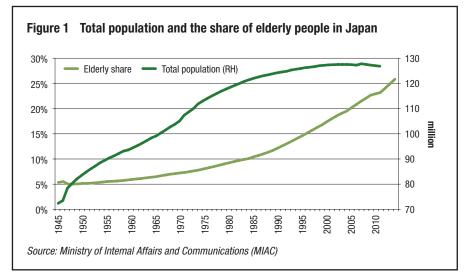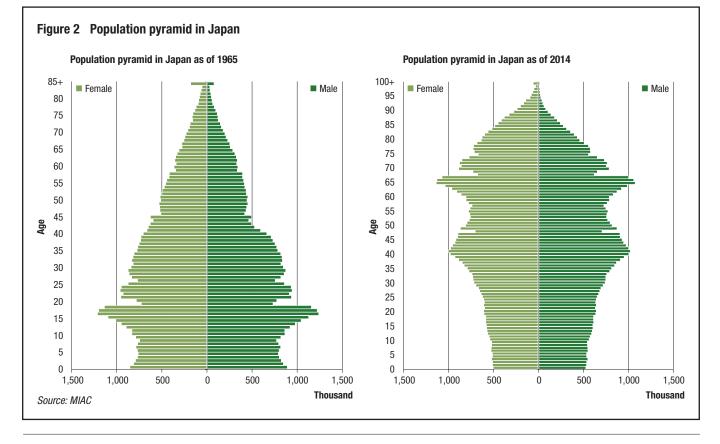# Housing and demographics:
experiences in Japan

↳ **By Masahiro Kobayashi[1]**

1. Introduction

Japan has undergone a significant change of demographics in the past several decades. In 1945 when World War II ended, the Japanese population was 72 million. It increased to 128 million by 2010 and then started to decline. In the meantime, there has been a significant increase in the elderly population; in 1945 the proportion of those aged above 65 years old was 5.1% of the total population, which had increased to 26.0% by 2013 [Figure 1]. The figure is one of the highest in the world, and in this regard, Japan is the front-runner as an aging society.

The shape of the population pyramid used to be a triangle in Japan until the middle of 20th century,

Figure 1 Total population and the share of elderly people in Japan

Source: Ministry of Internal Affairs and Communications (MIAC)

Figure 2 Population pyramid in Japan

Source: MIAC

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[1] The views and opinions are author's own and do not represent those of JHF or the Government of Japan. This article has been prepared for the sole purpose of providing information only and not as an offer, sale or inducement to buy or sell bonds.

but the shape has changed dramatically since then and as of 2014, those aged at 65 year old represent the largest age group [Figure 2]. The population numbers of those aged between 64 and 67 are more than 2 million each, and the only age group which has more than 2 million of population as of 2014 other than them is those aged at 40 years old. The former age group comprises post-war baby boomers, and the latter composes junior baby boomers.

The two large age cohorts made for a unique configuration of the working age population in Japan. The United Nations defines "working age population" as those in the 15 to 64 age group. The inverse dependency ratio, which is the ratio of the working age population divided by the rest of the age groups (younger than 15 and older than 64), has two peaks in Japan [Figure 3].
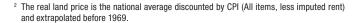
Post-war baby boomers have had significant impact on the dynamism of Japanese society. They migrated from rural agricultural regions to urban commercial and industrial regions in the 1960's and such migration caused severe housing problem in such metropolitan areas as Tokyo and Osaka. The second peak of the inverse dependency ratio was observed in the late 1980's and early 1990's. This coincided with the bubble economy in Japan. Baby boomers were still working while baby boomer juniors entered into working age. As the baby boomers started to retire, however, Japan is expected to experience a continuous decline of inverse dependency ratio for decades to come.
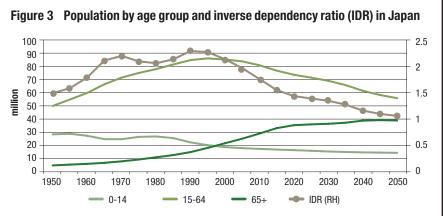
Will such a demographic trend negatively affect housing markets in Japan?

