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### Why household debt held by Korean seniors is problematic: An international comparison

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#### Abstract

This paper analyzes why the household debt held by seniors in Korea is highly vulnerable, compared to the US and major European countries. Based on household-level micro data, seniors in Korea have lower income, lower income stability, and fewer financial assets than those in the US and European countries. In addition, the macro-financial environment over the last decade in Korea promoted debt accumulation. Hence, if Korean economy is hit by adverse macro-financial shocks, such as a sudden increase in interest rate or a decline in house prices, seniors in Korea are expected to be impacted most seriously.

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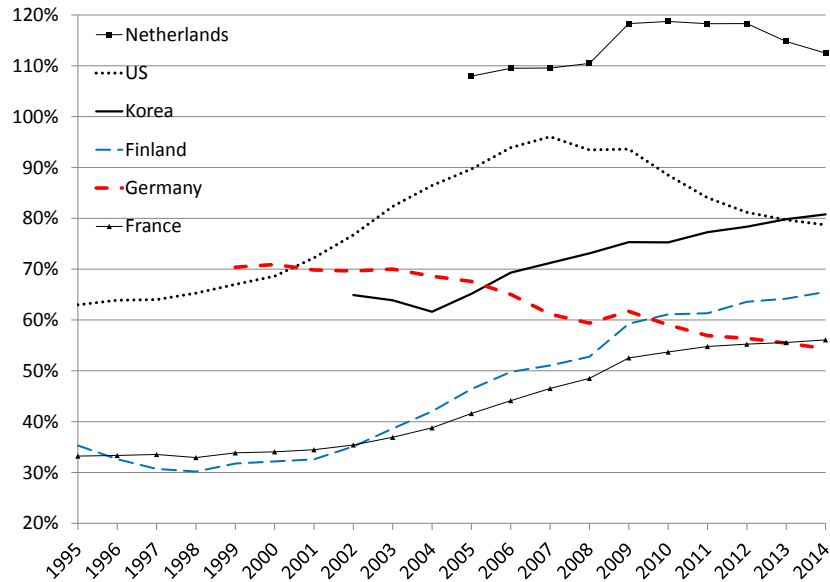
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# 1 Introduction

Increases in household debt have become serious social and economic problems in many countries. Excess accumulation of household debt can adversely affect economic stability (OECD (2012)), economic resilience from shocks (Mian and Sufi (2011)), and economic growth (Cecchetti et al. (2011) and Mian et al. (2015)). Though it is hard to conclude what is a “sustainable” or “suitable” level of household debt, many countries have experienced a fast rise in household debt over the last decade (see Figure 1).

Figure 1: Household Debt to GDP Ratio by Country



Source: OECD, Bank of Korea

In this paper, I analyze the vulnerability of household debt and repayment capacity in Korea. Unlike the US where household debt decreased after the global financial crisis, Korean household debt has steadily increased since the early 2000s.<sup>1</sup> Korea’s household debt-to-GDP ratio in 2014 is in fact almost identical to that of the US for 2003 and 2014. Household debt-to-GDP ratios in Finland and France have also steadily increased since the early 2000s, but remain lower than Korea. There are, of course, many countries where the household debt-to-GDP ratio is higher than Korea, like Netherlands (112%), Denmark (126%), and Switzerland (123%).<sup>2</sup> The issue, however, is not the level of debt, but whether it will be repaid comfortably.

I initially assess the repayment capacity of senior (60+) Korean households through an international comparison. More specifically, I examine household debt non-repayment risk in terms of the level of income, stability of income, and financial asset holdings, using

<sup>1</sup>Many countries, like Denmark, Hungary, and UK, also de-leveraged right after the global financial crisis.

<sup>2</sup>I am limited to examining European countries covered by the Eurosystem Household Finance and Consumption Survey (HFCS).

household-level micro data in Korea, the US, and Europe. To the best of my knowledge, there are no papers which compare Korean household debt conditions to those of European countries and the US at the micro level. Though seniors in Korea have relatively enough assets to repay their debt in the long run, they have the most household debt in terms of their income and financial assets. In addition, seniors in Korea have a significantly lower proportion of stable income, like pensions, than in sample European countries and the US. Hence, senior Korean households have relatively weak liquidity buffers and are more likely to have difficulties in repaying their debts from adverse economic shocks

Next, I analyze how changes in macro-financial conditions affect household debt held by senior households. Specifically, I decompose the changes in household debt by age over the last decade into cohort and age effects. Householders in Korea, especially seniors, have increased their debt holdings via a favorable macro-financial environment, which is captured by the cohort effect. The recent Korean borrowing pattern is actually quite similar to the US before the financial crisis. Hence, if Korea faces adverse shocks, as experienced in the US, senior households in Korea will likely have problems repaying their debt.

## 2 Data Overview

I conduct international comparisons and analysis of household repayment capacity using four types of household-level micro data in Korea, the US, and Europe. Each data source is different in terms of the survey year, frequency, and panel element. However, since these data sets, discussed below, commonly include household-level income, asset, and debt information, I jointly use them together in main exercises.

