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Demographics and the Long-Term Outlook for Housing Investment

Housing construction has been a driving force behind U.S. economic recoveries. On average, residential construction has accounted for two-thirds of the increase in final sales during cyclical upturns (Perry and Schultze 1993). In the most recent recovery, however, homebuilding activity has been modest, accounting for less than a third of the increase in final sales. With housing affordability at a twenty-year high, those in the industry are puzzled and concerned by the lackluster growth of home construction.

Why has the housing industry not boosted the economy as much during this recovery? Demographics would seem to be an important part of the answer. The average annual increase in the population aged 25 and over is projected to fall from the 2.6 million experienced during the 1980s to 1.7 million in the 1990s. As growth in the adult population slows, so will the demand for new housing.

The purpose of this article is to measure the importance of projected shifts in the size and age distribution of the U.S. population for the rate of growth in housing demand (that is, net housing investment). We wish to give the reader a sense of just how much and for how long the population slowdown is likely to restrain housing demand. The analysis runs through the first decade of the next century and provides separate estimates for single-family and multifamily housing.

Our results indicate that the contractionary effects of the population slowdown are already being felt in the housing industry and probably have been at work since the latter part of the 1980s. In our simulations, changes in the size and age distribution of the population lower net housing investment by 17 percent from the late 1980s through the first half of the 1990s. Population factors then reduce net investment an additional 22 percent from the mid-1990s through the first half of the first decade of the next century before turning favorable.

On a percentage basis, the effects of the population slowdown are greatest in multifamily building. Population shifts reduce net investment in multifamily units by 60 percent from the late 1980s through the end of this century. Single-family building is not spared, however. Population factors decrease net investment in single-family homes by one-third from the late 1980s through the middle of the first decade of the next century.

Are the demographics inexorable? Is it possible that changes in immigration policy could offset the slowdown in the native population? The numbers show that to stave off a decline in new home construction, immigration quotas would have to be doubled, from the current limit of 700,000 people per year to around 1.5 million per year.

We also investigate whether the effects of the population slowdown could be reversed by changes in cohabitation patterns. In the scenario most favorable to housing investment, we assume that high economic growth encourages substantial new household formation and that baby boomers, who in their younger years had less of a taste for marriage than did their parents, continue to live as single adults in relatively high proportions. The implied changes in household formation have a

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strong effect on the mix of new housing demand, greatly favoring multifamily investment. However, these changes can only reduce the projected decline in total net investment from 36 percent to 22 percent from the late 1980s through the early part of the twenty-first century.

Population shifts may not be the only influence on housing demand over the next few decades. Housing demand is also greatly affected by interest rates and tax laws. But given what we know about the size of the decline in births following the end of the baby boom, demographics are certain to play a major role in the future of the U.S. housing industry. Any long-term assessment of housing demand must begin with basic population arithmetic.

Framework for analysis

To calculate the effect of demographic shifts on housing demand, we use a method similar to the one developed by Jaffee and Rosen (1979). We begin with individual population projections by age group and use historical headship rates to estimate the household population by age of household head and type of household (family or nonfamily). Projections of housing demand by type of home (single-family or multifamily) then are developed by combining the estimates of household population with historical propensities to demand housing of a particular type by age and type of household.

The computational framework is given formally by

$$(1) \qquad HSF = K_s \sum_i POP_i [f_i \theta_{fi} + n_i \theta_{ni}]$$

and

$$(2) \qquad HMF = K_m \sum_i POP_i [f_i (1 - \theta_{fi}) + n_i (1 - \theta_{ni})],$$

where *HSF* and *HMF* are the stock demands for single-family and multifamily housing in a given year; K_s and K_m are scale factors; POP_i is the number of people in age bracket i; f_i is the likelihood of a person of age i heading up a family household (the family headship rate); n_i is the likelihood of a person of age i heading up a nonfamily household (the nonfamily headship rate); θ_{fi} is the likelihood that a family household headed by a person of age i would occupy a single-family home; and θ_{ni} is the likelihood that a nonfamily household with head of age i would occupy a single-family home.

In our basic population analysis, all of the terms in equations 1 and 2 are treated as constants, except for the population data. We simply run the population numbers through the equations to see how much of an effect on housing investment we should expect from population shifts alone.

