. However, our main results remain unchanged. Column (3) includes controls for education, race, marital status, and whether respondents have children. We find that married respondents with children tend to have a lower risk-taking tendency compared to others. The risk-taking tendency appears to increase with higher levels of education, but including these controls does not alter our main results.

3.2. Assessing Cohort Effects

In an alternative approach, we adopt the methodology introduced by Malmendier and Nagel (2011) to examine the cohort effect while accounting for age and time effects. To capture the impact of different life-long experiences, we employ a similar approach as Malmendier and Nagel (2011) by using individual experience in capital

markets as a proxy for the cohort effect. Instead of relying on predefined generational cohorts, we consider respondents' past experience in the stock and bond market as a determinant of their risk-taking tendencies.(3) This approach allows us to capture the influence of individual experiences within the context of capital market participation, providing insights into the cohort effect on risk-taking behaviors. Specifically, rather than defining a generation cohort, we use respondents' past experience in the stock and bond market as a determinant of their risk-taking tendencies.

Columns (1) and (2) of Table 3 present the regression results with year-fixed effects. In Column (1), we find that positive past experience in the stock market increases households' risk- taking tendencies regarding financial investment. To illustrate the economic significance, a one standard deviation increase in past experience leads to a 3% increase in risk-taking tendency, measured in terms of one standard deviation. Assessing the age effect, we reaffirm the finding that risk-taking behavior decreases with age, with magnitudes similar to those in Table 2. The signs of coefficients for other control variables remain consistent with Table 2. By extending the sample period up to 2019, including four additional survey waves compared to Malmendier and Nagel (2011), we obtain similar results. In Column (2), we use individual experience in the one-year bond market as a measure, but we do not find a significant effect from this experience measure. It is worth noting that our extended sample period includes times with ultra-low interest rates after the Great Recession, which might explain this difference from Malmendier and Nagel (2011).

Columns (3) and (4) examine the influence of stock market experience and age on households' stock market participation. Our findings significantly differ from those of Malmendier and Nagel (2011). Column (3) employs a dummy variable indicating whether the household holds any stocks through direct holdings or mutual funds as

(3) Malmendier and Nagel (2011) construct a past asset return experienced by each household by calculating $A_{it}(\lambda) = \sum_{k=1}^{age_{it}-1} \omega_{it}(k,\lambda) R_{t-k}$ where $\omega_{it}(k,\lambda) = (age_{it} - k)^{\lambda} / \sum_{k=1}^{age_{it}-1} (age_{it} - k)^{\lambda}$ and R_{t-k} is the return in year t-k.
Malmendier and Nagel (2011) suggests the lambda as 1.5, which is in the ballpark of the estimates.

〈Table 3〉 Past Experience on Risk-Taking Behavior and Asset Holdings (Full Sample)

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Risk-Taking Tendency		Stocks		Bonds	
			Have	log $	Have	log $
Exp: Stock Market	0.738***		-0.392	-6.388		
	(4.07)		(-0.61)	(-0.94)		
Exp: Bond (1 year)		1.054			-4.562***	-51.34***
		(1.02)			(-10.79)	(-9.02)
Age	-0.004***	-0.004***	0.0004*	0.012***	0.001***	0.010***
	(-23.23)	(-20.85)	(2.23)	(7.25)	(12.14)	(14.49)
log Income	0.042***	0.042***	0.073***	0.949***	0.037***	0.466***
	(9.55)	(10.04)	(43.69)	(25.60)	(19.57)	(20.81)
log Asset	0.016***	0.016***	0.041***	0.461***	0.012***	0.138***
	(10.56)	(10.59)	(11.14)	(11.21)	(6.64)	(7.00)
Female	-0.077***	-0.076***	-0.017**	-0.129*	0.010**	0.103***
	(-11.51)	(-11.22)	(-2.42)	(-2.04)	(3.18)	(3.67)
Edu2_Highschool	-0.0002	-0.001	0.009	-0.011	0.001	-0.031
	(-0.03)	(-0.12)	(1.09)	(-0.13)	(0.21)	(-0.59)
Edu3_College	0.046***	0.045***	0.053***	0.372**	0.013	0.080
	(14.61)	(14.34)	(4.99)	(2.95)	(1.65)	(0.95)
Edu4_PostCollege	0.106***	0.105***	0.160***	1.618***	0.050***	0.483***
	(14.22)	(14.51)	(14.69)	(12.45)	(4.80)	(4.45)
Race2_Black	0.002	0.002	-0.059***	-0.551***	-0.011***	-0.100***
	(0.28)	(0.28)	(-9.12)	(-8.41)	(-4.68)	(-4.24)
Race3_Hispanic	-0.014*	-0.014*	-0.069***	-0.577***	0.002	0.039
	(-2.01)	(-1.98)	(-12.78)	(-11.14)	(1.00)	(1.74)
Race4_Others	0.008*	0.008*	-0.013	-0.130*	-0.012**	-0.130**
	(1.88)	(1.89)	(-1.76)	(-1.89)	(-2.86)	(-3.07)
Not Married	0.077***	0.076***	0.029***	0.405***	0.014***	0.198***
	(16.25)	(16.06)	(4.39)	(6.24)	(7.53)	(9.70)
Have Kids	-0.014**	-0.014**	-0.036***	-0.425***	-0.015***	-0.179***
	(-2.76)	(-2.89)	(-8.24)	(-9.49)	(-5.41)	(-6.57)
Observations	245,460	245,460	245,460	245,460	245,460	245,460
R-squared	0.093	0.093	0.214	0.255	0.104	0.115
Fixed Effects	Year	Year	Year	Year	Year	Year

