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## Wealth Composition and Drawdown Patterns of Retirees a Comparative Study

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### ABSTRACT

This study aims to pursue a two-fold research objective: first, to examine the wealth composition and its drawdown patterns of the retirement-age households in Korea and, second, to assess policy options to safely monetize real estate assets held by them, the reverse annuity mortgage (RAM) in particular. In so doing, we compare our findings to those from the U.S. as reported by Poterba, Venti, and Weiss (2011). The results indicate that, between the U.S. and Korea, the wealth compositions of the retirees are vastly different in several respects: first, the average share of real estate in Korea is far greater than that in the U.S., over 80 percent vs. 24.7; second, the share of the annuitized public and private pensions is far higher in the U.S. compared to Korea, 44.9 percent vs. 7.7 percent in Korea; third, the share of financial assets is roughly similar, that is, 12.6% in the U.S. and 10.3% in Korea; last but not least, the share of non-residence real estate rapidly rose rapidly between 2006 and 2012 in Korea, quite dramatically for certain consumer cohorts. Hence, the Korea case represents an extreme of 'real estate-rich-cash-poor' retirees, making it a fertile ground for trading the monetizing instruments such as RAM. Nonetheless, the market penetration by the product is still minimal, the subscription rate of 0.81 percent among all the eligible households as of 2015. To investigate empirically the reasons behind such low subscription rate, we perform a regression analysis on determinants of the propensity for entering the RAM contract; The results show that the bequest motive does reduce the propensity to subscribe the product, and that the two indicators of the consumer knowledge on the product do yield positive and statically significant results. Based on the findings, we stress the need for a heightened level of consumer education on the viewpoint of the protection financial consumers, for which the government, the lending and guaranteeing institutions, as well as academia should put a concerted effort so as to help elderly make rational decisions.

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*Keywords: Household wealth composition, reverse annuity mortgage, bequest motive, and protection of financial consumer*

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## I. Introduction

Population aging has been, and will continue to be, a global phenomenon. To illustrate, those people who are 65 years or older are projected to almost double in the next twenty years, from about 600 million in 2015

to over 1.1 billion in 2035, rising to 13 percent of the total world population by then.<sup>1</sup> Facing this demographic shift, it is fair to predict that how retirees (in a given country) can finance post-retirement consumption and how a society can ensure them a financially sound living will increasingly become an imperative public policy issue in many countries. As a relevant empirical evidence to this vein, Poterba, Venti and Weiss (2011) examined

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<sup>1</sup> The figures are based on the UN Population Statistics, the 12th revised version published in 2013.

wealth compositions of those households in the U.S. who are at the starting points of retirement, and tracked their wealth drawdown patterns as the aging progresses by using a household panel data set. Among others, they report that, while those retirement-age households (i.e., those households being headed by 65~69 years old persons) tend to have a fairly significant portion of their wealth in the form of home equity, they tend NOT to monetize that in the early stage but rather to use that as a hedge against the longevity risk and a shock in medical expense in later stage of retirement.

This study replicates and extends Poterba et al. based on a similar household panel data set from Korea, first, by documenting the wealth composition and its drawdown patterns of the retirement-age households in Korea and, second, by examining policy options to safely monetize housing and other real estate assets held by them. One key attribute of the analyses done by Poterba et al. is to annuitize the pensions, both public and private: that is, they compute the expected present values of remaining pension payments for each household and include them as parts of household wealth. We follow the same practice by computing the discounted present values of the pensions by using the Korean Longitudinal Study of Aging (KLoSA) data covering from 2006 to 2012, and treat them as a wealth component along with several others (e.g., primary residence, non-residence real estate, financial asset, among others). In the Korean case, the retirement-age households are defined as those whose heads are in the 60~64 year old and 65~69 year old age cohorts; household types are categorized into several different groups - single-person households, married couples (two-person), and others; and, the wealth compositions in the beginning year as well as the transitions over the sample period (2006 to 2012) are examined. In addition, we assess the role of reverse annuity mortgage (RAM) as a welfare-enhancing monetizing mechanism for home equity; And, in so doing, we examine how effective the product has been in serving the retirement-age households and what consumer protection issues have emerged out of the Korean experience.

Our results indicate that, between the U.S. and Korea, the wealth compositions of the retirees are vastly different in several respects. First and foremost, the share of real estate in Korea is far greater than that in the U.S.: while housing and other real estate take 25.9 percent on the average in the U.S., as reported by Poterba et al., in Korea primary residence alone amounts to 45.5 percent

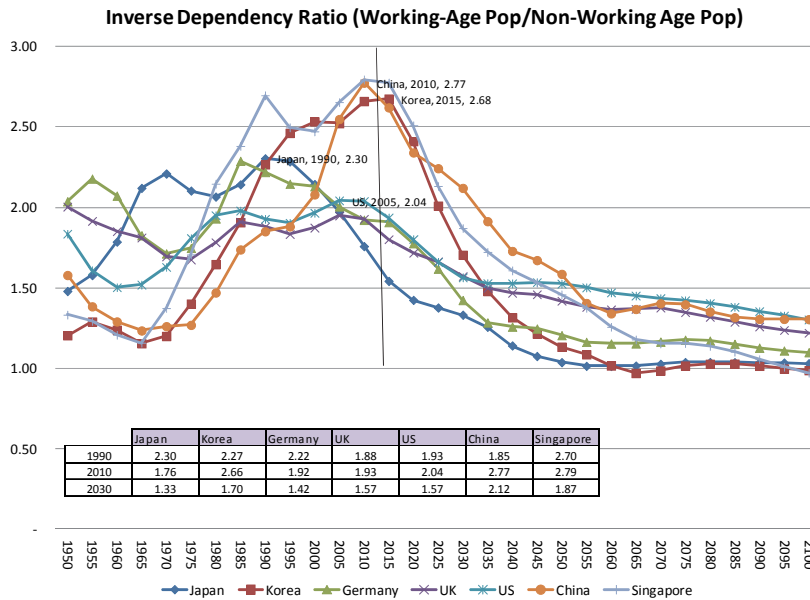
and non-residence real estate gets another 35.2 percent, making the average share of total real estate over 80 percent. This real estate centric wealth portfolio in Korea is not limited to specific asset strata but fairly uniform across all asset deciles examined. Second, the share of the annuitized public and private pensions is far higher in the U.S. compared to Korea: the total share of public and private pensions takes 44.9 percent in the U.S., while it makes only 7.7 percent in Korea. Third, the share of financial assets is roughly similar, that is, 12.6% in the U.S. and 10.3% in Korea. Last but not least, in the Korean case, the share of non-residence real estate rapidly rose between 2006 and 2012, e.g., the average annual compounded growth rate of 27.7 percent for married couples. The result indicates that investment behavior of the retirees in Korea has been tilting toward non-residence real estate (e.g., retail stores, rental properties to lease), possibly in search of income supplements from cash-flow-generating real assets.