To specify the equations, the scale factors K_s and K_m were chosen so that the two simulated series on net investment would replicate, respectively, the average value of new single-family and new multifamily homes put in place during the period 1970–89. The resulting values are $K_s = 73.2$ and $K_m = 45.0$, both in thousands of 1982 dollars. Values used for the remaining parameters are based on 1980 data and are shown in Table 1. The headship rates are Bureau of the Census estimates. Following Census convention, family households are either married couples or single-parent households with at least one child. Nonfamily households include singles and two or more unrelated individuals sharing a residence. The propensities to occupy single-family housing are from the Current Population Survey.

Especially important to the analysis are the terms in brackets in equations 1 and 2. These terms represent the number of single-family and multifamily housing units demanded per capita. Their values are shown in the last two rows of Table 1. Within the adult age categories, the most significant variation in the numbers occurs between the age groups 25–34 and 35–44. The frequency of single-family home demand rises by a third and that of multifamily demand falls by a little more than a third as households move from one age group to the next. These differences in per capita housing demand play a significant role in our analysis, because every member of the baby boom generation passes between these age groups sometime during the 1980s and 1990s.[1]

[1] *The baby boom generation refers to those born between the years 1946 and 1964.*

Table 1
Anatomy of Per Capita Housing Demand in 1980 by Age Group and Type of Structure

	Age of householder					
	<25	25–34	35–44	45–54	55–64	≥65
Headship rates, by type of household						
Family (f_i)	.04	.36	.47	.47	.43	.34
Nonfamily (n_i)	.03	.11	.07	.08	.13	.29
Percent of households occupying single-family homes, by type of household						
Family (θ_{fi})	.55	.75	.86	.88	.89	.86
Nonfamily (θ_{ni})	.31	.38	.46	.55	.63	.62
Single-family homes per capita ($f_i\theta_{fi} + n_i\theta_{ni}$)	.03	.32	.43	.46	.46	.46
Multifamily housing units per capita [$f_i(1-\theta_{fi}) + n_i(1-\theta_{ni})$]	.04	.16	.10	.09	.10	.17

The effect of population shifts on net housing investment

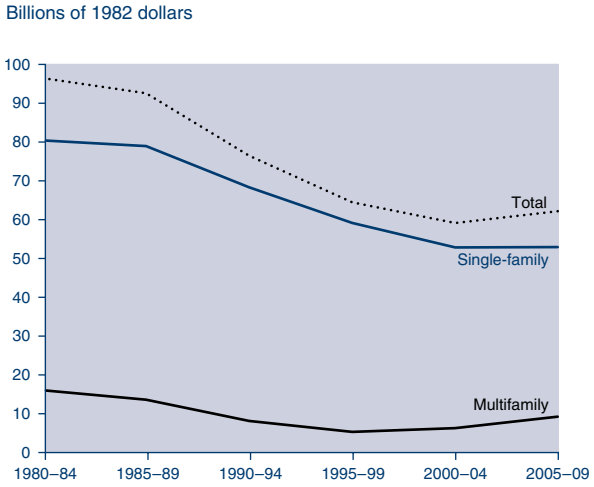
Equations 1 and 2 provide the analytical framework for measuring the effect on housing demand of shifts in the size and age distribution of the population. To carry out the analysis, we use population data for the period 1980–2010, with data through 1990 being Census estimates of actuals and data beyond 1990 being Census projections. The demographics have their most visible impact on the rate of growth in housing demand, or net housing investment. Thus, we show the calculated path of net housing investment (*Figure 1*). To help smooth the series, the results are presented as annual averages over five-year periods.

The first point to notice is that the population slowdown does not bring about an absolute decline in housing demand. Net investment remains positive throughout the forecast period. What the demographics do is reduce the rate of growth in housing demand. From the latter half of the 1980s through the period 2000–04, total net housing investment falls by 36 percent. On a percentage basis, the population slowdown is most important for multifamily building. Net investment in multifamily units declines by 60 percent from the late 1980s through the late 1990s. The demographics reduce single-family investment throughout the 1990s and into the first half of the first decade of the next century. Net investment in single-family homes falls by one-third over this period.