To analyze Korean household debt, I used two types of data sets which cover different survey years: the Survey of Household Finances and Living Conditions (SHFLC) and the Household Income and Expenditure Survey (HIES). The SHFLC is an annual panel initiated in 2010 and published by Statistics Korea. The most recently released survey year is 2014. The number of sample households in the SHFLC is around 10,000 in 2010-11, and around 18,000 in 2012-14.<sup>3</sup>

The HIES is the predecessor of the SHFLC. The HIES is a single year survey which was conducted in 2006 by Statistics Korea with a sample size of 9,300. Both the SHFLC and HIES are specialized in household finance and contain finely categorized household asset, income, and debt information.<sup>4</sup>

I examine the European countries' household finances based on the Eurosystem Household Finance and Consumption Survey (HFCS), published by the European Central Bank (ECB). Central banks and statistics offices in fifteen European countries carried out the survey, whose final results were collected by the ECB.<sup>5</sup> The number of sample households varies by country. Surveys were conducted around 2010 and are planned to be repeated every 2-3 years.

For the US, I used the Survey of Consumer Finances (SCF) as published by the Federal Reserve Board. The SCF provides very finely categorized household finance data and many

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<sup>3</sup>The SHFLC re-sampled interviewees in 2012. Hence, it is possible to generate a balanced panel between 2010 and 2011, and between 2012 and 2014.

<sup>4</sup>The spirit of SHFLC and HIES is similar to the American SCF.

<sup>5</sup>Among the fifteen participating countries, I dropped Malta as household age is not reported.

papers have used the SCF to analyze US household finance issues (for example, Porterba and Samwick (2001) and Chirstelis et al. (2015)).

Each data set contains different household debt and asset categories. Since each country has its own distinct housing and credit environment, it is difficult to categorize household asset and debt items uniformly across countries. Fortunately, since each survey reports the total amount of any remaining household debts or assets, I can calculate total debts and assets easily.

### 3 Assessment of Household Debt Repayment Capacity

In this section, I compare household debt repayment capacity across countries. I initially assess the repayment capacity based on household asset. It turns out that Korean households have enough assets (especially, real estate assets) to repay their debts in the long run. However, when I evaluate the repayment capacity, based on household liquidity-related measures and income stability, senior households in Korea are very likely to face difficulties in repaying their debts. I then examine why senior householders in Korea are more likely to struggle repaying their debt in the next section.

#### 3.1 Total Debt to Asset Ratio

Senior Koreans do hold significant assets to repay their debts. As presented in Figure 2, the household debt-to-total-asset ratio in Korea is 18%, and the ratio for senior households is 13%.<sup>6</sup> Though the ratio in Korea is higher than in most sample countries, the level indicates that Korean households can afford to repay their debt in the long run by reducing their assets, especially real estate assets (see Figure 3). Hence, someone might want to conclude that household debt held by Korean seniors does not have any repayment problems in the long run. However, when we examine the household debt repayment capacity based on liquidity-related measures as presented below, seniors in Korea can possibly face difficulties in repaying their debts.

#### 3.2 Total Debt to Income Ratio

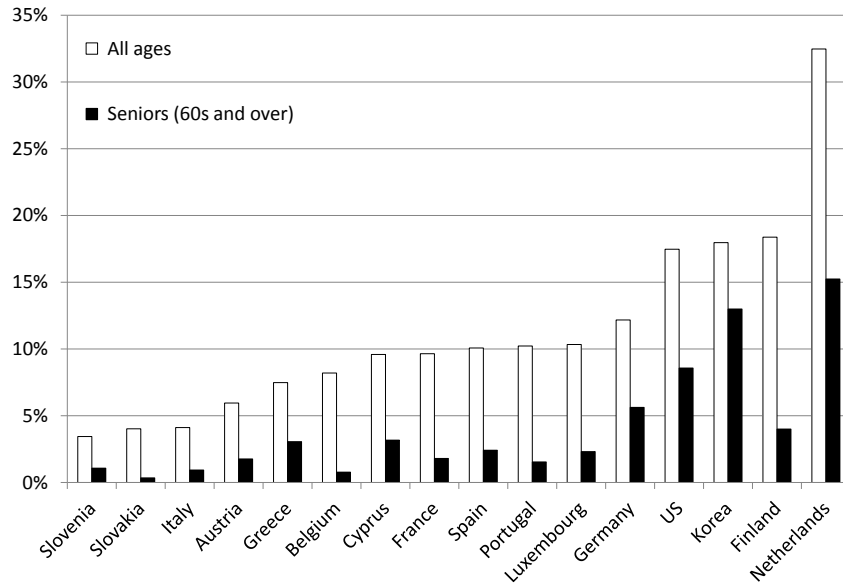
Seniors in Korea currently bear the heaviest debt load in terms of income among seniors in major European countries and the US (see Figure 4). Korea's total debt-to-income ratio across all age groups is also significantly higher than those of major countries. Worse, Korea is the only country in which senior households' total debt-to-income ratio is higher than the population as a whole. Contrary to Korea, senior's total debt-to-income ratio in the US and all sampled European countries is significantly lower than the overall country average.