In sum, the Korean case represents an extreme of 'real estate-rich-cash-poor' retirees, due in large part to the less well-developed pension system and the real estate centric investment behavior, making it a fertile ground for trading the monetizing instruments such as RAM. Besides the real estate concentric wealth composition, there is another pressing need to monetize real estate in Korea. That is, the traditional asset-based welfare system for retirees is rapidly changing in recent years. Like other East Asian countries,<sup>2</sup> Korea has relied on the intra-family support system, which works as: when parents work and earn labor income, they heavily invest in education of their children; after retirement, children (usually the eldest sons) support the parents by living together; and, after parents' passing, the house is inherited to the children who lived with them. However, the system is in a rapid transition, and an increasing number of retirees do not reside with their children and support themselves financially and socially. As it is a general belief, the apartment-based housing structure (the high-rise condominiums including small single-floor flats) is one of the reasons behind this transition.

Not surprisingly, the subscription of the RAM product in Korea is on a rise in recent years, from 515 in 2007

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<sup>2</sup> This type of support system is also prevalent in Japan and China, although it is shifting in those countries as well (Yamada (2006), Yin (2010)).



Data source: UN Population Statistics, 12<sup>th</sup> Revision (2013)

Figure 1.

to 26,928 as of February 2016. Yet, its market penetration is still very low, 0.81 percent of all the eligible households as of 2015. To investigate empirically the reasons behind such low subscription rate, we perform a regression analysis on determinants of the propensity for entering the RAM contract based on the survey data compiled by the Korea Housing Finance Corporation (or HF). The results show that the bequest motive does reduce the propensity to subscribe the product, and that the two indicators of the consumer knowledge on the product do yield positive and statically significant results. Based on the findings, we stress the need for a heightened level of consumer education on the viewpoint of the protection financial consumers, for which the government, the lending and guaranteeing institutions, as well as academia should have a joint effort so as to help elderlies make rational decisions by weighing various relevant factors.

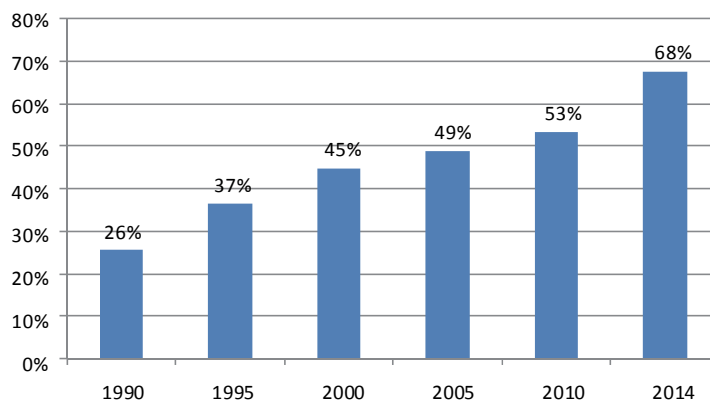
The rest of the paper consists of the four sections: description of relevant trends along with findings from prior studies (Section 2); data analyses (Section 3, including data description (Section 3.1), and findings and implications (Section 3.2); assessment of the RAM product in Korea as a monetizing mechanism (Section 4); and, concluding remarks (Section 5).

## II. Trends and Prior Findings

Korea represents the country whose pace of population aging is projected to be unprecedented for the next two decades or so. One widely-used indicator to that end is the inverse dependency ratio (IDR), the ratio of working-age population (those whose ages are between 14–65 years old) to the non-working-age population (the rest of the age cohorts). For Korea, DIR peaked at 2.67 in 2015, and is predicted to rapidly declining to 1.4 in 2035 and to a little more than one in 2050, implying that one working-age person should support one non-working-age person by that time. This projected rate of decline in Korea is faster than what happened in DIR for Japan during the last twenty years, which is peaked at 2.3 in 1990 but lowered to 1.76 in 2010.

Given this on-going demographic shift, one can imagine that market penetration of RAM should be on the rise, which is not yet supported by data. For example, in the U.S., the RAM contracts as a share to the total eligible households (those with households heads' age being over 65 years old) increased in recent years but still take only 2.1 percent in 2011. (Nakajima and Telyukova (2014)) In Korea and Australia as well, the RAM contracts have

**Table 1.** Share of those who do not live with children (among people who are 65 or older)



Data source: The Korean census bureau (1990 to 2010);  
The Survey of the Current State of Elderlies (for 2014)

been on the rise recently but the extent of its penetration is still fairly low; And the product does not have any meaningful spread in other Asian countries either, with Singapore and Japan being such examples.

In an analytical point of view, several embedded risks to RAM, to be exact how to measure and manage them by lender or guarantor, are quoted as a hurdle to expand its penetration. First, the crossover-risk is the primary risk that should be managed by lenders and guarantors, i.e., the risk of the liquidation value of collateral (or home) being lower than total principal and interest paid by the lender to the borrower. (Min and Cho (2009)) Second, related to the first risk, the housing price risk, which refers to the risk of assumed housing price growth rate during the loan life (hence, forward-looking price trend), is another one that should be dealt with in product design. In the Korean case, the assumed annual price growth rate was 3.3 percent as of the end of 2011, for which Lee et al. (2012) proposed to lower to 2.8 percent given the housing market conditions then. The third one, also related to the first risk, is the longevity risk, i.e., the risk of the mortality table being under-predict (over-predict) expected remaining lives (death rates) for older age cohorts. Related to this, Choi (2015) documents that the longevity risk is substantial in Korea, which tends to vary depending on different forecasting models applied. Finally, there are both moral hazard and adverse selection problems documented in the literature, i.e., the possibility that RAM borrowers do not properly maintain

the property and the effect of housing market conditions such that demand for RAM is adversely affected by a favorable housing price trend (i.e., the lower the projected price growth, the lower the RAM demand). (Davidoff (2014)) These risk factors should be adequately reflected in designing the details of RAM product in a given country, such as eligibility rules (e.g., minimum age), lending parameters (maximum collateral ratio), and risk premiums.

In the Korean case, two additional factors - bequest motivation and consumer understanding on the product - appear to be at work as underlying reasons for the low penetration. As shown in Table 1, according to the data from the Korean Census Bureau, the share of the seniors who do not live with their children among all those who are 65 years or older was more than doubled during the last twenty years or so, from 26 percent in 1990 to 53 percent in 2010. Although it is from a different data source, the figure for 2014 shows a dramatic surge to 68 percent. Nonetheless, the extent of market penetration of the RAM products in Korea is minimal, 0.81 percent among eligible senior households (i.e., those households who are 60 years or older and owner-occupied without extra housing unit).<sup>3</sup> In Section 4, we hypothesize and empirically test effects of various underlying determinants to the consumer decision on RAM subscription in Korea, based on which we also discuss relevant consumer protection issues.