Table 2 details the results by age group. The most significant patterns in the numbers relate to the baby boom generation. Baby boomers enter the 35–44 age group in the early 1980s, producing a bulge in housing investment in that age bracket through the mid-1990s. We can then follow the bulge as the cohort matures. The bulge appears in the 45–54 age bracket beginning in the early 1990s, and it reappears in the 55–64 group at the turn of the century. The baby boomers also leave their mark as they vacate an age bracket. Their maturation is the reason for the absolute drop in housing demand in the 25–34 age group during the 1990s and in the 35–44 age group during the first decade of the next century.

Also noticeable, although much less signifi-

Figure 1
Net Housing Investment by Type of Structure: Simulated Series Based on Shifts in the Size and Age Distribution of the U.S. Population (Five-Year Averages of Annual Rates)



cant in size, is the effect of the baby bust generation born in the Great Depression. The relatively low number of births during the 1930s is the reason for the low net investment numbers in the 55–64 age group during the period 1985–94 and in the 65-plus age group during the period 1995–2004.

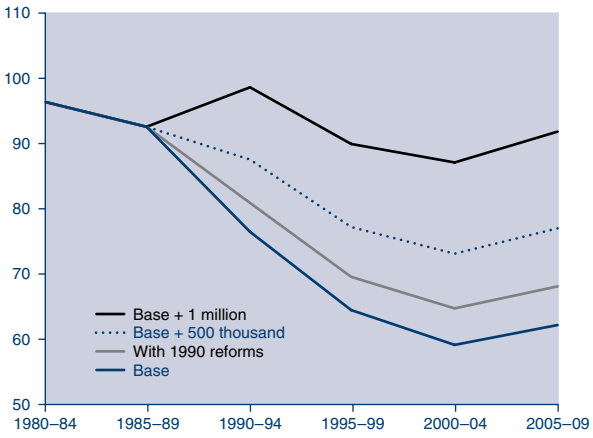
Housing and immigration policy

Our prediction that net housing investment will fall sharply over the next two decades is made essentially on the basis of a projected decline in the growth of the U.S. adult population. We can be confident in our assumptions about the future growth of the native population, because in a forecast that goes out no more than twenty years, the size of adult age groups can be estimated from known birth rates. The major risk in the population forecast is immigration. In this section we give the reader a sense of how much more open U.S. immigration policy would have to be if a slowdown in housing demand is to be avoided.

To quantify the impact of alternative immigration policies, we use the same algebraic framework as in the previous section but modify the population numbers to reflect an increased flow of immigrants. In our simulations, an infusion of new immigrants occurs each year beginning in 1991 and continuing throughout the forecast period. Upon arrival, these new immigrants are distributed across age groups in the same way as legal immigrants who were admitted into the United States between 1980 and 1988. Except for age, immigrants are identical to natives.[2]

The increase in immigration allowed for in the simulations is something over and above the immigration assumed by the Census Bureau in its projections. In the Census projections we used for our base case, net immigration was assumed to occur at a rate of about 500,000 people per year. These projections were made before the Immigration Act of 1990, which raised legal immigrant quotas to about 700,000 per year. We consider three alternatives to our base case. The first provides for an increase in flows of 200,000 immigrants per year. This case gives us a rough idea of how important the 1990 reforms will be to the

Figure 2
Housing and Immigration Policy (Simulated Net Investment)



[2] *There are, of course, significant differences between immigrants and natives. Most crucial for housing demand is that immigrants on average earn less income, even after a long assimilation period (see Borjas 1990). Thus, our simulations probably overstate the impact of new immigrants on housing demand.*

Table 2
Effect of Population Shifts on Net Housing Investment by Type of Structure and Age of Householder, 1980–2009 (Average Annual Rates, in Billions of 1982 Dollars)

	Age of householder						
	<25	25–34	35–44	45–54	55–64	≥65	Total
Change in demand for single-family homes							
1980–84	–1.1	21.4	38.0	–1.1	3.9	19.2	80.4
1985–89	–.1	7.8	38.4	19.4	–6.6	20.5	79.5
1990–94	.1	–13.8	28.2	39.1	–.3	15.0	68.3
1995–99	.2	–17.7	10.0	39.9	19.1	7.5	59.1
2000–04	.0	–5.3	–18.8	29.6	38.0	9.5	52.8
2005–09	–.1	7.3	–23.9	10.7	38.3	20.9	53.3
Change in demand for multifamily housing							
1980–84	–.1	6.6	5.6	–.1	.5	4.3	16.7
1985–89	–.1	2.4	5.7	2.4	–.8	4.5	14.1
1990–94	.0	–4.3	4.1	4.9	.0	3.2	8.0
1995–99	.0	–5.5	1.5	5.0	2.5	1.6	5.2
2000–04	.0	–1.6	–2.7	3.6	5.0	2.1	6.4
2005–09	.0	2.2	–3.5	1.3	5.0	4.6	9.5

housing industry. In our second case, immigrant flows are raised by 500,000 people per year. In a final scenario we assume immigration quotas are increased by 1 million per year.