2. Observations

Housing starts in Japan have had a strong correlation with core working age populations [Figure 4]. Regression analysis using actual housing starts as explained variables and number of population of age groups for 20's, 30's and 40's year old as explanatory variables shows coefficient of determination (R^2) of 0.836 for the observation period of 1955 to 2014, with t value of each explanatory variables ranging from 5.37 to 10.37, meaning that they have statistical significance.
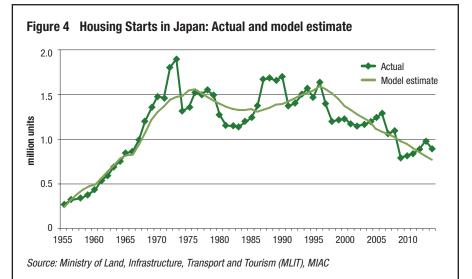
Not only housing starts, but property prices also had a strong correlation with demographics in Japan [Figure 5]. The two peaks of the inverse dependency ratio, or the period of population bonus, coincided with the peaks of real land
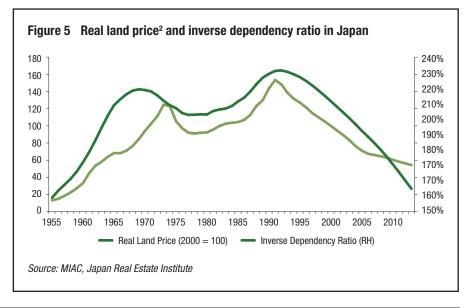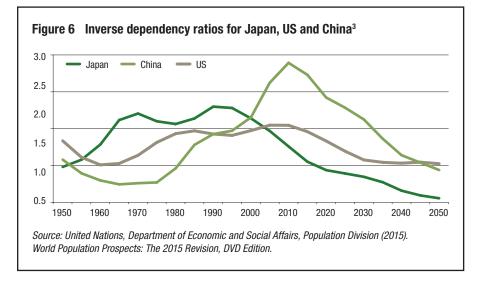
Figure 3 Population by age group and inverse dependency ratio (IDR) in Japan

Note: estimates start from 2015

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition

Figure 4 Housing Starts in Japan: Actual and model estimate

Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT), MIAC

Figure 5 Real land price[2] and inverse dependency ratio in Japan

Source: MIAC, Japan Real Estate Institute

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[2] The real land price is the national average discounted by CPI (All items, less imputed rent) and extrapolated before 1969.

Figure 6 Inverse dependency ratios for Japan, US and China[3]

Source: United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.

prices. During these population bonus periods, there was a plentiful supply of houses as was illustrated in Figure 4, but despite of such supply, the real land price climbed in those days, suggesting that demand was stronger than supply.

Although Japan is the forerunner of an aging society, it is a challenge for many other countries, not only for advanced economies but also for emerging economies including China [Figure 6]. China introduced the so-called "one child policy" around 1980, and this has distorted the demo-graphic composition of China. However, the inverse dependency ratio is expected to decline in the US as well, although the total number of the population as well as the working age population is expected to grow in the US.
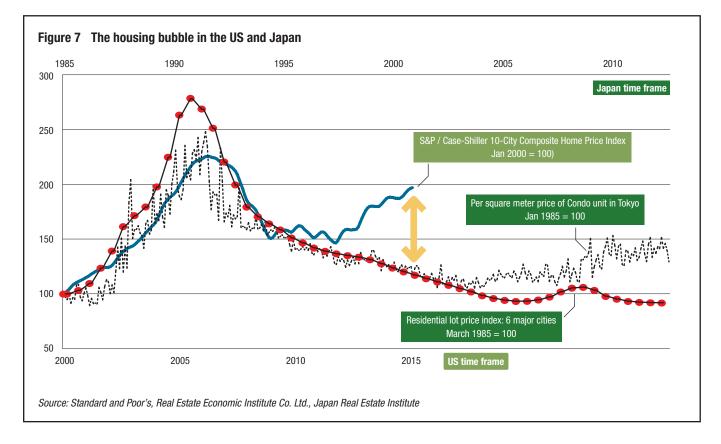
What is interesting is that the US had two peaks of the inverse dependency ratio just as was the case with Japan for the same reason. The second peak, in the early 2000's, was the period of the US housing bubble which led to the subprime crisis. If the demographic factor is the only fac-tor affecting the housing market, we can see only gloomy pictures for many countries for decades to come.