<sup>3</sup> The figures are from the 2014 Survey of Housing Pension Demand, compiled by the Korea Housing Finance Corporation (or HF).

**Table 2.** Composition of Household Wealth in Korea (by household type as of 2012)

	Single person household		Married couples		Others	
		%		%		%
Total	10,314.2		28,764.5		23,230.0	
Annuitized pension	1,164.1	11.3	2,228.0	7.7	1,411.4	6.1
Financial asset	559.5	5.4	2,974.0	10.3	1,795.6	7.7
Real Estate asset	8,572.5	83.1	23,222.7	80.7	19,700.8	84.8
Current residence	6,952.3	67.4	13,085.0	45.5	12,366.8	53.2
Home-owned	6,368.8	61.7	12,145.8	42.2	11,330.1	48.8
Rental deposit	583.5	5.7	939.2	3.3	1,036.8	4.5
Other real estate asset	1,620.2	15.7	10,137.7	35.2	7,334.0	31.6
Other asset	18.1	0.2	339.8	1.2	322.1	1.4

\*Unit: 10,000 Won

**Table 3.** Changes in Household Wealth in Korea, 2006 to 2012 (unit: 10,000 KRW)

	Single person household			Married couples			Others		
	2006	2012	△*	2006	2012	△*	2006	2012	△*
Total	7,696.790	10,3014.20	4.9%	15,979.50	28,764.50	10.3%	14,005.30	23,230.00	8.8%
Annuitized pension	1,405.60	1,164.10	-3.0%	2,195.20	2,228.00	0.3%	1,658.90	1,411.40	-2.7%
Financial asset	474.8	559.5	2.7%	2,194.30	2,974.00	5.2%	1,964.20	1,795.60	-1.5%
Real Estate asset	5,880.50	8,572.50	6.4%	11,514.40	23,222.70	12.4%	10,299.80	19,700.80	11.4%
Current residence	4,588.50	6,952.30	7.1%	9,175.40	13,085.00	6.1%	8,375.40	12,366.80	6.7%
Home-owned	4,136.60	6,368.80	7.4%	8,478.50	12,145.80	6.2%	7,634.50	11,330.10	6.8%
Rental deposit	451.8	583.5	4.3%	696.9	939.2	5.1%	740.9	1,036.80	5.8%
Other real estate	1,292.00	1,620.20	3.8%	2,339.10	10,137.70	27.7%	1,924.30	7,334.00	25.0%
Other asset	-64.1	18.1	--	75.6	339.8	28.5%	92.5	322.1	23.1%

\* Average annual compounded growth rate

### III. Data Analyses

#### A. Data description

The data used for our analyses is the Korean Longitudinal Survey of Aging (KLoSA), a panel data for those aged 45 and over in Korea surveyed every even-numbered year starting from 2006 (until 2012). The number of sample each year is approximately 10,000 people. We categorize households into three groups - single-person households, married couples, and all others. The single-person households include unmarried persons as well as those who are married but separated, divorced, or widowed. The married couples consist of those who do not have, or do not live with, children. The last category includes those with three or more family members (e.g., married couple living with their children) or two or more non-married people living together.

From the data, the annuitized pension amount (for type  $\tau$ ) is computed as:

$$W_t^\tau = P_t^\tau + \frac{S_{t+1}^a \cdot P_t^\tau}{(1+r_t)^1} + \frac{S_{t+2}^a \cdot P_t^\tau}{(1+r_t)^2} + \dots + \frac{S_{t+k}^a \cdot P_t^\tau}{(1+r_t)^k} \quad (1)$$

$$S_{t+i}^a = (1 - D_{t+1}^a) \cdot (1 - D_{t+2}^a) \cdot \dots \cdot (1 - D_{t+i-1}^a) \cdot (1 - D_{t+i}^a) \quad (2)$$

$W_t^\tau$  : Annuitized pension amount at time t (2006 in our case)

$P_t^\tau$  : Annual pension amount (assumed to be constant over time)

$S_{t+i}^a$  : Cumulative expected survival rate for age a projected for time t+i at time t

$D_{t+i}^a$  : Expected death rate for age a at time t in time t+i

$r_t$  : Discount rate (the 91 days CD rate, or the

**Table 4.** Wealth Composition by Asset Decile as of 2012 (unit: 10,000 KRW)

Group	Category	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
All	Total	1,728	1,164	3,724	6,645	9,713	13,803	18,948	26,656	41,540	102,553
	Pension	84 (15.57)	118 (5.43)	165 (5.43)	528 (8.19)	1,241 (11.76)	1,711 (11.77)	2,449 (11.26)	3,679 (12.10)	7,075 (14.51)	25,768 (17.61)
	Financial	-7,032 (-4.37)	-33 (8.59)	260 (8.33)	537 (9.20)	970 (11.74)	1,707 (12.63)	2,745 (13.73)	4,173 (15.25)	7,435 (16.42)	24,019 (16.42)
	Real Estate	-1,292 (78.18)	591 (79.48)	2,408 (78.85)	5,084 (74.48)	7,858 (76.50)	11,123 (72.86)	15,837 (70.88)	21,541 (66.84)	32,596 (62.57)	91,547 (62.57)
	Others	-3,900 (10.62)	80 (6.49)	197 (4.63)	298 (4.56)	482 (3.26)	- (3.26)	708 (3.29)	999 (3.40)	1,660 (3.40)	4,976 (3.40)
Single person household	Total	-361	488	1,637	2,702	4,201	5,949	8,617	11,875	18,163	51,260
	Pension	73 (32.84)	102 (10.23)	119 (5.37)	146 (18.74)	793 (16.91)	1,330 (19.20)	1,938 (17.86)	2,831 (15.82)	4,078 (20.78)	15,913 (20.78)
	Financial	-4,248 (12.84)	40 (21.79)	254 (18.13)	492 (11.67)	- (11.67)	918 (7.03)	- (6.31)	1,816 (13.98)	3,603 (13.98)	10,551 (13.77)
	Real Estate	-114 (28.90)	90 (51.08)	594 (65.50)	1,777 (69.86)	2,954 (64.43)	5,068 (73.76)	7,444 (64.38)	10,203 (63.76)	16,437 (63.76)	45,150 (58.95)
	Others	-4,560 (25.42)	79 (16.91)	197 (11.00)	298 (11.39)	482 (6.99)	550 (7.03)	710 (6.31)	999 (6.44)	1,660 (6.44)	4,981 (6.50)
Married couples	Total	-1,747	4,695	8,377	11,510	15,463	19,904	25,773	34,556	50,860	119,142
	Pension	117 (5.17)	191 (6.59)	510 (10.82)	1,252 (10.57)	1,645 (10.58)	2,114 (11.58)	3,071 (13.34)	4,990 (17.94)	11,079 (17.94)	30,009 (17.65)
	Financial	-6,898 (2.91)	107 (5.38)	416 (7.60)	880 (9.05)	1,408 (10.45)	2,089 (12.62)	3,346 (13.64)	5,103 (14.40)	8,892 (16.68)	28,363 (16.68)
	Real Estate	-2,431 (89.75)	3,309 (85.48)	6,608 (79.00)	9,147 (77.28)	12,021 (76.22)	15,235 (73.13)	19,394 (70.35)	26,325 (64.97)	40,127 (62.74)	106,692 (62.74)
	Others	-4,302 (2.18)	80 (2.55)	197 (2.58)	298 (3.10)	482 (2.75)	550 (2.68)	710 (2.67)	999 (2.69)	1,660 (2.69)	5,000 (2.94)