The table reports the panel regression results of the effect of age and past experience on risk-taking tendency. The sample period is from 1992 to 2019. Dependent variables are Risk-Taking Tendency in Columns (1)-(3), Have Stocks in Column (3), log $ Stocks in Column (4), Have Bonds in Column (5), and log $ Bonds in Column (6). Main independent variable is Exp: Stock Market, Exp: Bond (1 year), and Age. All columns include log Income, log Asset, Female, Education dummies, Race dummies, Marital status, have kids, and year fixed effects as control variables. Reported coefficient estimates have t-statistics in parentheses based on standard errors clustered by year, with ***, **, and * respectively denoting statistical significance at the 1%, 5%, and 10% levels.

the dependent variable. Surprisingly, we do not find a significant effect of past stock market experience on stock market participation, in contrast to Malmendier and Nagel (2011). However, the age effect remains significant and positive on stock holdings, even after controlling for past experience, year effects, and other control variables. Column (4) employs the logarithm of stock holdings as the dependent variable and yields similar results.

In Columns (5) and (6), we investigate households' participation in the bond market. Column (5) uses a dummy variable indicating whether the household holds any bonds, while Column (6) uses the logarithm of bond holdings as the dependent variable. Once again, we do not find a positive effect of past experience on bond holdings, contrary to Malmendier and Nagel (2011). If anything, we find a negative association.

To explain the divergence between our results including post-crisis survey responses and those of Malmendier and Nagel (2011), which are based on data up to 2007, we re-estimate Table 3 using the sample periods employed by Malmendier and Nagel (2011), namely up to 2007. The results reported in Table 4 using this restricted sample are similar to what Malmendier and Nagel (2011) found. Specifically, past experience with stock returns is significantly and positively associated with stock market participation. We do not find a statistically significant association between past experience with bond returns and bond market participation, and we no longer observe the counter-intuitive negative association.

The comparison of Tables 3 and 4 suggests a substantial weakening of cohort effects following the Global Financial Crisis (GFC). We propose two factors that may have contributed to this shift. First, the profound impact of the GFC and subsequent central bank interventions, such as quantitative easing (QE), has been instrumental in overshadowing cohort effects. These interventions have had a significant influence on market dynamics, leading to greater homogeneity in portfolio choices among

〈Table 4〉 Past Experience on Risk-Taking Behavior and Asset Holdings (up to 2007)

	(1)	(2)	(3)	(4)	(5)	(6)
	Risk-Taking		Stocks		Bonds	
Variables	Tendency		Have	log $	Have	log $
Exp: Stock Market	1.313***		1.147*	11.55*		
	(5.94)		(2.38)	(2.23)		
Exp: Bond (1 year)		2.572			-3.817	-41.62
		(1.39)			(-1.90)	(-1.68)
Age	-0.004***	-0.004***	0.001*	0.017***	0.001	0.010
	(-14.63)	(-13.68)	(2.28)	(4.58)	(1.97)	(1.95)
log Income	0.043***	0.042***	0.073***	0.915***	0.037***	0.455***
	(6.25)	(6.12)	(55.30)	(28.52)	(11.96)	(12.91)
log Asset	0.019***	0.019***	0.050***	0.560***	0.016***	0.182***
	(9.19)	(9.10)	(10.77)	(10.10)	(6.20)	(6.30)
Female	-0.072***	-0.071***	-0.005	-0.027	0.016**	0.159***
	(-7.94)	(-7.83)	(-0.49)	(-0.28)	(3.68)	(4.08)
Edu2_Highschool	-0.009	-0.010	0.021**	0.140	0.01	0.033
	(-1.57)	(-1.75)	(2.72)	(1.97)	(1.27)	(0.64)
Edu3_College	0.044***	0.043***	0.074***	0.642***	0.025**	0.211**
	(14.55)	(14.16)	(21.05)	(13.43)	(3.59)	(2.68)
Edu4_PostCollege	0.112***	0.110***	0.178***	1.842***	0.070***	0.690***
	(9.70)	(9.52)	(17.63)	(16.82)	(7.74)	(7.39)
Race2_Black	-0.007	-0.007	-0.056***	-0.508**	-0.014***	-0.121***
	(-0.76)	(-0.81)	(-4.35)	(-4.00)	(-4.56)	(-4.10)
Race3_Hispanic	-0.008	-0.008	-0.074***	-0.596***	0.004	0.068**
	(-0.70)	(-0.71)	(-9.73)	(-7.77)	(1.52)	(2.92)
Race4_Others	0.004	0.004	-0.025	-0.268	-0.016*	-0.186*
	(0.63)	(0.63)	(-1.57)	(-2.01)	(-2.05)	(-2.27)
Not Married	0.082***	0.081***	0.018	0.295**	0.012**	0.180***
	(20.29)	(19.03)	(1.99)	(3.53)	(3.90)	(4.99)
Have Kids	-0.011	-0.014	-0.036***	-0.421***	-0.016**	-0.198**
Observations	125,549	125,549	125,549	125,549	125,549	125,549
R-squared	0.103	0.102	0.219	0.261	0.109	0.121
Fixed Effects	Year	Year	Year	Year	Year	Year