3. Difference between US and Japan

After the collapse of the property bubble, Japan faced a persistent decline in property prices while the US seems to have averted this [Figure 7].

Figure 7 illustrates the trajectory of property prices for Japan starting from 1985 and the US starting from 2000. The residential lot price in 6 major metropolitan areas in Japan is illus-trated with a black line with red circle marker and the per square meter price of condominium units in Tokyo metropolitan area is illustrated with a black dotted line for Japan, both indexed to 100 as of year 1985. The blue fat line stands for the US housing price as measured by S&P Case/Shiller Home Price Index for 10 major cities indexed to 100 as of year 2000.

The property prices in both countries doubled in 5 to 6 years and then the property bubble collapsed. The trajectory of the creation and collapse of the bubbles seems almost identical for the initial 10 years or so. However, since 2012, the US housing price has started to pick

Figure 7 The housing bubble in the US and Japan

Source: Standard and Poor's, Real Estate Economic Institute Co. Ltd., Japan Real Estate Institute

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[3] Estimates start from 2015. The figures after 2015 are UN estimates with medium fertility.
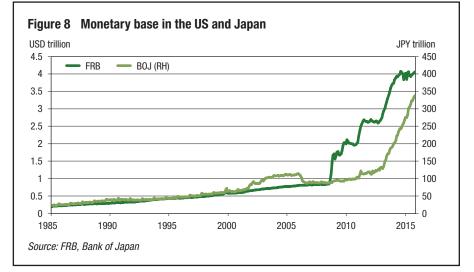
up and apparently deviated from Japanese case. S&P Case/Shiller Home Price Index employs "repeat sales method" and it may reflect the status of property market more accurately than other statistics, but according to other statistics including new home sales prices by the Census Bureau of the US Department of Commerce, and existing home sales prices by the National Association of Realtors, home prices have already recovered to the level of the pre-crisis peak. In any case, the home price in the US did not follow the same path as Japan. In this regard, the argument that relates housing prices with the inverse dependency ratio may not be plausible. US case suggests that Japan is the outlier rather than main stream.
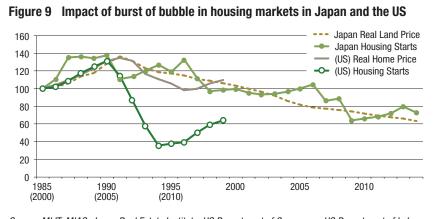
What made the US different to Japan would be the difference of monetary policy after the collapse of the property bubble, among others. Aggressive monetary accommodation by the Federal Reserve prevented the US economy falling into "lost decades".
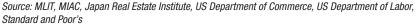
In Japan, the Bank of Japan, the central bank, was praised by the media to depress the property price even after the property price started to decline in the early 1990's. There was strong support from the public to punish speculative real estate transactions. In retrospect, it was wrong from the perspective of the macro economy. In the middle of the 1990's, the Bank of Japan started to lower its official discount rate, but did not implement a large scale asset purchase program as the Federal Reserve did immediately after the outbreak of the global financial crisis [Figure 9]. The Japanese economy suffered from 15 years of deflation from 1998 until Bank of Japan introduced an extraordinary monetary accommodation named "Quantitative and Qualitative Monetary Easing (QQE)" from April 2013.

The population accounts for only a fraction of change in the economy if measured by the contribution to the composition of GDP change, but people were very pessimistic in Japan. This pessimism was reinforced by the persistent deflation and many people believed that deflation was caused by the declining population, and that property prices would continue to decline along with deflation because the Japanese population would continue to decline for decades to come. The QQE is a social experiment to change the minds or expectations of people.