\*Unit: 10,000 Won

\*Column per cent in the parenthesis

widely-used short rate in Korea) at time  $t$   
 $t+k$  : Maximum age to live (100 years old)

We calculate  $St+i^a$  and  $Dt+i^a$  for each year for each household based on the Life Expectancy Table of Korea, and use the 91-days commercial deposit (CD) rate, the benchmarking rate for long-term commercial loans in Korea, plus a maturity risk premium.<sup>4</sup>

## B. Findings and comparisons

The results show that the married couple has the largest net wealth. The average net wealth among the group is 287 million Korean won (about 260,000 USD). The net wealth of single person household is less than half of married couples, 103 million won (about 93,000 USD).

<sup>4</sup> We use the current 91-days CD rate of 4.48%, and add 110 basis points by surveying the premia charged on long-term residential mortgage loans in Korea as of July 2016. The data source for the Life Expectancy Table is Statistics Korea and the interest rates is Bank of Korea.

The share of the annuitized pension is 6~12 percent of total net asset. Compared to the US, financial dependence on pension is much weaker, although the pension more significant contributes to single-person households' wealth.

As shown in Table 2, the share of real estate is over 80 percent for all three household types - 83.1 percent for single-person households, 80.7% for married couples, and 84.8 percent for others. In comparison, the share of housing and other real estate in US is reported to be 25.9 per cent (Poterba *et al.*, 2011: 97). In general, primary residence represents the largest portion, although other types (i.e., non-residence real estate) also take a fairly significant share. For example, for married couples, while primary residence is 42.2 percent, other real estate takes 35.2 percent of the total household wealth.

Table 3 shows changes in the wealth compositions by household type between 2006 and 2012. All three household types are shown to have an increase in net worth. However, the extent varies across the groups: as a compounded average annual growth rate, 4.9 percent (per annum) for single-person households, 10.3 percent

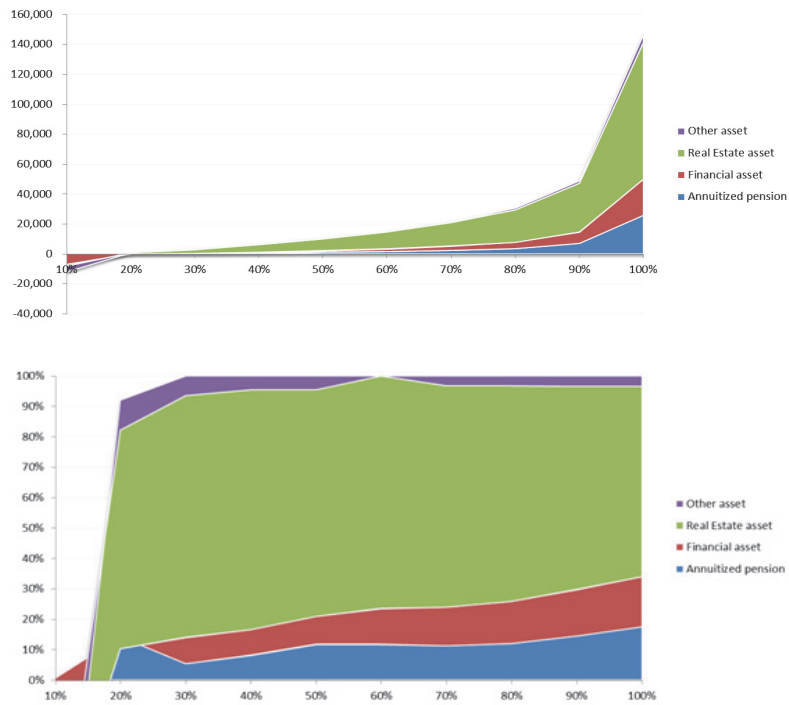


Figure 2. Asset composition by asset strata – All households (as of 2012)

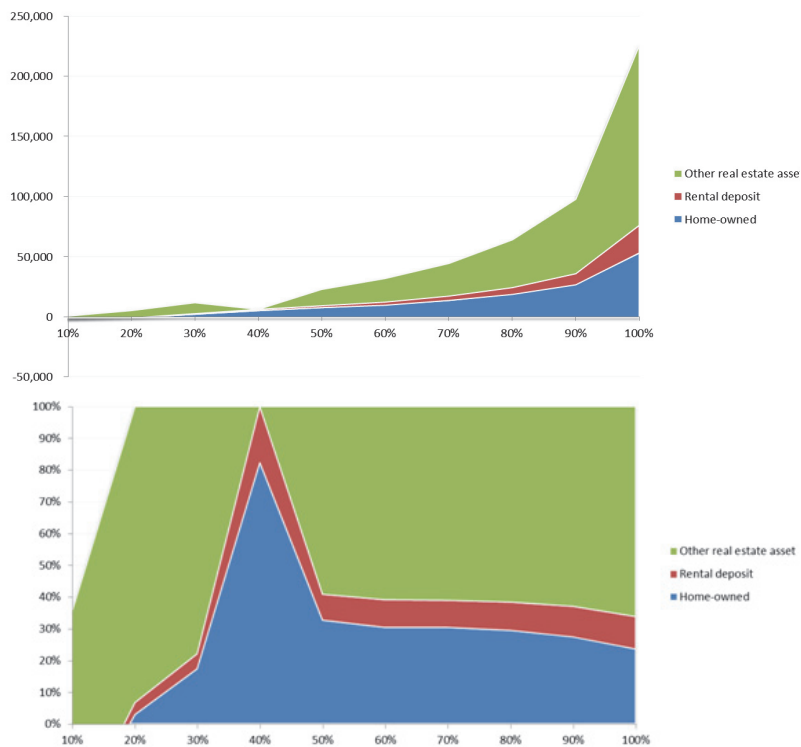


Figure 3. Composition of real estate asset by asset-strata as of 2012 – All households

for married couples, and 8.8 percent for others.