Then, how did Korean seniors accumulate relatively large debt despite low income? Unlike European countries and the US where households downsize their debt gradually over the life cycle, Koreans are likely to delay debt repayment until retirement. Mortgages in Korea, which comprise 62% of total household debt, are mostly structured as bullet loans,

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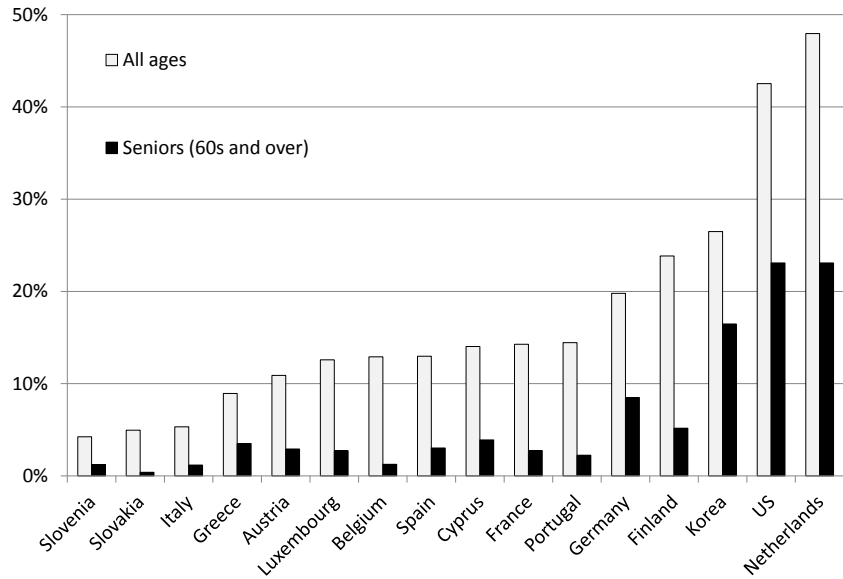
<sup>6</sup>Household debt-to-total-asset ratio is measured by  $\sum_{i \in \text{Age group}} w_i d_i / \sum_{i \in \text{Age group}} w_i a_i$  where  $w_i$  is the sample weight of household  $i$ ,  $d_i$  is household debt, and  $a_i$  is household asset.

Figure 2: Household Debt to Total Asset Ratio by Country



Source: 2014 SHFLC, 2013 SCF, HFCS

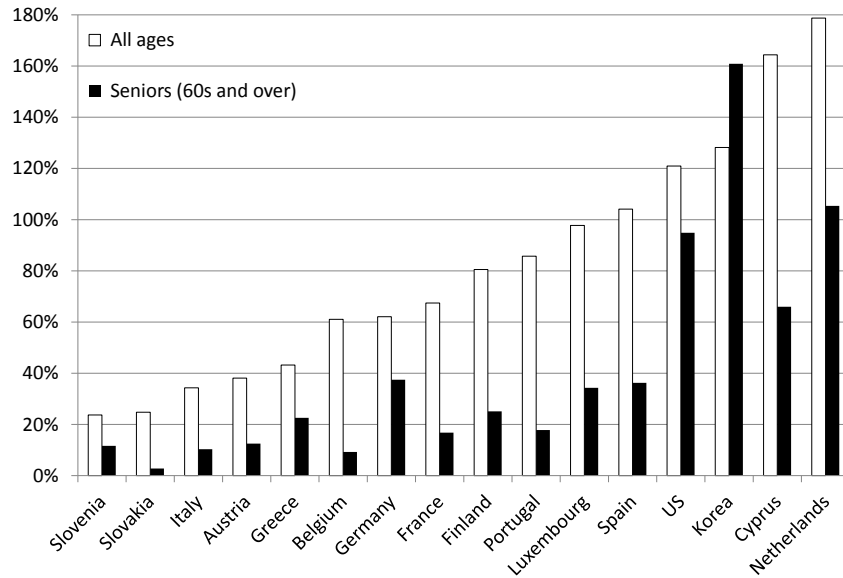
Figure 3: Household Debt to Real Estate Asset Ratio by Country



Source: 2014 SHFLC, 2013 SCF, HFCS

where payment of the entire loan principal is due at the end of the loan term, with rela-

Figure 4: Household Debt to Income Ratio by Country



Source: 2014 SHFLC, 2013 SCF, HFCS

tively short maturity.<sup>7 8</sup> Hence, households in Korea simply refinance loans when the loan contract expires, rolling over the debt again until their retirement age. 90% of households that take out bullet-type loans roll over their debt once the debt contract hits the expiration date (Financial Supervisory Service (2012)). Since the house value in Korea has steadily increased over the last decade, financial intermediaries could supply credits to households without bearing serious risk.<sup>9</sup> This Korean-specific loan contract structure makes senior households have heavy debt burdens.