Another factor that favorably affected to the US home price recovery would be the drastic decline

Figure 8 Monetary base in the US and Japan

Source: FRB, Bank of Japan

Figure 9 Impact of burst of bubble in housing markets in Japan and the US

Source: MLIT, MIAC, Japan Real Estate Institute, US Department of Commerce, US Department of Labor, Standard and Poor's

of supply of houses [Figure 9]. Comparing the number of housing starts in the US starting from 2000 to Japan starting from 1985 again, the housing starts in Japan remained significantly higher than the US after the collapse of the bubble due to some extent to policy measures to stimulate the economy in Japan. This is the adjustment to the supply side, not the demand side.

The effort to sustain the housing markets by this policy initiative adversely affected the market in terms of property prices at least, and this lesson has some implication for China these days.

4. Aging society and household finances

So far, QQE by Bank of Japan has been working well. After 30 years[4], property prices (housing

and stock) have regressed to fundamentals (GDP) [Figure 10]. In the long run, the bubble would burst and after the collapse of the bubble, property price would recover so long as the fundamentals of the economy are sound. In this regard, the property bubble per se may not be as important as many people would believe, at least over the longest term.
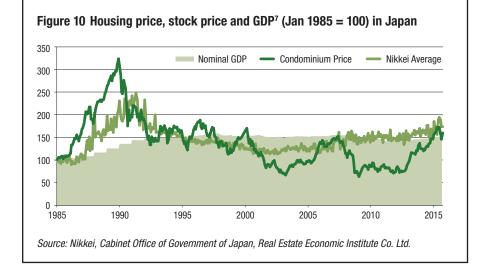
However, 30 year is long enough to see the change of generations. A different generation, having different experiences, may change their behavior over such a long time horizon.
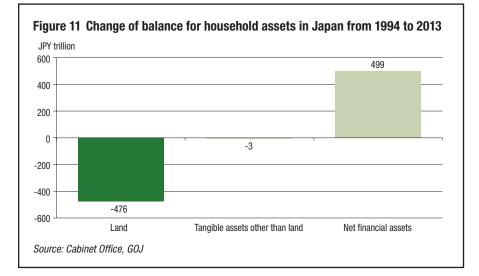
During the asset disinflation period, the value of land held by the household sector declined by 476 trillion yen from 1994 to 2013[5]. In the meanwhile, household sector hoarded almost equivalent amount of financial assets[6] (499 tril-

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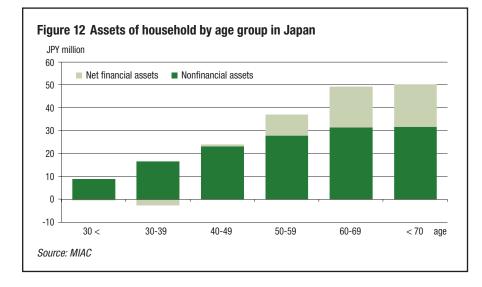[4] The Japanese economy faced significant fluctuation since the Plaza Accord of 1985.

[5] Current series of SNA (National Accounts of Japan) starts from 1994 and ends in 2013 as of November 2015.

[6] Considering that the level of stock prices is almost the same for 1994 and 2013, the change of financial assets is largely attributable to the increase of cash and deposits.

Figure 10 Housing price, stock price and GDP[7] (Jan 1985 = 100) in Japan

Source: Nikkei, Cabinet Office of Government of Japan, Real Estate Economic Institute Co. Ltd.

Figure 11 Change of balance for household assets in Japan from 1994 to 2013

Source: Cabinet Office, GOJ

Figure 12 Assets of household by age group in Japan

Source: MIAC

lion yen) and restrained personal consumption [Figure 11]. Household sector which faced decline of property price may have tried to rebalance their asset position by increasing financial assets, may it be intentionally or incidentally.

Another reason to explain the increase of financial assets held by the household sector also relates to demographics. An elderly population has more net financial assets as well as nonfinancial assets (mainly owned houses) [Figure 12]. Payment of lump sum retirement benefits is one of the major causes.

