DISAPPEARING CITIES: DEMOGRAPHIC HEADWINDS AND THEIR IMPACT ON JAPAN’S HOUSING MARKET

Japan’s population is rapidly aging and shrinking, and doing so unevenly across regions. Large cities, notably the Greater Tokyo area, are experiencing net migration inflows, while other regions are experiencing net migration outflows. In this chapter, we assess the regional differences in population dynamics and their implications for house price developments in Japan. Due to the durability of housing compared to other forms of investment, the magnitude of house price declines associated with population losses is larger than that of house price increases associated with population gains. These model-based predictions are likely to underestimate the actual fall in house prices associated with future population losses, as expectations of lower housing prices in the future could trigger more population outflows and disposal of houses, especially in rural areas. We suggest policy measures to help close regional disparities and avoid potential over-investment by taking account of demographic trends for housing supply.

A. Motivation

1. **Japan is at the leading edge of global demographic change, facing not only a shrinking, but also a rapidly aging population.** According to official projections, Japan’s total population will continue to decline, after reaching a peak in 2010. In addition to its shrinking population, another demographic challenge for Japan is its aging population. The old age dependency ratio (measured as old-age population as a share of working-age group) has been on the rise—the ratio exceeded 40 percent in 2014 and is expected to accelerate, reaching above 70 percent in the next 50 years.

2. **Rural areas are facing more adverse population trends than urban areas.** Different regions in Japan are experiencing the demographic transition (an aging and shrinking population) at a different pace. Large cities, particularly the Greater Tokyo area, are experiencing net migration inflows, driven by younger Japanese seeking education and jobs. For other regions of Japan, population is declining and aging rapidly, as low fertility and outflows of the young exacerbate adverse demographic trends. Altogether, the regional disparities are growing, led by the divergence of demographic trends across regions.

3. **Housing market and real estate prices are one important channel through which demographics affect the macroeconomy.** According to Japan’s National Survey of Family Income and Expenditure of 2014, dwelling-related liabilities (purchase of house and/or land) consists of about 75 to 90 percent of total household liabilities. In addition, land and real estate are strong collateral for household and business lending. Therefore, a fall in housing prices has important implications for household wealth and the health of household and bank balance sheets.

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4. **This chapter assesses the relationship between demographic trends and housing prices in Japan.** Among various issues in the context of regional disparities, we focus on regional differences in population dynamics to try and understand to what extent demographic trends have influenced housing market prices in Japan in the past twenty years. First, we document how demographic trends and housing prices have evolved over time across Japanese regions. Second, we ask to what extent demographic trends are drivers of housing price dynamics in Japan and how this relationship has evolved over time. We then look at the potential drivers of uneven population growth across regions and offer policy recommendations to help address regional disparities in housing price developments.

B. **Demographics and Housing Prices in Japan**

5. **Japan’s declining and aging population generates an oversupply of houses, particularly in rural areas.** According to the Ministry of Infrastructure, Land, and Transportation, nearly 13 percent of Japan’s total dwellings are vacant. These unoccupied houses are referred to as “Akiya” and are sold for free (or at a negative price). In the next 15 years, the number of vacant houses will increase to a staggering 21.7 million houses, or about one-third of total dwellings in Japan. This phenomenon is observed in all parts of Japan, but particularly in rural areas, where the population is shrinking at a faster pace than in urban areas.

6. **Japanese are moving to the four largest cities—Tokyo, Osaka, Nagoya and Fukuoka.** Population change at the prefecture-level can be characterized by inflows of people into these cities. In the past two decades, the population of the Greater Tokyo area, including Tokyo, Saitama, Chiba and Kanagawa prefectures, grew by about 10 percent, while Hokkaido lost about 6 percent of its population (Figure 1). As a result, prefecture-level population concentration increased in the four cities, with Tokyo’s population increasing by the largest magnitude of 1.3 percentage points, and Hokkaido decreasing by the largest magnitude of 0.3 percentage points.

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**Figure 1. Japan: Population Change by Prefectures Between 1996-2015 (in percent)**

In the past two decades, population declined in rural areas, but concentrated in large cities.