The results are shown in Figure 2. As one would expect, housing investment rises uniformly with each successive increase in the quota limit. The 1990 reforms are seen to have a modest effect on housing investment. In the base case, net residential investment drops by 33 percent from the late 1980s through the end of the first decade of the twenty-first century. In the scenario with 1990 reforms, investment still falls by 26 percent. To avoid a decline in net housing investment, immigration quotas have to be raised to 1.5 million per year, more than double the amount under current policy.

Housing and headship rates

In projecting housing demand from demographic data, it is necessary to know not only how many people there are but how they group themselves into households. Over the past two decades, there has been a growing trend toward single-adult households. Rising divorce rates, delayed marriages, and greater societal acceptance of singleness have contributed to this trend. Because single adults have a higher propensity to rent apartments than do families, we would expect that the trend toward singleness has tilted the demand for housing away from single-family and toward multifamily units. With a greater number of households being formed from a given population, the overall level of housing demand may also have been raised.

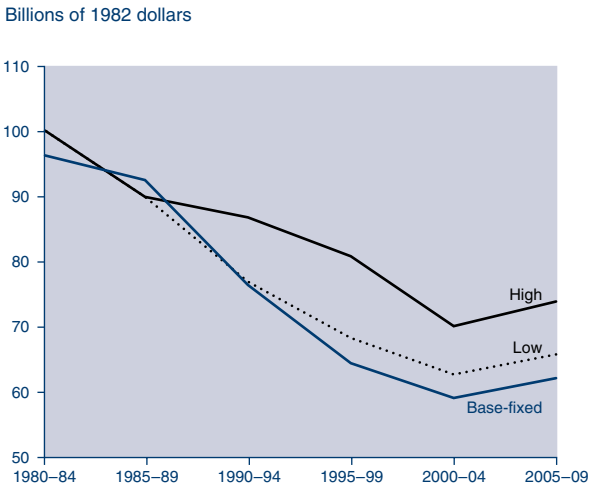
The purpose of this section is to determine the importance of recent and possible future changes in cohabitation patterns for housing investment. We once again use equations 1 and 2, but now we allow headship rates to change over time. For the years 1980 through 1990 we use Census estimates of actual headship rates. For the years 1991 through 2010, we consider a range of

possible values based on the work of Hendershott (1988). Hendershott's projections run from 1990 through the year 2000. We use these projections to extend the actual headship rates to 2000. For the first decade of the twenty-first century, we assume that the trends over the previous ten years continue but at only one-half the rate.

From the group of alternative scenarios suggested by Hendershott, we chose two that produce a wide range of possible outcomes for housing investment.[3] In the scenario we label "high," the projected headship rates are based on the assumption that economic growth will be high and that baby boomers will continue to have a strong preference for living as single adults, even as they grow older. In the "low" scenario, income growth is assumed to be low and there is a less rapid decline in the married-couple share of households.[4]

The results of the simulations involving changing headship rates are shown in Figures 3 through 5. For comparison, we also present the base case. Beginning with actuals, the changes in headship rates that occurred during the 1980s appear to have altered the mix of housing investment but not the total amount. Comparing the base case with the series simulated from actual headship rates, net investment in multifamily homes is raised 25 percent by the changes in headship rates. This rise is offset by a comparable absolute decline in single-family investment, however, so that total net residential investment is essentially unchanged.

Figure 3
Housing and Headship Rates: Alternative Scenarios Involving Changing Patterns of Cohabitation (Simulated Net Investment)
All Homes



Turning to the projections, the results from the "low" scenario are similar to those for the 1980s. The projected changes in headship rates have a large percentage effect on multifamily investment, but only a small effect on total investment. The total investment series with changing headship rates is, over the entire forecast period, only 5 percent higher than the base case series.

