Introduction

The world is in the midst of a major demographic transition (IMF 2004). Demographic transition in a country generally starts with a declining total fertility rate leading to an aging society coupled with an increasing life expectancy, followed by a shrinking of the labor force participation and finally resulting in a shrinking of the total population. While highly asymmetric across countries in the region, East Asia is also expected to experience a rapid change in its demographic structure in the near future. Japan is already at an advanced stage of demographic transition—birthrate decline and aging—, Korea is undergoing an early phase of this process, and other countries—China, Singapore and Thailand, for example, are not far behind.

Demographic change will tend to have significant, though uncertain, impacts on a number of fronts—economic growth, labor markets, savings, financial markets and the government’s fiscal position. Drawing on a growing body of literature on the subject, this note attempts to explore effects, among others, on savings (especially household savings) of demographic changes in Japan and Korea, and to provide implications for savings of China in the years to come. It is well known that East Asian countries, particularly China, have enjoyed remarkably high growth rates over the decades largely thanks to high investments which have been financed from high levels of domestic savings. With rapid aging envisaged in the future, however, there is a growing concern that savings may decline fast leading to lower investment and thus lower economic growth. To address this concern, it is very important to understand an expected trajectory of household savings with demographic transition in the region.

Theory and Empirical Results

The life-cycle hypothesis provides a basic theoretical framework for the impact of demographic changes on household savings. According to the hypothesis, individuals smooth their consumption over their life time while the age distribution of their income follows a hump-shaped profile. This life-cycle behavior of consumption and saving implies that younger people dissave against their future incomes, adult workers save the most at the middle and end of their working life, and the elderly draw down their savings upon retirement. Therefore aggregate household savings patterns move according to changes in the age composition of the population in a country (IMF 2005). An initial increase in the working-age population and a decrease in the under-15 (years) population who save less lead to boost economy-wide savings, but as a larger portion of the population reach old age and retire, the share of savings in national income would be eventually expected to decline. In addition, as the proportion of the non-working age population increases, the government would be expected to spend more on pensions and health services even as revenues decline, resulting in a negative impact on public savings (IMF 2004).

There have been many empirical studies to test this life-cycle hypothesis. Most studies, using cross-section or panel cross-country data or time series data, find quite a strong relationship between demographic changes and household savings as the
hypothesis predicted. Both the old age and the young age dependency ratios defined as the population aged 65 and older and the population aged 14 and younger as a share of the working age (age 15–64) population tend to reduce the household savings rate with the impact of the former being much stronger. Life expectancy has a positive impact and the labor force participation rate of the aged has a negative impact on the savings because both delays people’s retirement and requires more savings for retirement—though these variables are not statistically significant.

However, understanding how demographic changes will affect savings is far from complete (IMF 2004). Some studies based on household survey data find rising savings across all age groups and higher savings of the elderly, resulting in no a hump-shaped age profile of savings that is typical to the life-cycle hypothesis and thus casting doubt about its predictions (Chamon and Prasad 2009, Jha et al. 2009). This might be because, apart from measurement discrepancies between macro and micro data, the hypothesis does not adequately take into account the desire of the elderly to leave bequests, uncertainties about their retirement, and the need of the young to buy houses and get married in the country-specific context (IMF 2005). More broadly, there are uncertainties about the reactions of individuals as the demographic transitions unfold. Furthermore, even though households will probably behave according to the predictions of the life-cycle hypothesis, the aggregate saving will also be significantly influenced by other factors such as differences in economic and social structures, government policies, business-cycle conditions as well as corporate savings behaviors.

Cases: Japan and Korea

Both Japan and Korea have benefitted from high savings rates in their early pursuit of fast economic growth. Until 1970, Japan’s gross savings-GDP ratio based on national income accounts remained high providing ample domestic resources required for economic development. Following two decades of ups and downs, however, the savings rate has been on a decline since 1990 as can be seen Figure 1. More strikingly, the household savings rate as a share of GDP has fallen dramatically since as early as the 1980s, declining from 16.2 percent in 1981 to just 5.4 percent in 2008 with a brief pause during the bubble years. Korea shows a similar movement of the household savings rate. Hovering at around mid-30 percent of GDP throughout the 1980s and 1990s, its gross savings rate has dropped to 30.1 percent in 2009. Similar to Japan, but more strikingly, the household savings rate of Korea led the drop of gross savings with more than 13 percentage point decline in just a decade and it remains one of the lowest in the OECD and Asia (Figure 2). Interestingly, both countries have experienced the increase of corporate savings that acted as a buffer against further decline of gross savings.