Sources: Statistics Bureau of Japan, Cabinet Office
7. Despite the shrinking population, the total number of households in Japan has not declined (see Figure 2). The number of households increased by 76 percent from 1970 to 2015. During this period, the increase was greater for large cities (which increased by 116 percent) than for rural areas (which increased by 18 percent). As a result, the total number of households in 2018 stands at around 50 million. However, the average size of a family has declined steadily, with an increase in both the shares of the nuclear family and one-person family.

![Figure 2. Japan: Household Statistics](image)

8. Japan’s housing prices have gone through a large swing since the early 1990s.\(^2\) Housing price movements in Japan can be grouped into five time periods: (1) pre-bubble period, (2) post-bubble period until 2001, (3) mini-bubble between 2002–08, (4) pre-Abenomics and (5) Abenomics period. With the economic expansion experienced in the 1970s and 1980s, housing prices in Japan increased until the years leading up to the so-called ‘Bubble Period’ of the early 1990s. Beginning in 1988, price appreciation intensified, increasing by 6 percent annually on average. The bubble collapsed with a sharp decline in housing prices until 1994. The price has been on a declining trend since then, with a short-lived period of a “Mini bubble (2002–08)”, and a recent minor recovery in housing prices after 2014. Since the beginning of Abenomics, prices have started to increase gradually (increasing by 2.7 percent since 2014 and by 0.7 percent in 2018). With the recent increase in housing prices, they have recovered to the level last observed in 2013.

\(^2\) Throughout the chapter, with the exception of Box 1, residential land prices are used as a proxy for housing prices.
9. There is a clear regional dispersion in terms of housing price changes since the Bubble Period burst in the early 1990s. Figure 3 shows the growth rate of housing prices across prefectures. The map on the left shows the price change since 2002, demonstrating that all prefectures, except for Tokyo, experienced a decline in housing prices (by between -5 to -15 percent). The map on the right shows prefecture-level house price changes since 2014. Compared to the left map, numerous prefectures experienced house price appreciation in recent years (average 1.9 percent nationwide since the beginning of Abenomics in 2013). The range, however, varies greatly: largest gains are seen in Miyagi and Fukushima prefectures by 18 percent (likely related to the reconstructions after the earthquake), followed by Tokyo (16 percent), while large losses are seen in Akita (-6.5 percent), Shimane (-5.5 percent) and Yamanashi (-4.8 percent) prefectures. See Box 1 for recent developments in housing prices in Japan and their potential drivers.

Figure 3. Japan: House Price Change by Prefecture
(in percent)

2002–2018: Tokyo-to is the only prefecture with an increase in house prices since 2002.

2014–2018: Since 2014, an increase in house prices is observed for other prefectures.

Source: Ministry of Land, Infrastructure, Transport and Tourism.

C. Modeling Population Growth and Housing Prices

In this section, we assess the long-term relationship between population growth and housing prices using prefecture-level data, motivated by the ‘durable housing’ model developed by Glaeser and Gyourko (2005).

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According to the National Survey of Family Income and Expenditure (2014, for two-person households), there is great variation across prefectures as to how much household wealth can be explained by housing. With housing accounting for an average of 66 percent of household wealth (nationwide, likely exaggerated as it focuses on two-person households, who are likely to have a house), this is somewhat lower than other advanced economies – United States about 70 percent, Spain, Greece, Italy around 80 percent. For Japanese prefectures, this ranges from 52 percent (Shinamane prefecture) to Tokyo (80 percent), and Okinawa (above 90 percent).
10. A simple durable housing model proposes a nonlinear relationship between changes in housing prices and population growth. The non-linear relationship is that the magnitude of the fall in housing price associated with population decline is larger than that of housing price rise from population increase of the same magnitude. The ‘durable housing’ model by Glaeser and Gyourko (2005) suggests that such an asymmetric relationship is due to the durability of housing, where housing supply is elastic when new houses are built, while not elastic when houses need to be demolished. This leads to a kinked supply-curve of housing. In this model, net inflows of population increase demand for houses, and housing prices increase (P2). On the other hand, population outflows of the same magnitude lower the demand for houses (P3), where the change in housing price is larger than that with net inflows. If at the same time the supply of houses increases due to sales by owners who move out from the region, a further decline in housing prices can be expected (P4) (Figure 4).