Another possible reason for highly accumulated household debt held by Korean seniors might be the loan for starting self-employed businesses after retirement. Household income in Korea suddenly decreases after the retirement age, compared to the US (Kim (2015)). Hence, many retired Koreans decide to start their own small businesses (e.g. small restaurant, cafe, or laundry service) to subsidize their reduced income (see the next subsection). Data shows that the proportion of household debt for the purpose of self-employed businesses composed of 32% for senior Koreans, which contrasts with 25% for all ages. When senior households

<sup>7</sup>In the US, the term of mortgage contract averages 24-25 years, calculated from the 2013 SCF. For European countries, it is around 20-30 years (ECB (2009)). However, Korean average mortgage contract terms only recently increased to around 17 years and was 13 years in 2008 (Financial Supervisory Service (2008) and Ministry of Strategy and Finance (2014)).

<sup>8</sup>The proportion of bullet-type loans in Korea is 29% and was 43% in 2009. The average mortgage contract term for bullet-type loans is 3.3 years in Korea (Financial Supervisory Service (2008) and Ministry of Strategy and Finance (2014)). Bullet-type mortgages account for 7.5% in European countries and 7% in the US (ECB (2009) and Ghent and Kudlyak (2011)).

<sup>9</sup>Before the Asian financial crisis in the late 1990s, financial intermediaries in Korea rarely supplied credits to households. Customarily, they mainly lent money to firm sectors. Hence, an increase in household debt in Korea has become problematic since 2000.

start their businesses, they usually take out loans backed by their accumulated (real estate) assets. A sudden decrease in household income after retirement along with an increase in household debt for small private businesses is another factor that leads to a high level of household debt-to-income ratio for seniors in Korea.<sup>10</sup>

### 3.3 Income Stability

Korea's senior householders have a lower repayment capacity than the US and European countries in terms of income stability. As shown in Figure 5, relatively stable pensions and transfers account for only 18% and 40% of the income of householders in their 60s and 70s, respectively, reflecting Korea's under-developed pension system. Conversely, the proportion of wages and business income in terms of total income is 72% and 44% for householders in their 60s and 70s. Since these income sources are likely sensitive to economic fluctuations, income stability among senior householders in Korea is low.

Contrary to the Korean case, the proportion of stable income is 46% and 84% for German householders in their 60s and 70s. Similarly, it is 60% and 88% for the Netherlands but only 25% and 52% in the US. Though the portion of stable income earned by US senior householders is lower than Europe, it is still significantly higher than Korea.

### 3.4 Asset Liquidity

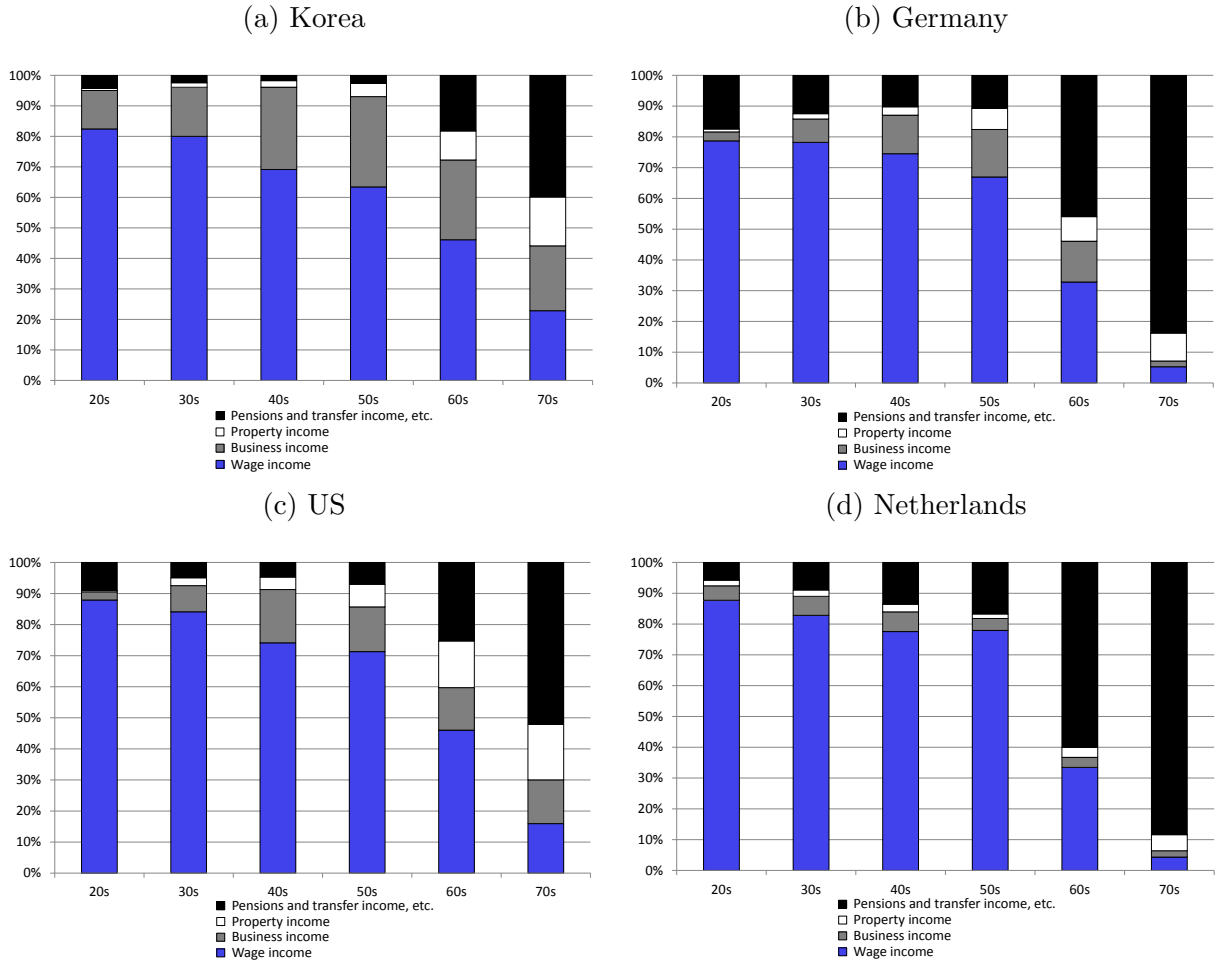
Korean seniors also face short-run non-repayment risk in terms of their liquid assets. Senior householders' debt-to-financial-asset ratio in Korea is the highest among the sample countries (See Figure 6). Korea is the only country where the debt-to-financial-asset ratio for seniors is higher than the overall country average. This implies that senior households in Korea are more likely to be vulnerable to shocks, such as a sudden increase in interest rate. In addition, if changes in the macro-financial environment demand a swift reduction in debt, senior households that are tightly constrained in their liquidity are most likely to experience a short-run deterioration in repayment capacity.