Among the asset classes, the annuitized pension increased only for married couples, while it declines for other household types. On the other hand, the share of real estate increased for all household types and for all sub-categories, often quite remarkably. In the case of primary residence, its share increased by 7.5 percent (per annum) for single-person households, 6.2 percent for married couples, and 6.8 percent for others. The share of non-residence real estate shows a more dramatic increase for certain cohorts: 3.8 percent for single-person households, 27.7 percent for married couples, and 24.9 percent for others. The results indicate that investment behavior of the retirees in Korea, married couples in particular, is tilting toward non-residence real estate (e.g., retail stores, rental properties to lease), possibly in search of income supplements from cashflow-generating real assets.

Table 4 shows our findings by asset strata, i.e., the deciles by asset level. Among others, the share of annuitized pension is shown to have a range of 5~18 percent in net worth, which is lower for low-asset groups but higher for high-asset ones. The result implies that the pension system in Korea would deepen the income and wealth inequalities among retirees. On the other hand, the share of real estate is lower for the high-asset groups, roughly 80 percent among low-asset groups but about 60 percent for high-asset households. This pattern is largely due to the increasing share of financial asset for the latter. Figure 2 visually present the asset compositions across the deciles, both by absolute amount and by percent.

Figure 3 shows the profile of real estate asset by the asset strata. The result demonstrate the pattern that, the higher the wealth level, the larger the amount (as well as the share) of non-residence real estate.<sup>5</sup>

Figure 4 shows the effect of major events in older life on the average home equity. In general, the average home equity increases between two adjacent years. However, if he or she experienced separation by divorce or death, then the average home equity dropped, an expected outcome of downsizing housing consumption due to the reduction in household size. The impact of separation events on home equity is also shown in the birth-year

cohort analyses performed (Figure 5-8).

As key implications of our analyses, the retirement households in Korea are shown to be real estate centric in their asset holding patterns, have very low shares of annuitized pensions – minimal compared to those observed in the U.S., and the share of real estate is even increasing in recent years with the non-residence real estate taking a quite dramatic rise for certain household types. Interestingly, this real-estate oriented profile is not limited to the specific asset-strata. We find this pattern across most asset deciles. The higher-asset decile has relatively larger portion of financial asset, so the share of real estate asset is slightly lower than other groups – which is still 63 per cent. Given these observations, the key policy direction to deal with the current pace of population aging in the country is to monetize (or liquidify) real estate held by retirement-age households in order to ensure a stable and adequate income supplement out of their asset bases.

#### IV. RAM in Korea: A viable policy option?

The history of RAM in Korea goes back to the mid-1990s when a couple of commercial banks introduced a purely private RAM product (i.e., no government support). That program, however, did not last long because it suffered the problem of very low subscription. The product re-emerged in 2007, this time with an explicit guarantee by the Korea Housing Finance Corporation (HF), the government-sponsored mortgage securitizer similar to GSEs in the U.S. The new product, referred to as “Housing Pension,” resembles HECM (Home Equity Conversion Mortgage) in the U.S. in that HF provides with a hedging against the cross-over risk, that is, the risk of the lenders’ payments of principle to borrowers along with the interest accrued exceeding liquidation value of property (or collateral) at contract expiration. Other details of the program include: it targets those homeowners who are 60 years or older (which was extended from 65 years old since 2009); the lenders charge up-front premium (about 1.5% of property value) and the guarantee fee (0.75% of unpaid principal balance for each monthly principal paid); as time goes by, the principal amount

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<sup>5</sup> In Korea, the rental deposit, the downpayment for the property leased by landlord, takes a fair share due to the peculiar rental system in the country, called as Chonsei. That component also rises with the asset level, as shown in Figure 3.