![Figure 4. Japan: Population Growth and Housing Price Change (Glaeser and Gyourko (2005))](image)

Source: Glaeser and Gyourko (2005).  
Note: MPPC is minimum profitable production costs.

11. The theoretical model predicts that cities with negative population growth experience a large decline in housing prices. Following Glaeser and Gyourko (2005), we run the following regression:

$$\Delta P_{it} = \alpha + \beta \times POPLOSS_{i,t-1} + \gamma \times POPGAIN_{i,t-1} + \epsilon_{it}$$

where P is the publicly-assessed residential land price adjusted for inflation (in Yen/meter$^2$) as a proxy for housing prices; POPLOSS variable takes on a value of zero if prefecture i’s population grew during period t and equals the prefecture’s actual percentage decline in population if the prefecture lost population during the period. Similarly, POPGAIN variable takes on a value of zero if prefecture i experienced population loss during period t, and equals the actual population growth rate if the prefecture gained population. The expected signs of coefficients of $\beta$ and $\gamma$ are positive, and that $\beta >$
y. This implies that a price decline is larger (β) for a given loss of population (POPLoss <0) than a price increase (γ) for a given population increase (POPGain >0). In order to account for the lagged impact of population on housing price, we use POPLoss and POPGain of t-1 in the regressions. We also add the variables “old dependency ratio” and “vacancy rate” (both in percentage change with one lag) to control for other factors that might affect demand for and supply of houses. Figure 5 shows a simple correlation between housing price change and net migration flows over the period of 1996–2018. This simple correlation supports the prediction of non-linearity (orange line), as housing price growth in Tokyo-to is much lower than what is predicted by the relationship between the two variables in other prefectures (dotted red line).

12. **Panel regressions using prefecture-level housing prices and population dynamics confirm this non-linear relationship.** Table 1 shows regression results based on panel data of the annual change in population and real land prices across three different time periods: (i) 1970–2015, (ii) the past two decades since the collapse of the asset bubble, covering 1996-2015, and (iii) more recent periods over 2010–15. Results show that during 1970–2015 (column 1), the estimated coefficient for population loss is higher than that of population gain, confirming the prediction by Glaeser and Gyourko (2005) that housing prices fall faster with declining population than they increase with a growing population. However, in more recent periods, while the correlation between housing price decline and population decline stays robust, the relationship between housing price increase and population increase disappears. This confirms the overall decline in housing prices across regions since the early-1990s bubble burst, regardless of the extent of population growth.

13. **In reality, negative effects on housing prices from population decline may be even larger than the model-based predictions.** The results suggest a larger decline in housing prices associated
with population loss than a housing price increase with the same size of population gain. The model, however, does not factor in households' expectations on future house price developments and their potential impact on house prices. In fact, residents expecting a housing price decline may sell their houses and have less incentive to own houses, which will add to already-existing oversupply of houses and create further downward pressures on housing prices. This vicious cycle may lead to a larger decline in house prices in regions with declining population more than the model-based predictions.

D. Why are Japanese Moving to Large Cities?

The proximate cause of regional disparities in population dynamics and related housing price dynamics is the continuous inflow of population into large cities. This section explores several factors that influence population concentration in large cities.

14. Large cities offer jobs and education for younger Japanese. There exists a large variation across prefectures in terms of the share of population with higher education—for rural prefectures such as Akita and Aomori, the share of population with university degrees or higher make up about 5 percent of the population. This contrasts with Tokyo or Kanagawa (a prefecture in the suburbs of Tokyo) that has close to 20 percent of its total population with higher education (university degree or above). The chart below shows that higher education opportunities are also far greater in large cities (colored bars) than in others: this is one factor that underpins the younger generation moving out from their home prefectures (Figure 6, left chart).
15. Some studies show that skilled workers are better at generating growth in endogenous amenities, increasing the value of housing (Shapiro, 2006; Glaeser and Saiz, 2004). Service amenities, including health care and retail stores, are also concentrated in large cities. These factors compose a core part of the local standard of living, and it is natural that people would prefer to live in areas which have easy access to these amenities. For example, according to 2016 data of social indicators by Statistics Bureau of Japan, the number of general hospitals (per 100 square kilometers of habitable area) was 6 for Japan on average, of which the largest was 42.4 for Tokyo and the lowest was 1.7 for Akita prefecture. Demand for amenities can explain the positive correlation between housing price changes and the share of the educated population (Figure 6, right chart), as affordability of these services increases with income.