A serious scenario in Korea would be a sudden decrease in house prices as experienced in the US. Since household asset held by senior Koreans is mostly composed of real estate assets, a decrease in asset prices might increase their default risk. Then, financial intermediaries might ask those financially troubled households to repay debts or to meet the loan-to-value ratio guideline. This in turn makes some marginal households sell their homes or reduce their housing equities, leading to a further decrease in house prices as in Kiyotaki and Moore (1997) or Bernanke et al. (1998). Since seniors in Korea have only small liquidity buffers, it is highly probable that unexpected house price shocks will seriously affect those old-aged households.

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<sup>10</sup> It is possible to consider a scenario that a large household debt held by seniors might reflect their strong capacity to repay. Contrarily, small household debt extended to the younger households reflects their weak collateral capabilities and unstable future income. The young generation has not accumulated assets and does not hold as secure jobs as the senior had before. Then, younger households is unlikely to accumulate assets in the future, as well as debt. Though it is a plausible story to interpret the current household debt phenomenon, Korean medias report that household debt taken out by the young generation has increased recently. In addition, the young generation has started buying houses. If I have longer time series data, I can empirically test such a hypothetical scenario.

Figure 5: Household Income Composition by Household Age



Source: 2014 SHFLC, 2013 SCF, HFCS

#### 4 Analysis of Dynamic Changes in Household Debt

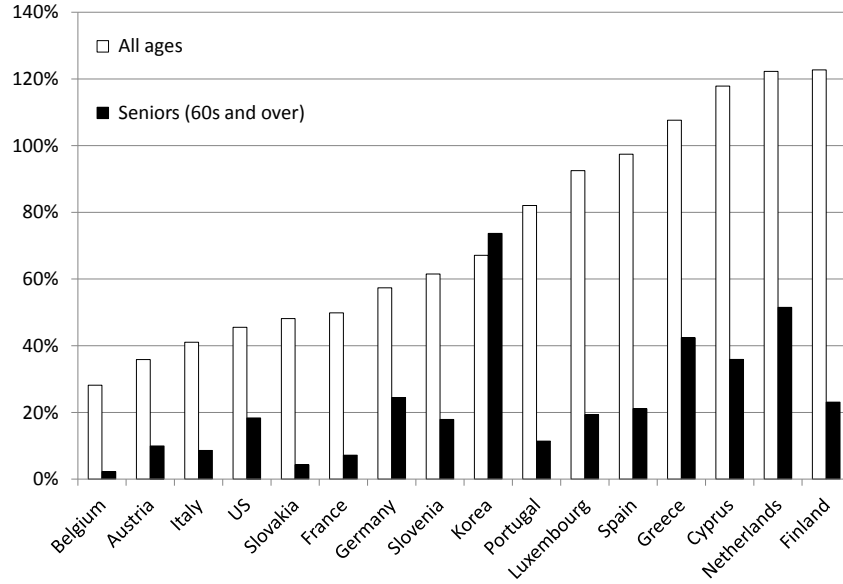
Senior household debt is affected not only by household-specific factors, but also by macro-financial conditions, which influence household's debt and repayment patterns over the life cycle. To analyze this, I decompose the change in average household debt by age group into cohort and age effects.<sup>11</sup> Let  $d_{a,t}$  denote the average household debt of age- $a$  householders at time  $t$ . After time  $\Delta$  passes, the average debt of a household with an age  $a + \Delta$  head at time  $t + \Delta$  can be expressed as  $d_{a+\Delta,t+\Delta}$ . Then, the change in average household debt from  $t$  to  $t + \Delta$  can be decomposed as follows:

$$\begin{aligned}
 d_{a+\Delta,t+\Delta} - d_{a,t} &= \underbrace{[\alpha (d_{a+\Delta,t+\Delta} - d_{a,t+\Delta}) + (1 - \alpha) (d_{a+\Delta,t} - d_{a,t})]}_{\text{Age effect}} \\
 &\quad + \underbrace{[\alpha (d_{a,t+\Delta} - d_{a,t}) + (1 - \alpha) (d_{a+\Delta,t+\Delta} - d_{a+\Delta,t})]}_{\text{Cohort effect}}
 \end{aligned}$$

<sup>11</sup>The methodology that I used here is similar to Porterba and Samwick (2001).