The changes in headship rates assumed in the "high" scenario have a more sizeable impact on housing investment. Once again the results are most dramatic in multifamily investment. The projected changes in headship rates almost double the average annual rate of multifamily investment. Because of substantial increases in total headship rates in this scenario, single-family investment is also raised, by an average of 11 percent over the forecast period. In total, net housing investment is 19 percent higher because of the projected changes in headship rates. These gains are not sufficient, however, to offset the contractionary effects of the population slowdown. Total net housing investment continues to fall in this scenario.

Long-run forecasts of multifamily building clearly must factor in the possibility of a continued trend toward single-adult households. Not to do so would understate investment by one-quarter or

[3] *In addition to the Hendershott scenarios, we considered an alternative forecast using projected headship rates from the Bureau of the Census. The results using these projections fell between the other two scenarios. Thus, we did not include these results in the text.*

[4] *Hendershott projects total headship rates (family plus nonfamily) on the basis of assumptions about future economic conditions. The relationships are consistent with the theory that privacy is a normal good. More households will be formed from a given population the greater the ability of the population to afford housing. The breakdown of total headship rates by type of family depends upon assumptions about future tastes for marriage.*

more. Future changes in cohabitation patterns are probably less crucial in the overall outlook for residential construction. We obtained numerically significant results for total housing investment only after making extremely aggressive assumptions about future rates of household formation. Even in this case, total residential investment is projected to fall 22 percent from the late 1980s through the period 2000–04.

Implications

Our analysis has focused on the rate of growth in housing demand, or net housing investment. We chose to present our results in this way because shifts in the size and age-mix of the population speak more directly to this variable than to any other. Those interested in the future of the housing industry, on the other hand, are probably more concerned with what the population slowdown will mean for construction jobs and home prices. We conclude with a discussion of what our results suggest will happen to these variables. In our discussion, we use results from the base-case simulations, with fixed headship rates. This represents something of a worst-case scenario. But absent a major liberalization of immigration policy or rapid economic growth, it may not be far off the mark.

Figure 4
Housing and Headship Rates (Continued)
Single-family

Billions of 1982 dollars

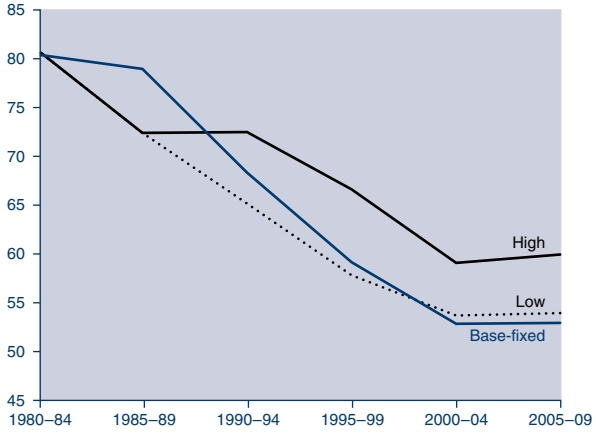
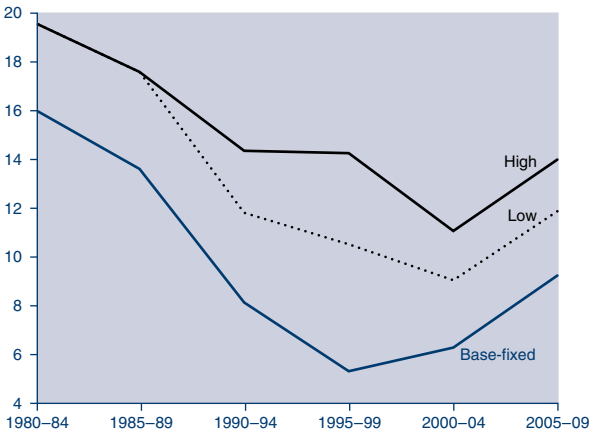