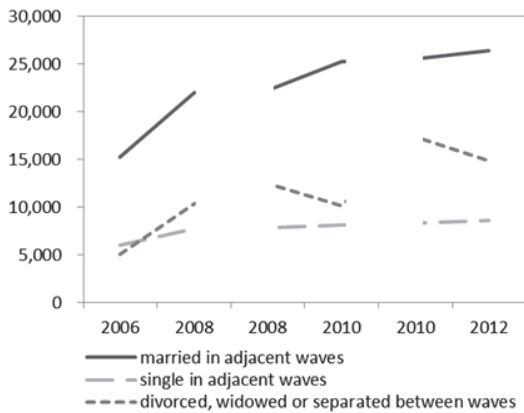


Figure 4. Change in average home equity - Older households

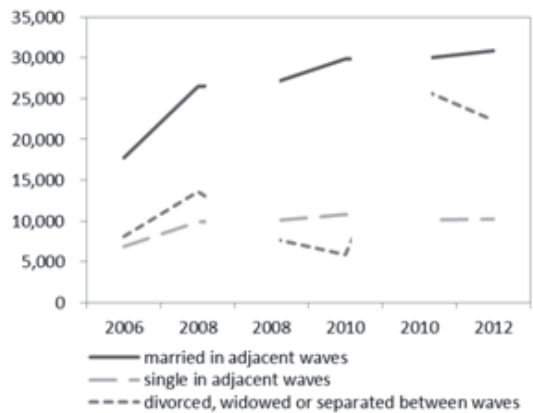


Figure 5. Birth-year cohort 50s in 2006

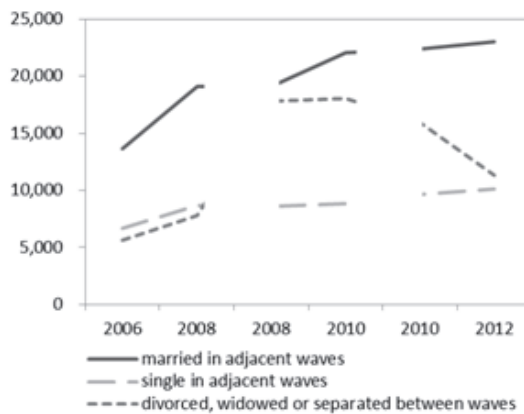


Figure 6. Birth-year cohort 60s in 2006

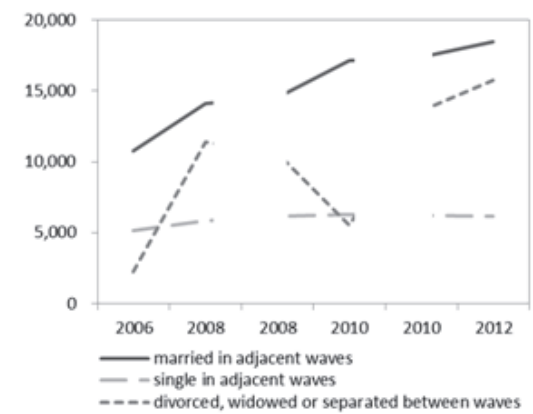


Figure 7. Birth-year cohort 70s in 2006

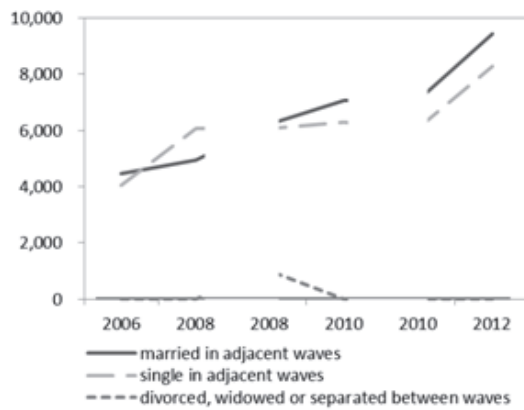


Figure 8. Birth-year cohort 80s in 2006

increases and net home equity owned by the borrower decreases; the loan expires when the borrower passes away or moves from the collateral (but, if spouse still lives in the property, then the payment continues until he/she dies); on expiration, HF reimburses the principal and interest (PI) to the lender and liquidates the collateral to recover the expense.

On the viewpoint of HF, it is a non-recourse lending in that, if the liquidation value exceeds PI, then HF pays the remainder to borrower or inheritor; but, if it falls short to PI, then HF does not claim the gap to the counterparty. In terms of payment method (to borrower), two types of the product are being traded - tenure type (annuity-like lifetime payments) and term type (payments until pre-defined maturity dates). Both types can set a

**Table 5.** RAM subscription rates in Korea (among eligible households\*)

	2007	2009	2011	2013	2015
(A) > 60 years old	2,540,236	2,767,487	3,009,609	3,267,756	3,587,377
(B) > 65 years old	1,802,637	1,974,848	2,156,329	2,360,559	2,564,012
(C) New subscriptions	515	1,124	2,936	5,296	6,486
(D) Cumulative subscriptions	515	2,334	7,286	17,595	29,120
(D) / (B)	0.02%	0.08%	0.24%	0.54%	0.81%
(D) / (A)	0.03%	0.12%	0.34%	0.75%	1.14%

\* Owner-occupying one-unit holders who are 60 or older (65 or older before 2009)

Data source: Statistics Korea's the Life Expectancy Table and HF's Housing Pension Statistics (of various years)

certain level of credit line, which reduces amount of monthly payment. Though the monthly payment is generally fixed, a variable payment arrangement is feasible (e.g., the payment being reduced by 30% after 10 years from issuance). Overall, the current RAM products in Korea are consumer-friendly.<sup>6</sup>

As mentioned earlier, the Korean case represents an extreme of the asset-rich-cash-poor condition among retirees with housing and other real estate taking over 80% of total household wealth, plus the culture of the asset-based welfare system for elderlies is also in a rapid transition. Although both conditions point to a deep market penetration by Housing Pensions, the subscription rate to the program is fairly low, 0.81 percent of all eligible people as of 2015 as shown Table 5. The question to pose is, why?

In the literature, so-called “annuity puzzle” is advanced as an explanation of the tendency not to annuitize the asset among retirees. In particular, bequest motive and uncertainty regarding future consumption level (e.g., unexpected increase in medical expense) are possible causes for lower the demand for converting illiquid assets to annuities.<sup>7</sup> In addition, adverse selection, provision of social security, illiquidity of annuitized products are also quoted as the reasons for such low demand for RAM product. In recent years, behavioral economists extend their inquiries to psychological biases: that is, mental accounting, loss aversion, and money illusion all tend

to reduce demand for the monetization, inducing to keep the illiquid assets in household portfolios. For example, it is generally the case that they are reluctant to monetize their primary residence, partly because of transaction costs of moving (financial as well as psychological) as well as frequent moving if and when they rent. Nonetheless, it is imperative to unlock and monetize their real estate holdings to help stabilize their post-retirement income stream, which will also help lessen government burden to finance public pension programs.<sup>8</sup>

In the following, we empirically test the factors that explain the low subscription rates for the RAM products in Korea by using a household level survey data compiled by HF (the 2014 Survey of Housing Pension Demand). The survey targets those households who own one or more houses and are 60 or older. The number of sample is 3,000 households. We use the binary logic choice model to test the factors. The dependent variable is the revealed intention of joining the Housing Pension (=1 if yes, =0 if no). The independent variables included are: age of respondent (Age), motive to bequest all property (D\_Bequest), motive to bequest of partial, or a part of, property (D\_Partial Bequest), status of residence (D\_Cores id =1 if reside with child, =0 if not), presence of spouse (D\_Couple=1 if yes, =0 if no), residual income (Resid\_Income = income - the minimum cost of living, with the unit of million KRW), level of education (Edu\_H =1 if high school graduate, =0 if not) with middle school graduation as reference, another indicator of the level

<sup>6</sup> The RAM product in Korea is not vulnerable to the issue of adverse selection given that any positive difference between selling price and PI is paid to borrower, which partially enables inheritance; With the credit line option, it also offers a hedge against uncertainty to future consumption level.

<sup>7</sup> See Brown(2007) for the literature on the annuity puzzle. Hu and Scott (2007) and Brown (2007) elaborate the phenomenon on viewpoint of behavioral economics.

<sup>8</sup> Yaari(1965), Bernheim(1987), Davidoff, and Brown and Diamond(2005) claim that, assuming no motive of inheritance, it is optimal for elderlies to convert asset holdings into pension, partially or entirely, to smooth the life-time consumption stream. They also examine alternative options of asset monetization: gradually converting asset holdings into cash vs. liquidating asset all at once to purchase pension program (the latter of which can remove longevity risk).