However, the elderly population, although it may be rich in assets, usually has poorer cash flow than working age population. In short, they are asset rich but cash poor. In this regard, there are possibilities for a reverse mortgage market to develop in Japan, but challenges remain. One prerequisite is the stabilization of property prices. If the price of property continues to decline, the premium to recover the cost after the disposition of the property at the time of the death of the borrower of a reverse mortgage would be too expensive to attract many customers. Another is the stabilization of future interest rates.

In this regard, it is to be noted that as the population ages, the macroeconomic savings rate for the household sector continued to decline and turned into negative in 2013.

So far, the long term interest rate is anchored thanks to the QQE by the Bank of Japan. The inflation rate is picking up, but remains below 2% objective [Figure 13]. Will such a low interest rate environment last even after more elderly people retire? We have to closely monitor the development of capital markets after the normalization of extraordinary monetary accommodation by Bank of Japan.

5. Impact on homeownership

As of October 2013, there are 60.63 million housing units in Japan, of which, 8.20 million are vacant[8]. Among the remaining 52.43 million houses which are occupied, 61.7% are owner-occupied. This 61.7% is referred to as the homeownership level in Japan. As of today, homeownership is not a major policy priority in Japan. The major policy priority is how to address the 8.20 million vacant houses, accounting for 13.5% of the total housing stock.

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[7] "Condominium Price" represents per square meter price of condominium units in the Tokyo Metropolitan Region. The current series of "Nominal GDP" starts from 1994 and figure here is the seasonally adjusted annual rate on a quarterly base. Figures before 1993 are the author's

estimates of annual value by chaining the previous series at 1994. The "Nikkei Average" is the value at the end of the month except for May 2015.

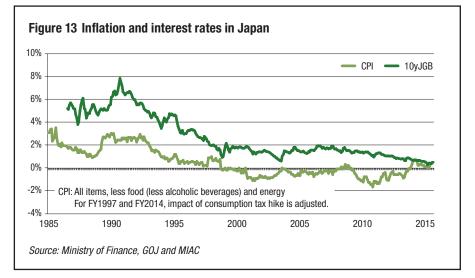[8] Includes both owner and rental property as well as second houses.

The vacancy rate is higher in regions with declining population [Figure 14]. The total population of Japan started to decline from 2010, but the degree of demographic change differs depending on the region. There are 47 prefectures in Japan and from the 2008 census to the 2013 census, the national population decreased by 394,000, but in Tokyo, the population increased by 462,000. Okinawa ranked second in terms of population growth due to a high birth rate (the increase of Tokyo is due to social migration because the birth rate in Tokyo is the lowest among 47 prefectures).
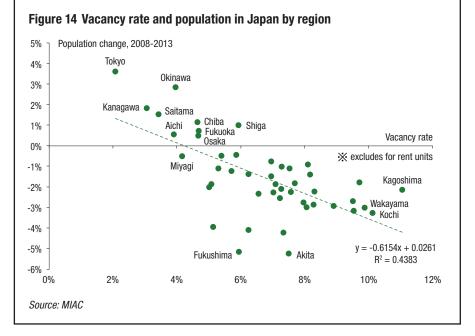
A certain level of vacancy rate may be necessary to secure mobility of people. However, more than half of the vacant units are vacant for more than 5 years, and the vacancy rate of 13.5% is thought to be too high by many people in Japan. Some people say that there is no need to construct new houses anymore because there are 8.20 million vacant houses and we should utilize those vacant housing units before constructing new houses.
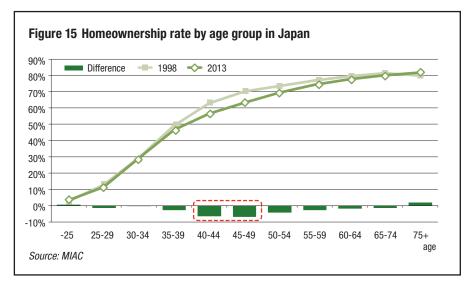
However, high vacancy rates are observed in regions which are far from Tokyo, and those who need houses, especially the young, may face more difficulty finding employment opportunities in those regions than in Tokyo. How to revitalize the regional economy to attract more young households is a policy priority which encompasses various elements including the housing issue, among others.