The table reports the panel regression results of the effect of age and past experience on the risk-taking tendency. The sample period is from 1992 to 2007. Dependent variables are Risk-Taking Tendency in Columns (1)-(3), Have Stocks in Column (3), log $ Stocks in Column (4), Have Bonds in Column (5), and log $ Bonds in Column (6). The main independent variable is Exp: Stock Market, Exp: Bond (1 year), and Age. All columns include log Income, log Asset, Female, Education dummies, Race dummies, Marital status, have kids, and year-fixed effects as control variables. Reported coefficient estimates have t-statistics in parentheses based on standard errors clustered by year, with ***, **, and * respectively denoting statistical significance at the 1%, 5%, and 10% levels.

investors. The extraordinary measures taken by central banks to stabilize financial markets and stimulate economic growth have created an environment where investors' decisions are more aligned, reducing the influence of cohort-specific factors. Second, the rise of passive investments, including exchange-traded funds (ETFs), has played a role in reducing the entry barriers for investors. The accessibility and simplicity of passive investment vehicles have attracted a broader range of participants, resulting in more uniform behaviors across different cohorts. The availability of low-cost, diversified investment options has made it easier for investors to adopt similar investment strategies, further contributing to the attenuation of cohort effects. In summary, the combined effects of the GFC and central bank interventions, along with the increased popularity of passive investments, have likely diminished the influence of cohort effects reflecting differential life-long experiences and fostered greater convergence in investor behaviors across different generations. Age had a similar effect as in Table 3.

4. Conclusion

This study examined the role of age and cohort-specific factors in investors' risk-taking decisions. While we focus on the U.S. case, the implications of these findings for Korea are significant, given the rapid aging of its society. The observed cohort effects underscore the importance of considering historical experiences and events when studying risk preferences among older individuals. Therefore, policymakers and financial institutions in Korea should carefully consider these cohort-specific factors when designing retirement and investment strategies tailored to the needs and preferences of retired seniors as well as tax policies.

Furthermore, these findings also bear implications for corporations' financing decisions in an aging society. As risk aversion increases among retired seniors, the aggregate risk capacity of the population may become constrained, potentially limiting

firms' ability to pursue investments with higher risk profiles. Therefore, it becomes crucial for businesses to understand the dynamics of risk preferences among retired seniors, including the interplay between age and cohort effects. This understanding can guide companies in adapting their strategies to effectively cater to this demographic segment.

최동범
서울대학교 경영대학 부교수
08826 서울 관악구 관악로 1
전화: (02) 880-6955
E-mail: dong.choi@snu.ac.kr

최현수
KAIST 경영대학 부교수
02455 서울 동대문구 회기로 85
전화: (02) 958-3592
E-mail: hschoi19@kaist.ac.kr

References

임소연, 김세완, Yanxin Lu, 김영민 (2022): "인구구조와 직ㆍ간접 주식투자 간 관계 분석: 노년세대를 중심으로", 『금융연구』, **36, 1**, 1-24.

Abel, Andrew B (2003): "The effects of a baby boom on stock prices and capital accumulation in the presence of social security", *Econometrica,* **71, 2**, 551-578.

Brooks, Robin (2006): "Demographic change and asset prices", In G20 Workshop on Demography and Financial Markets, Sydney.

Choi, Dong Beom, and Hyun-Soo Choi (2021): "The effect of monetary policy on bank wholesale funding", *Management Science*, **67, 1**, 388-416.

Dohmen, Thomas, Armin Falk, Bart HH Golsteyn, David Huffman, and Uwe Sunde (2017): "Risk attitudes across the life course", *The Economic Journal*, **127**, F95-F116.

Investment Company Institute (2010): *Investment Company Fact Book,* https://www.ici.org/system/files/attachments/2010_factbook.pdf.

Investment Company Institute (2022): *Investment Company Fact Book,* https://www.ici.org/system/files/2022-05/2022_factbook.pdf.

Malmendier, Ulrike, and Stefan Nagel (2011): "Depression babies: Do macroeconomic experiences affect risk Taking?", *The Quarterly Journal of Economics*, **126, 1**, 373-416.

Malmendier, Ulrike, and Stefan Nagel (2016): "Learning from inflation experiences", *The Quarterly Journal of Economics,* **131, 1**, 53-87.

Okun, Morris A (1976): "Adult age and cautiousness in decision", *Human Development*, **19, 4**, 220-233.

Poterba, James M (2001): "Demographic structure and asset returns", *Review of Economics and Statistics*, **83, 4**, 565-584.

Shiller, Robert J (2005): *Irrational Exuberance*, 2nd ed., Princeton University Press