2 An increase of 1 percentage point in the old age dependency ration reduces savings over time by a range of 0.5 to 1.6 percentage point of GDP, whereas an increase of 1 percentage point in the young age dependency ration reduces savings by 0 to 0.7 percentage point of GDP (Loayza 2000, IMF 2005 and kujis 2006).  
3 See IMF (2005). The factors commonly identified to affect savings are: GDP per capita and GDP growth, real interest rate, the degree of financial market developments (private sector credit), terms of trade, public spending on health and education associated with the precautionary motive of savings, and macroeconomic uncertainty (inflation).
Even at a first glance, demographic changes appear to make significant impacts on the movement of household savings rates in both countries. In Japan, a falling dependency ratio—from 56 in 1960 to 45 in 1970—and a resulting rapid expansion of working-age population supported high savings rate from 1950 and through 1970 suggesting the period being ‘demographic bonus’ for the country. After 1990, however, Japan entered a typical demographic onus as the fertility rate continued to decline and workers of baby boom generation began to retire (Figure 3). Its working-age population peaked at 87.26 million in 1995, while its labor force peaked at 67.93 million in 1998 and has been declining since. During the two decades through 2008, the old-age dependency ratio increased by about 16 percentage points and gross (household) savings declined by 9 (8) percentage points from its peak of 34 (13.3) percent in 1991 to 25 (5.3) percent in 2008. Korea follows Japan with the lag of around 15 years when it comes to the population aging. It has enjoyed demographic bonus until recently thanks to a rapidly falling young-age population and modestly increasing aged population providing a condition for high savings. Since the 2000s, however, Korea’s demographic transition turned the course as the dependency ratio started to increase, albeit modestly, due to the rapidly increasing old-age dependency ratio (Figure 4).

Lots of studies have been conducted to take a closer look at the demographic impacts on savings for the two countries, focusing initially on determinants of high gross savings and later on the declining trend of household savings. Main findings from these researches are;

- Most empirical analysis based on time-series data as well as cross-country data find that the demographic effects on household savings are both statistically and economically significant that is consistent with the predictions of the life-cycle model.\(^4\)

- Most studies based on household survey data also find a stable hump-shaped age-saving profile across age cohorts with the savings of the elderly lower than that of the younger households again consistent with the life-cycle model.\(^5\)

- The old-age dependency ratio, among demographic variables, has clearer and larger impacts on savings as other cross-country studies, while the role of the young-age dependency ratio does not seem as obvious as the theory suggested\(^6\).

- Demography is one of long-term structural forces behind the movement in savings rates, and as such other structural and cyclical factors are equally or more important in explaining savings in the short-term. A structural factor identified as

\(^4\) For instance, IMF (2005), among others, found that the old-age and the young-age dependency ratio had negative coefficients, -0.25 and -0.20, in its estimated aggregate household saving equation in Japan. In the case of Korea, Kwack and Lee (2006) found that a 1 percent rise in the old- and young-age dependency ratio decreases the savings rate by 0.34 and 0.15 percent, respectively.

\(^5\) Horioka and Hagiwara (2010); Jha et.al (2009).

\(^6\) Horioka and Hagiwara (2010) report the sign of the young-age dependency ratio is not stable and insignificant in their estimation results including Korea and Japan. Further, contrary to conventional wisdom, Karasulu (2010) argues that a significant drop in the young-age dependency ratio induced by the fast drop in the fertility rate was a key reason for the declining savings rate.
significant in two countries was the public pension system which exerted downward pressure on precautionary savings. Examples of cyclical factors were; increased access to finance and deteriorating terms of trade after the Asian crisis particularly in Korea.

Looking ahead, the demographic structures of Japan and Korea are expected to change rapidly around 2020 up to 2050. According to the UN’s World Population Prospects (2008), Japan’s total dependency ratio will increase to 67 in 2020 and 86 in 2040 from the current level of 56. While Japan is already at an advanced stage of the demographic transition with the highest life expectancy and the lowest birth rate among industrial countries, Korea’s speed in the population aging is remarkably much faster. Indeed, the dependency ratio of Korea will touch 40 in 2020 and 72 in 2040. It is expected that Korea will enter into an aged society in the next decade with labor force and total population declining from mid-2010s. Based on this long-term population prospects and simple empirical models capturing the effect of aging, savings rates in the two countries are projected to decline sharply as the share of the elderly in the population rises and working-age population falls. IMF (2004) predicts that Japan’s gross savings as a share of GDP will decrease by 12 percentage points by 2050, and Horioka et.al (2007) further argues its household savings becoming zero or even negative in the near future. Korea will also show its savings rate decline by as much as 5 to 14 percentage points by 2030 (Kwack and Lee 2005, Horioka and Terada-Hagiwara 2010).