**Table 6.** Binary Logic Regression results for the RAM subscription decision in Korea

Variable	Model 1		Model 2	
	Coefficient	z-Statistic	Coefficient	z-Statistic
C	1.1624	1.5987	2.0066**	2.1531
Age	-0.0414***	-4.2669	-0.0209*	-1.9360
Edu_H	0.3276***	2.6936	0.2416**	1.9792
Edu_C	0.1798	0.9820	-0.1175	-0.5743
D_Couple	-0.1156	-0.8425	-0.1410	-1.0088
D_Coresid	-0.0265	-0.2262	-0.0069	-0.0575
Resid_Income	-0.0217	-1.0825	-0.0154	-0.7797
Multi_Own	0.6540***	3.6326	0.5564***	3.1288
Price_House	0.0074***	2.8764	0.0043	1.1830
Non_Resid Asset	-0.0052*	-1.9291	-0.0005	-0.1358
D_Bequest	-1.0900***	-9.1577	-3.8219***	-4.0505
D_Partial Bequest	-0.6069***	-4.1692	-3.6883*	-1.7352
D_Aware_Pension	0.4113**	2.4371	0.4024**	2.4008
D_Know_Pension	0.3107**	2.2588	0.3399**	2.4931
McFadden R-squared	0.0812		0.0626	
H-L Statistic	13.434 (Prob. 0.0978)		9.673 (Prob. 0.2888)	
Andrews Statistic	15.764 (Prob. 0.1066)		15.594 (Prob. 0.1119)	
Observation	3000		3000	

Note: \*p <0.1, \*\*p<0.05, \*\*\*p<0.01

- C: Constant
- Age: Age
- Edu\_H: If high school graduation=1, if not =0 (Standard: Middle School Graduation)
- Edu\_C: If college graduation=1, if not =0 (Standard: Middle School Graduation)
- D\_Couple: If reside with spouse=1, if not =0
- D\_Coresid: If reside with child=1, if not =0
- Resid\_Income : Income minus the minimum cost of living (unit : million won)
- Multi own: If multi-home owner (more than 2 houses)=1, if not = 0
- Price\_House: Home owner's evaluation price (unit: 10 million won)
- Non\_Resid Asset: Amount of total asset minus house price (unit: 10 million won)
- D\_Bequest: If bequest of all property = 1, if not = 0
- D\_Partial Bequest: If bequest of partial property =1 , if not = 0
- D\_Aware\_Pension: If people heard about housing pension =1, if not =0
- D\_Know\_Pension: Among those who heard about the housing pension, if they have great knowledge about housing pension=1, if not =0

of education (Edu\_C =1 if college graduation, =0 if not), those who own more than two housing units (Multi\_Own= 1 if own more than two, =0 if not), awareness of Housing Pension (D\_Aware\_Pension=1 if heard about housing pension, =0 if not), level of knowledge about Housing Pension among those who heard about the housing pension (D\_Know\_Pension=1 if have great knowledge about housing pension, =0 if not, which is interacted with D\_Aware\_Pension=1), home owner's valuation of current residence (Price\_House, with the unit of 10 million KRW), and non-residence asset(Non\_Resid Asset=amount of total asset - valuation of current residence).

The results are reported in Table 6, in which two model outcomes are shown - the realized values for D\_Bequest

and D\_Partial Bequest (Model 1) and the predicted values for the same variables based on a set of instruments (Model 2).<sup>9</sup> We carried out two goodness-of-fit tests: Hosmer-Lemeshow(H-L) test and Andrews test. The test results show that we can't reject both models at 5% significant level as providing sufficient fits.

As main findings, it is shown that the bequest motive

<sup>9</sup> We are currently investigating determinants of two type of the bequest motive - selfish one (i.e., bequest in return for joint-residence) vs. altruistic one (doing so purely for welfare of decedent), and are testing various model specifications for D\_Bequest and D\_Partial Bequest. For Model 2, we picked the best specification for the variable, although it is difficult to find a set of variables that retain the diagonality with those included in Table 6.

does reduce the propensity to subscribe Housing Pension, and that the two indicators of the consumer knowledge levels do yield positive and significant results. The results are also robust between the two models. Residing with descendant or with spouse, residual income, and education level show no statistically meaningful effects. Owning multiple housing units does increase the subscription propensity, which is robust between Model 1 and Model 2. Home-owner's assessed price impacts positively, and amount of non-residence asset influences negatively the subscription propensity. Their effects are significant in Model 1, but become insignificant in Model 2.

Though preliminary, our results do indicate that both bequest motive and level of consumer understanding impact the propensity to subscribe Housing Pension in Korea. In fact, the recent survey conducted by HF documents that 78.1 percent of the respondents select reduction of asset to inherit as the primary problem with RAM, while another 64.3 percent pick the constant monthly payments even when property values appreciate (multiple selections of the answer allowed).<sup>10</sup> In terms of the understanding on the product features, the survey reveals that a negative perception on net gain or loss with the subscription is another main reason (64.1% named "payment being lower than expected" and 50.4% pick "total payments received likely being less than property value"). The claims are generally unfounded in that the product is publicly-guaranteed by HF and its payments are set favorably for consumers on the viewpoint of social security for retirees. Yet the survey results show that the consumers do not tend to understand the complex nature of the product: among those who do not subscribe, only 17.5% properly understood the product feature, while 79.5% heard about the product.

Given that the choice between preserving home equity for future unexpected expenses vs. monetizing through RAM is a difficult one due to the complexity inherent to the product, there should be extended consumer education on the products in the viewpoint of the protection financial consumers. The main push to that end should be to help elderlies make rational decisions by weighing various relevant factors (for present as well as for future) rather than resorting to money illusion or other

irrationalities. That seems to be a compelling and urgent initiative that the government, the lending and guaranteeing institutions, as well as academia should have a joint effort to smooth the severe income shocks anticipated along the pace of aging in the country by monetizing home equity and other real estate assets.

## V. Cluding Remarks

This study examines the wealth composition and its drawdown patterns of the retirement-age households in Korea, and also puts an assessment on the RAM product in Korea in terms of its capability to monetize real estate assets held by retirees in the country. To emphasize the key

findings, our results show that: first, the average share of real estate in Korea is far greater than that in the U.S., over 80 percent vs. 24.7; second, the share of the annuitized public and private pensions is far higher in the U.S. compared to Korea, 44.9 percent vs. 7.7 percent in Korea; and, the share of non-residence real estate rapidly rose between 2006 and 2012 in Korea, quite dramatically for certain consumer cohorts.

As a remedy, we discuss the RAM product in Korea, whose market penetration is still very low. To investigate empirically the reasons behind such low subscription rate, we perform a regression analysis on determinants of the propensity for entering the RAM contract; The results show that the bequest motive does reduce the propensity to subscribe the product, and that the two indicators of the consumer knowledge on the product do yield positive and statically significant results. The main implication is that, while the traditional asset-based welfare system for elderlies is in a rapid transition, retirees in Korea are still inclined to put their homes to their children. In addition, it appears that consumer education of various sorts on the RAM products should be heightened. As a last point, how to monetize non-residence real estate, which takes another fairly large portion in household wealth in Korea, should also be the topic that warrants careful investigation in research community as well as in policy circle.