Figure 5
Housing and Headship Rates (Continued)
Multifamily

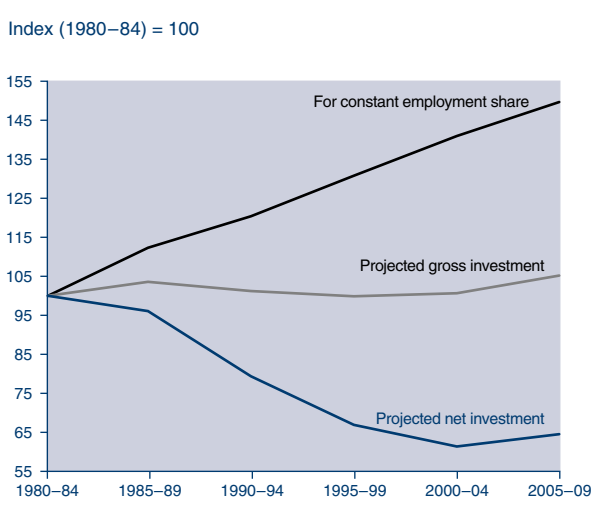
Billions of 1982 dollars



To assess the outlook for residential construction employment, we need to think in terms of *gross* investment rather than *net* investment. That is, we need to consider the construction that is needed to maintain and replace worn out buildings as well as that required to provide for a growing household population. To obtain estimates of gross housing investment, we assume that the stock of single-family homes depreciates at an annual rate of 2.25 percent and that apartments depreciate at an annual rate of 4 percent. Gross investment, then, is the sum of net investment plus what is needed to offset depreciation. In Figure 6 we show the resulting series on gross residential investment, along with the baseline series on net housing investment. To make comparisons easy, we index each series to equal 100 over the period 1980–84.

The population slowdown will bring about a sharp reduction in net housing investment but no significant change in gross investment. Thus, the homebuilding industry need not contract absolutely. There will be little if any job growth, however, and the industry is certain to play a smaller role in the economy. The top line in Figure 6 shows how much gross investment would have to rise to keep pace with historical and projected growth in the U.S. labor force. The width of the gap between this line and the line on gross housing

Figure 6
Gross Investment Needed to Maintain Housing's Share of Employment



investment indicates the degree to which demographic changes will reduce the share of residential construction in national employment. With gross investment being essentially flat and the labor force growing about 50 percent from the early 1980s through the year 2010, housing's share of employment is reduced by one-third.

Turning to home prices, it is useful to think of the price of a home as reflecting two components: the price of the land and the price of the structure. Given a certain fixity in the supply of land suitable for residential development, land prices will move with the stock demand for housing—rising as housing demand rises and falling as housing demand falls. Our analysis shows that future demographic shifts will reduce the rate of growth in housing demand but not its absolute level. Housing demand will continue to rise over the foreseeable future. There is, then, no apparent reason for residential land prices to be weakened by the population slowdown. It is always possible that real estate markets have failed to appreciate the extent of the slowdown in housing demand, having capitalized excessively any future appreciation in land values and having set themselves up for a price correction. But this would be a matter of some speculation and certainly not a necessary consequence of the demographics.

With a rising supply price for new home construction, the price of residential structures will vary directly with the rate of gross investment demand. How much prices would fall in response to a decline in investment demand depends on the size of the drop in demand and the price elasticity of supply of new structures. From the work of Muth (1983), it is widely believed that the supply of new homes is highly elastic in the long run, ensuring a limited price adjustment whatever the shift in demand. Our analysis further suggests that the shift in demand is not likely to be large in the first place. In our simulations, the demographics halt the growth of gross housing investment, but they do not reduce it.

Considering both land and structures, it is difficult to see in the population numbers a compelling reason for average home prices to fall. Thus, we strongly disagree with the conclusion of Mankiw and Weil (1989) that home prices may fall by half over the next two decades because of the demographic slowdown. There is more potential, we believe, for relative price adjustments to take place between different types of homes. The stock demand for housing will fall sharply for households in the age group 25–34 during the 1990s and for those aged 35–44 during the first decade of the next century. Prices of homes specialized to suit people in these age brackets (starter homes, homes for families with young children) may well weaken. On the other hand, the demographics will serve to strengthen the prices of homes that are popular with older adults who have graduated their children, the so-called empty nesters.

The population slowdown is an important economic and social event with the potential to substantially reduce the importance of homebuilding in the economy and to alter the prices of some single-family homes. However, these changes will be consumer driven and so should not be resisted. The changes also will take decades to play out and are relatively easy to forecast. They would not seem to pose a significant threat to macroeconomic stability. Policymakers need to be well-informed about the extent of the change in the housing industry that can be expected from the demographics to avoid overstimulating the economy and causing undue delay in the process of structural change.

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