While a rapid aging will inevitably continue to reduce household savings rates in Japan and Korea, some caution should be exercised to take these projections for granted. Firstly, there is an inherent uncertainty when using long-term population projections of any kind and demographic projections do become much more uncertain the further into the future one goes (IMF 2004). Secondly, as mentioned, there are also uncertainties on behaviors of individuals reacting to demographic changes, which is a core basis of the life-cycle hypothesis. For instance, the elderly rather than drawing on the accumulated wealth, could seek to maintain it in the face of uncertainty about their life after retirement or necessity of supporting their adult-age children. Further, if people expect that incomes in the future will be lower because of the demographic change, they could raise saving in the near-term to smooth their future consumption. Thirdly, more importantly, household savings rates would be significantly influenced by structural and cyclical factors other than demographic variables in the short-term period. For instance, the design of sustainable pension system as well as flexible labor market policies may counterbalance, at least partly, the negative effects of population aging on savings rates.

Implications for China

China’s high savings has attracted lots of attention among academia and policy makers as it lies at the center of heated debates of global imbalances. Having risen throughout the 1990s and 2000s (especially since the 2000s), China’s gross savings rate as a share of GDP stood at 53.2 percent in 2008, which is high by historical standards, international standards, and several empirical model predictions (Ma and Yi 2010). A closer look at components of gross saving reveals that its household savings, stood at 28.3 percent of GDP as of 2008, accounts for the largest portion of the gross savings though corporate and government savings are gaining importance during the mid-2000s (Figure 5).

Demography itself played a role to a certain extent. A sharp decline in China’s young-age dependency ratio, thanks to the one-child policy, has appeared to contribute to this exceptionally high savings that was largely supported by empirical analysis using time-series data (Figure 6). However, unlike Japan and Korea, a couple of studies based on household survey data find (i) a rising savings rate among all groups and (ii) further a U-shaped savings pattern across age cohorts, suggesting that younger people save more of their income, working-age people save relatively less and then old-aged again save a lot. This pattern is a

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7 IMF (2004) argues that past demographic projections have shown a clear tendency to underestimate the share of the elderly in the total population, the decline in fertility rate and the increase in life expectancy.
8 Jha et al (2009) explains that almost a monotonic increase in savings rate in tandem with the age of the household head found in household surveys of Philippines is attributable to its unique family composition that elderly persons live with working-age family members.
9 Horioka et al (2007) argues that the existence of a pay-as-you-go public pension system increased the savings of cohorts born after 1980 slowing the decline in Japan’s household saving rate as the proportion of these cohorts in the total population increased. Karasuğil (2010) asserts that eliminating the seniority wage system and increasing regular employment of old-age workers would reverse an increasing trend of the poverty risk, thus mitigating the decline of savings rate among these people.
10 Corporate savings as a share of GDP surpassed household savings starting 2001, peaked at 23.5 percent in 2004 and then remains behind household savings.
11 Horioka and Wan (2007); Chamon and Prasad (2008); Jha et al. (2009); Chamon et.al (2010).
sharp departure from the traditional life-cycle hypothesis. This may point to a relatively limited role for demographic changes to explain the rise in savings (especially urban household) rate in China and other important structural forces at work. Most notable, among others, is the precautionary motive that appears to drive up savings among younger and older households—a feature that was also present, but weaker in Japan and Korea. The large-scale reform of State-Owned Enterprises during the 1990s, the newly introduced but fragmented and limited public pension system, and still lower public expenditures on health, education and social security seemed to have combined to increase risks and uncertainties faced by households and may have contributed to higher household savings especially among older households. The introduction of private home ownership as part of corporate reforms during the mid-1990s is pointed out as well to have provided additional incentives for households to build up aggregate savings.

Going forward, as China’s demographic transition continues, the old-age dependency ratio is projected to rise in the coming decades reaching around 24 in 2030. While there is uncertainty, this will likely exert downward pressure on the current household savings rate. Compared to Japan and Korea, however, a meaningful rise in the dependency ratio is expected to be rather slow and begin only after 2025–2030. That’s because the rise in the old-age population will be partly offset by declining young-age population (Figure 6). This demographic trend suggests that while the aging effect on savings would eventually become substantial, it will be only mildly negative in the coming decade. Add to this other structural forces that contributed to building up savings, and the savings rate in China would not decrease meaningfully in the years ahead. This suggests that the government could take appropriate measures to address structural factors affecting the household savings rate, including one to reduce precautionary savings among the elderly without worrying too much about negative consequences of aging on nation-wide savings and investment.

12 For high corporate savings in China, poor corporate governance leading to low dividend payouts and financial underdevelopment are often cited as main reasons. The government’s savings rate is high because much of the rising government income has been invested and saved rather consumed especially in the 2000s reflecting its favor of investment and growth rather than providing public services and the build-up of pension assets.

13 Given the trend of population aging, Kujis (2006) predicts that China’s savings rate would decrease only by 2 percentage points by 2025 and Jha et.al (2009) projects it would rather increase by 2030.

14 Baldacci et.al (2010) asserts that a 1 percent of GDP increase in social spending would result in the reduction of household savings in the range of 0.56-1.03 percent of GDP based on the OECD country sample.
References

12. IMF (2005), “Global imbalances: A saving and investment Perspective”, In World Economic Outlook