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<sup>10</sup> As an interesting psychological factor, 38% of the respondents are concerned about children's feeling, 14.3% about his/her own reputation, and 9.3% for children's reputation.

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## Appendix

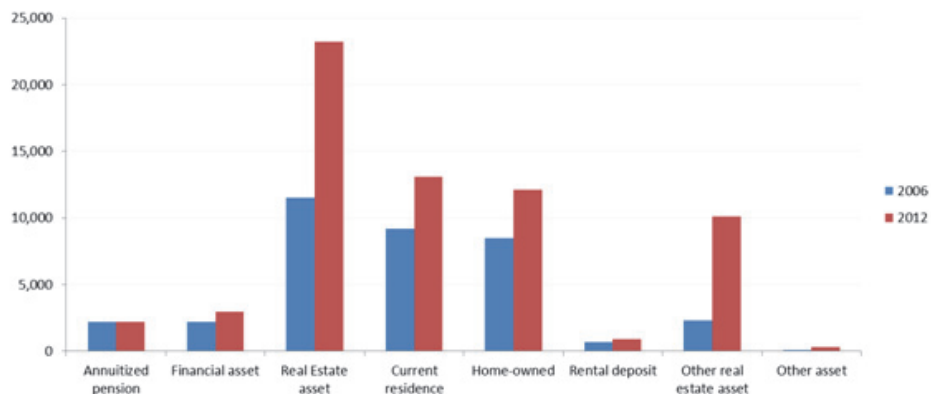


Figure 1. Net asset by category among married couples, 2006 and 2012



Figure 2. Net asset by category among single person households, 2006 and 2012

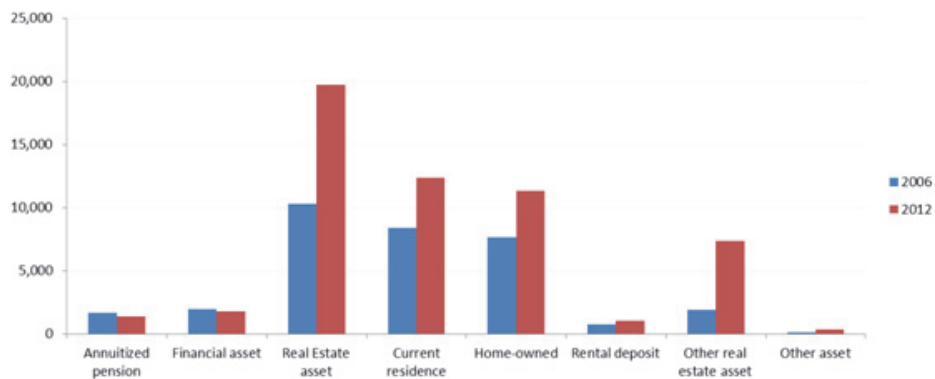


Figure 3. Net asset by category among others, 2006 and 2012

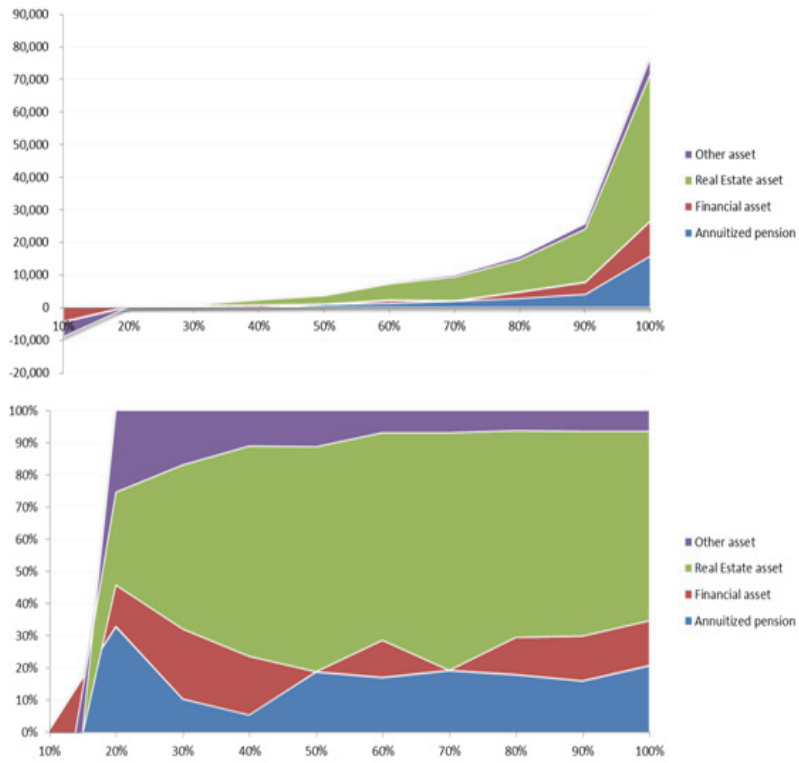


Figure 4. Asset composition by asset strata as of 2012 – Single person households

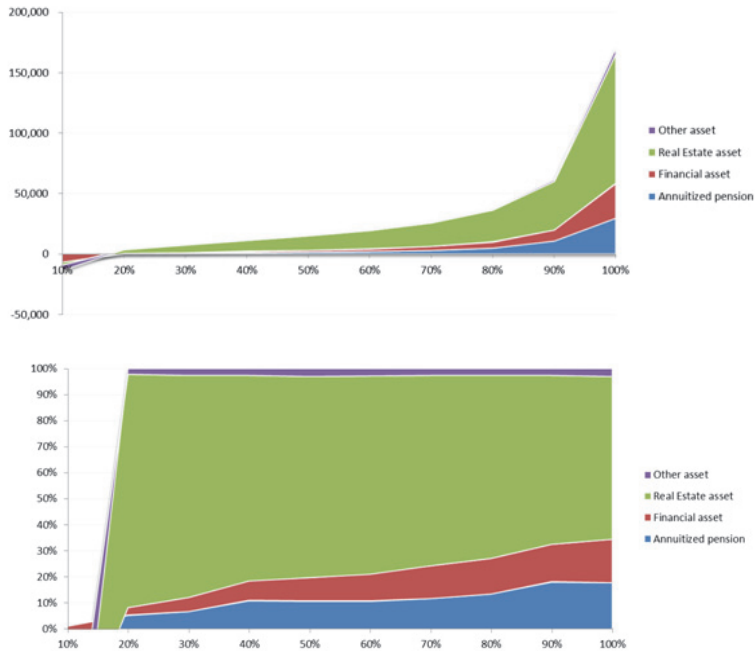


Figure 5. Asset composition by asset strata as of 2012 – Married couples