Figure 6: Household Debt to Financial Asset Ratio by Country



Source: 2014 SHFLC, 2013 SCF, HFCS

where  $\alpha \in [0, 1]$  is a weight which determines the reference point of age and cohort effects. In this paper, I arbitrarily set the value of  $\alpha$  as 0.5. If I use other values for  $\alpha$ , the qualitative results are the same.

The cohort effect can be interpreted as increased (or decreased) borrowing by a specific age group compared to the same age group in the past, influenced by macro-financial changes such as business cycles, interest rates, or macro-prudential policies. The age effect measures average net borrowing as a householder ages for a given survey year (or time), averaging out macroeconomic conditions.

To decompose the change in household debt into cohort and age effects, I need two different survey years of data. Since the HFCS is a single year survey, my analysis is based on the SHFLC and HIES in Korea<sup>12</sup>, and the SCF in the US.<sup>13</sup>

Figure 7 decomposes the change in household debt by household age between 2006 and 2014. Korea's recent macro-financial conditions (cohort effect) have acted to expand household debt in all age groups between 2006 and 2014, as displayed in the white bar in Figure 7. For instance, when compared with the 60-67 age group in 2006, the same age group in 2014 increased its debt by about 37% of (economy-wide) income.<sup>14</sup> This means that the

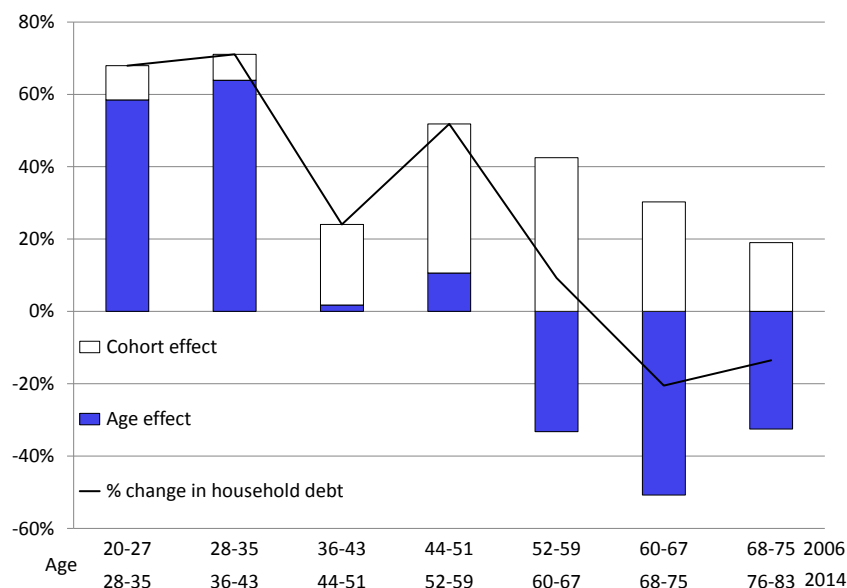
<sup>12</sup>As explained in section 2, the 2006 HIES data is the predecessor of the SHFLC. Hence, we can jointly use two cross-section data sets, 2006 HIES and 2014 SHFLC, to analyze trends as the questionnaires in both surveys are quite similar.

<sup>13</sup>To compare the changes in household debt between Korea and the US, I need to normalize the currency unit to make the two countries comparable. Hence, I divide each component (age and cohort effect) by the average income at time  $t$  and  $t + \Delta$ . All nominal values are normalized by  $t + \Delta$  prices.

<sup>14</sup>In 2006, the 60-67 age group had debt on average of 46m Korean Won (\$44k). The average debt held by the 60-67 age group in 2014 increased to 63m Korean Won (\$60k).

speed of the increase in household debt is faster than that of income, signifying a further deterioration in repayment capacity. In addition, the cohort effect for senior householders is much bigger than for those under 40s, suggesting that macro-financial conditions in this period caused a further depreciation of financial soundness among old-aged households.

Figure 7: Decomposition of Changes in Korean Household Debt by Household Age



Note: Horizontal axis denotes households with an  $a$ -year-old head in 2006 and thus an  $a + 8$ -year-old head in 2014. I normalized by dividing the average change in household debt in each age group into 2006 and 2014 average income of the entire population. Source: 2006 HIES, 2014 SHFLC.