![Figure 6. Japan: Education and House Prices](image)

Housing price growth is positively correlated with the share of the population with higher education qualifications.

Japan: Human Capital and Housing Price Change
(X-axis: Change of Housing Prices Between 2011-2018, Y-axis: Share of University and Graduate Degrees)

Source: Statistics Bureau of Japan; and IMF Staff Calculations.

E. Policy Implications

16. Policies to address regional disparities are crucial to prevent an excessive fall in housing prices in rural areas. In 2014, the Abe administration established the headquarters for regional revitalization in the Cabinet Office to promote even growth between rural and urban areas, and help retain population and talents in rural areas. To assist rural areas, the government introduced tax incentives for companies that either shifted their core functions or expanded the operations of their headquarters already located in other parts of the country. Also, tax incentives were provided to households who moved outside the capital area.

17. Forward-looking policies on housing supply and real estate investment that incorporate demographic trends are necessary to prevent a further decline in housing prices. Vacant houses create various social issues, but also have negative externalities in terms of prices, as
the presence of vacant houses tends to bring down the value of other houses in the neighborhood.\footnote{4} A regional supply of housing that factors in future demographic trends would help avoid potential over-investment in real estate, decrease the number of vacant houses, and help place upward pressure on housing prices.

\footnote{4} It used to be that the tax rate on land is reduced to one sixth of the appraised value if there remains a residential structure on the land. The initial motivation for this regulation was to accelerate the high utilization of land by giving an incentive to home construction during the years when the population grew. However, this tax incentive is one of the causes of the high vacancy rate in Japan, as the owner of the property had an incentive to leave the property as is, without demolishing the structure, to benefit from the lower property tax rate. New legislation was enacted in 2014 to accelerate the demolition of vacant houses.
Box 1. Recent Developments in Residential Property Prices in Japan

**Prices of high-rise condominiums in some Japanese cities have risen notably in recent years.**

According to the annual survey of commercial and residential land price by the Ministry of Land, Infrastructure, Transport and Tourism, which was released in July, the national average of residential land prices declined by 0.1 percent. However, prices rose in Tokyo, Osaka and Nagoya by 0.9 percent on the back of solid demand for condominiums and offices.

**Condominium prices have appreciated since the beginning of Abenomics in 2013.** Prices of certain types of housings in large cities and some tourist destinations have appreciated rapidly (text figure). Condominium prices have increased by 23 percent at the national level since 2013. Prices for new condominiums in the Greater Tokyo area in 2018 averaged ¥71.4 million (about $650,000), according to data from the Real Estate Economic Institution.¹

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**Potential drivers of property price appreciation are the ultra-low interest rate environment, an increase in tourism, and the inheritance tax.** The prolonged low interest rate environment incentivizes Japanese banks, mostly serving domestic clients, to increase real estate lending. An influx of foreigners in tourist destinations has also led to increased investment in real estate. Finally, demand for condominiums to avoid the inheritance tax is also generating upward price pressures.²

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¹ IMF (2017) concluded that condominium prices appear to be moderately overvalued in Tokyo, Osaka, and several outer regions, exceeding the values predicted by fundamentals by 5 to 10 percent.

² There is anecdotal evidence that valuations for tax assessment purposes make condominiums an attractive bequest compared to financial assets, as condominium prices are evaluated below market value and financial assets are evaluated at market value. So, there is a strong tax incentive for Japanese households to hold real estate and take out housing loans, since the latter is tax deductible at market value if one is to carry out a bequest.
References