Homeownership of 61.7% is not very high, but not very low among advanced economies. If we compare the homeownership rate by different age groups in Japan, it is higher amongst the elderly cohort than the young cohort. One of the reasons for Japan being able to maintain the rate of homeownership above 60% is the aging society; the proportion of elderly people, who have a higher homeownership rate amongst the total population is increasing. The aging society, however, does not cause an automatic rise of homeownership. The homeownership rate has declined amongst many age groups, especially among those in their 40's [Figure 15].

Another aspect to be noted about housing markets in terms of demographics is the number of construction workers. The number of employees in the construction industry has been declining faster than the total population, and insufficient construction workers can be a constraint on the industry for some time [Figure 16]. A declining population had been thought to be the cause of deflation because there is less demand in Japan, but now people are recognizing that

Figure 13 Inflation and interest rates in Japan

CPI: All items, less food (less alcoholic beverages) and energy
For FY1997 and FY2014, impact of consumption tax hike is adjusted.

Source: Ministry of Finance, GOJ and MIAC

Figure 14 Vacancy rate and population in Japan by region

Population change, 2008-2013

Vacancy rate

※ excludes for rent units

$y = -0.6154x + 0.0261$
$R^2 = 0.4383$

Source: MIAC

Figure 15 Homeownership rate by age group in Japan

Source: MIAC

a declining population has an impact on the supply side as well.

6. Conclusion

Housing comprises places where people live. As the population decreases, it may be natural for people to assume that there would be less demand for housing. There was such a strong belief in Japan after the collapse of the property bubble in the early 1990's and such a belief reinforced persistent deflation as a self-fulfilling prophecy, not only for the price of goods and services in general but also for property prices.

What was unique in Japan was that there were two periods of population bonus created by baby boomers and baby boomer juniors, which coincided with the housing boom. It is projected that the ratio of the working age population to the rest will continue to decline in Japan due to the low birth rate and growth of elderly populations. If the relationship between demographics and housing is taken granted, we would see a very gloomy outlook for the Japanese housing market.

However, the US, which has a similar demographic trend, has deviated from the trajectory of the property bubble and its aftermath. The US housing market recovered strongly due to the extraordinary monetary accommodation implemented by the Federal Reserve and averted persistent deflation as Japan experienced for as long as 15 years. The Federal Reserve learned a lot from the experience in Japan in the late 1990's and took effective policy measures. This is a good example of how we can learn from the experience of foreign countries.

Once caught in deflation, it is very difficult to get out of it[9] and therefore, it is very important to take measures to prevent the economy falling into deflation, especially for Europe where the demographic trend is closer to Japan than the US.

People in Japan may have focused too much on the demand side of the demographic impact on housing, but we have to pay attention to the supply side as well. Furthermore, demographics would impact on various aspect of the economy, not only on housing, and we have to distinguish what elements are more directly affecting housing than others, including job opportunities. In this

regard, the topic of "housing and demographics" is still at an early stage of statistical analysis and we have to verify the hypothesis with incoming data which are becoming available as the society ages.
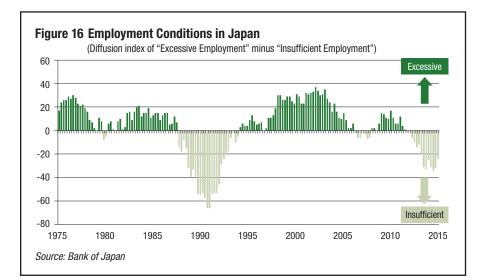
We are pleased and honored to share information on what is happening in Japan along with available statistics as they evolve and to exchange views with international housing finance experts to better serve the people on this planet.

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Figure 16 Employment Conditions in Japan
(Diffusion index of "Excessive Employment" minus "Insufficient Employment")

Source: Bank of Japan

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[9] See Bullard [2010].