Korean householders begin downsizing their debt when they enter their 50s, which is around 9 years later than US households who start in their mid-40s (see the age effect in Figure 9). One possible reason for such prolonged indebtedness is driven by the propensity of households to spend on their children’s education in their 40s, resulting in less savings (Kwon and Oh (2014)). The short-run bullet-type debt contract structure is another factor which makes households delay repayments and favor rolling over debt.

Households in the same age are not homogenous. Hence, I categorize households based on their financial characteristics and decompose changes in household debt within each group. Households that own their homes have significantly increased their debt over the last decade, compared to those who stay in rental houses (see Figure 8a and 8b).<sup>15</sup> In addition, the macro-financial environment was favorable to homeowners taking out their loans. Hence, we can infer that the main reason for an increase in household debt, especially held by seniors, was to build up their housing equities.

In the similar vein, households that are rich in their income and assets have increased their debt more over the last decade (see Figure 8c-8f). In addition, the macro-financial envi-

<sup>15</sup> I implicitly assume that a homeowner (renter) in 2006 is also a homeowner (renter) in 2014.

ronment has promoted to increase household debt by high-income and high-asset households. Contrarily to those asset and income rich households, there are almost no cohort effects for households whose income and assets are below the median in their age group. In addition, these low-income and low-asset households tend to start repay their debts earlier in their life than high-income and high-asset households (see the solid line). Hence, an increase in household debt, especially held by seniors, over the last decade in Korea was mainly driven by households that are (relatively) rich in their assets and income.

When I decompose the change in household debt in the US, I observe a positive cohort effect in all age groups before the global financial crisis, as shown in Figure 9a. However, after the global financial crisis, the cohort effect turned sharply negative (see Figure 9b). It is known that financial intermediaries in the US offered generous loans to low-income and low-credit households before the financial crisis, which resulted in a huge increase in household debt for all age groups (Mian and Sufi (2009, 2015) and Keys et al. (2013)). The post-crisis credit crunch then shifted macro-financial conditions towards debt reduction. During this period, there were no significant changes in the age effect, which is quite stable since the early 2000s.

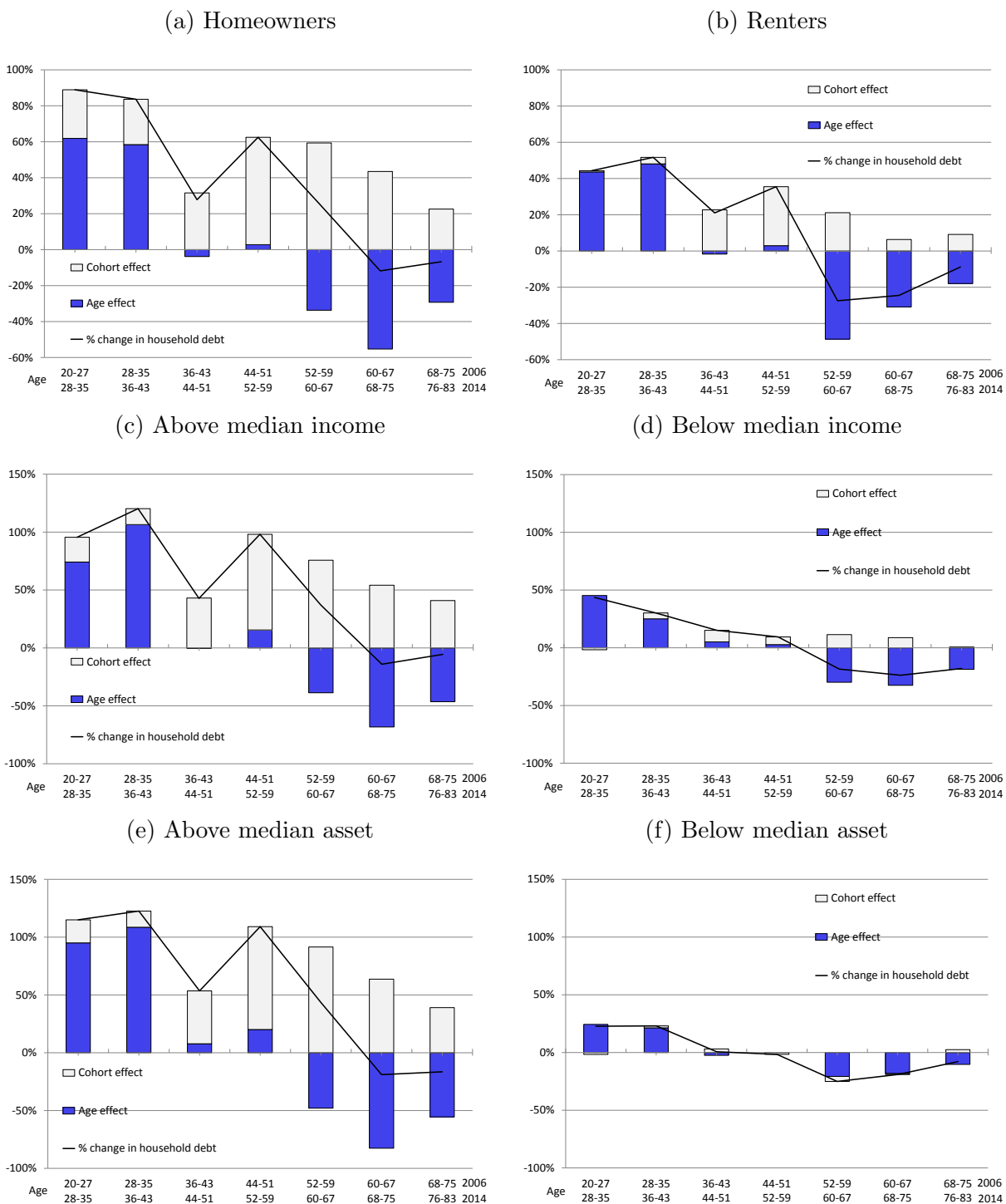
As presented in the US case, the cohort effect is much more volatile than the age effect. If Korea faced a similar scenario that forced debt reduction, the impact will most likely hit the senior population the hardest. Seniors in Korea have relatively unstable income sources and weak asset liquidity. In addition, they have accumulated most of their debt through the favorable macro-financial environment over the last decade. Though they have enough asset buffers, it is most likely that adverse shocks will negatively affect Korean senior householder's repayment capacity.

## 5 Conclusion

Korea's senior householders have weak debt repayment capacity, compared to major European countries and the US. They rely on less stable income sources, like pensions, but hold large debts relative to their financial assets and income. Though they have enough assets to repay their debts in the long-run, seniors in Korea may face short-run liquidity problems because of their weak liquidity buffers. Furthermore, with the recent macro-financial environment inducing an increase in the debt of all age groups, people are postponing repayment until their 50s. Hence, if Korea faces adverse macro-financial shocks, as experienced in the US, older households will likely be the most impacted.

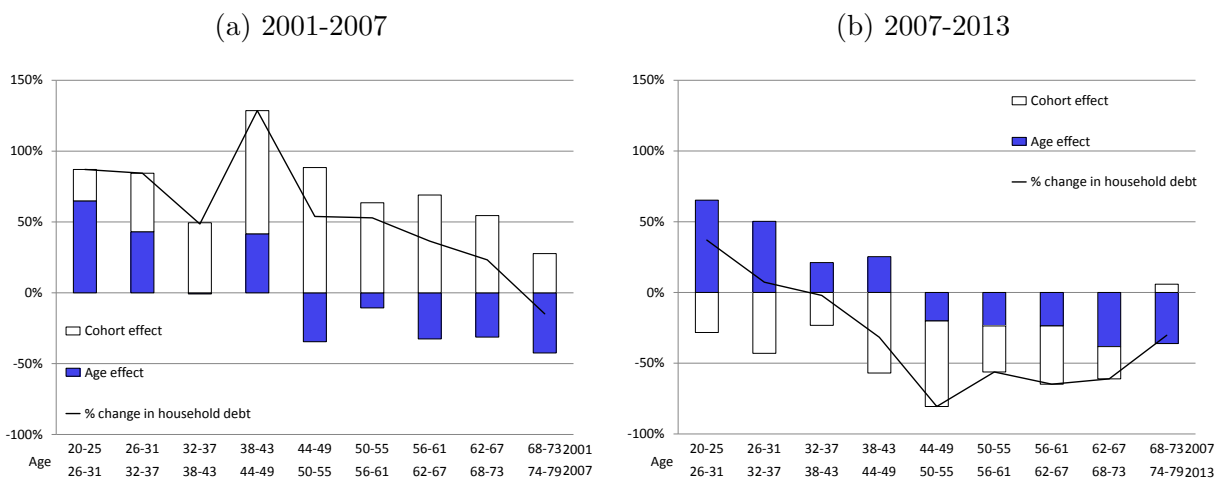
Though this paper does not fully consider several aspects of household debt issues in Korea and the analysis is based on small sampled data sets, there are several policy implications based on my analysis. First, Korean government should consider reforming and expanding real estate securitization market to enhance senior households' asset liquidity. For example, the reverse mortgage system, which is under-developed in Korea, can increase asset liquidity of senior households based on their real estate assets. Then, senior households do not need to make additional borrowing and can start paying off their debts using home equities. Second, Korean government and financial intermediaries in Korea should consider switching the loan repayment structure from interest-only bullet loans to monthly amortization loans. Since household income in Korea tends to significantly decrease after retirement, the government needs to induce households not to defer their debt burden until the twilight years.

Figure 8: Decomposition of Changes in Korean Household Debt by Household Characteristics



Note: Horizontal axis denotes households with an  $a$ -year-old head in 2006 and thus an  $a + 8$ -year-old head in 2014. I normalized by dividing the average change in household debt in each age group into 2006 and 2014 average income of the entire population. Source: 2006 HIES, 2014 SHFLC.

Figure 9: Decomposition of Changes in US Household Debt by Household Age Pre- and Post-Financial Crisis



Note: Horizontal axis denotes households with an  $a$ -year-old head in year  $t$  and thus an  $a + 6$ -year-old head in year  $t + 6$ . I normalized by dividing the average change in household debt in each age group into year  $t$  and  $t + 6$  average income of the entire population. Source: 2001, 2007, and 2013 SCF.

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