

HOUSEHOLD PORTFOLIOS IN JAPAN:  
Interaction between Equity and Real Estate  
Holdings over the Life Cycle♣

Tokuo Iwaisako\*  
Institute of Economic Research,  
Hitotsubashi University  
and  
Institute of Policy and Planning Sciences,  
University of Tsukuba

E-mail: iwaisako@ier.hit-u.ac.jp

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Interaction between Equity and Real Estate Holdings over the Life Cycle

Abstract

I study the relationship between portfolio choice and age for the Japanese households by means of micro data and by paying particular attention to the interaction between decisions to hold stocks and real estate. The major findings are: First, equity shares in financial wealth (S/FW) increase with age among young households, peaking in the fifties age group, then becoming constant. This peak comes in a much later stage of the life cycle compared with Amerkis and Zeldes (2001) report about U.S. households. Second, we observe exactly the same age-related pattern for real estate shares in household total wealth (RE/TW). Third, with respect to both shares, S/FW and RE/TW, the age-related patterns are mostly explained by the decision to hold or not to hold stocks/real estate. Fourth, no age-related pattern in equity holding is observed for households that do not own real estate. These findings suggest that the age-related pattern observed in stock holding will be mostly explained by household's tenure choice of housing. Households who are to purchase and have just purchased houses cannot take risky positions in financial investment because they are saving for down payments or taking heavily leveraged positions by taking out housing loans. Therefore any serious attempt at modeling Japanese households' dynamic portfolio choice should incorporate the effect of housing tenure choice. In the second half of the paper, we draw some policy implications from these findings.

Tokuo Iwaisako

Institute of Economic Research,  
Hitotsubashi University  
2-1 Naka, Kunitachi City, Tokyo 186-8603, JAPAN

and

Institute of Policy and Planning Sciences,  
University of Tsukuba  
Tenodai 1-1-1, Tsukuba, Ibaraki, JAPAN

E-mail: iwaisako@ier.hit-u.ac.jp

# 1 Introduction

In this paper, I investigate the relationship between age and portfolio choice of households in Japan. The main focus in this paper is the variation of equity share in financial and in total wealth of households and the interaction of these with the household's decision regarding homeownership.

The relationship between age and portfolio structure has been a focus of attention among economists for several important reasons. Here, I will discuss three of these. First, this relationship is directly related to the various issues of the aging economy. The potential effects of the aging of the population on the level of national saving and the social security system have drawn the attention of both academics and policy-makers. However, how households allocate their accumulated wealth across different assets has attracted less attention, even though the welfare of households depends on the riskiness of their portfolios as well as on the total wealth level. On a more practical level, how individuals allocate their portfolios is relevant to the debate concerning the defined contribution pension plan that allows participants some discretion in their investment choices.

Second, the way Japanese households allocate their wealth and how it will change are very important for understanding the ongoing structural change in the Japanese financial system, the Japanese Big Bang. Many macro and financial economists view that the bubble economy in the second half of the 1980s and the prolonged economic and financial turmoil since the early 1990s have been intimately related to the structural change in the Japanese financial system — a shift from a bank-oriented system to a market-oriented system<sup>1</sup>. In previous discussions, changing corporate financing decisions and corporate governance have been the main focus of analysis. However, in consideration of the general equilibrium, if the way firms raise funds for their business (i.e., the supply structure of financial assets) changes, the way households allocate their funds (the demand structure of financial assets) must also change. As such, studying the portfolio structure of Japanese households is essential for fully understanding of the changing Japanese financial system as a whole. In particular, I found that equity share in financial wealth of Japanese households apparently peaks at the later stage of their life cycle compared with U.S. households. This finding suggests that Japanese households' demand for risky financial assets is crowded out after they purchase homes, because they have already taken very risky positions by taking out a large amount of housing loans. In that

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<sup>1</sup>Hoshi and Kahsyap (2001) forcefully made this point.

sense, structural impediments in the Japanese land/housing problem, such as high land prices and the limited supply of family-size rented housing, are generating inefficiencies in financial markets too.

Third, the dynamic portfolio choice recently re-emerged as a major research topic in finance<sup>2</sup>. In response to theoretical developments, recent empirical studies, such as Amerkis and Zeldes (2001), Bodie and Crane (1997), Guiso, Haliassos, and Jappelli eds. (2001), and Poterba and Samwick (1995, 1997) investigated household portfolio choice in the U.S. and major European countries by emphasizing its relation with age. The analysis of this paper follows these previous studies. It is a unique addition to the literature, since none of the previous studies focused on the effect of real estate holding in determining the portfolio structure of financial assets.

Although some important previous works on the asset allocation of Japanese households (e.g. Noland 1988; Muramoto eds. 1998) exist, they emphasized the uniqueness of the Japanese household portfolio or the structural change of Japanese households' investment behavior from a microeconomic point of view. The motivation of this paper is more macro-oriented, and its conceptual framework is that of the life cycle model of the consumption/saving decision.

The remaining of this paper is organized as follows. In section 2, I describe the data set and the general aspect of the Japanese households' asset allocation. In section 3, I investigate the relationship between age and portfolio choice for Japanese households, extending the analysis to the case in which the household decision own houses is included. Section 4 discusses some institutional background as to why Japanese households face strong incentives to purchase their houses rather than renting. Section 5 is about potential policy implications of the findings of this paper. Section 6 is the conclusion.

## 2 Asset Allocation by Japanese Households

I use the annual survey data published by Nihon Keizai Shimbun, which is known as Nikkei Radar<sup>3</sup>. It contains information about households' portfolio allocation and characteristic such as age, income, and occupation. But, Nikkei Radar has various limitations. First, the observations are regionally limited to the Tokyo metropolitan area and surrounding prefectures. Regional bias is likely to make the sample average younger than the nation-

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<sup>2</sup>For the summary of recent theoretical developments, see Campbell and Viceira 2001; Jagannathan and Kocherlakota 1996.

<sup>3</sup>This data was previously used in Muramoto eds. (1998) and others.

wide average. For the same reason, there might be a bias in occupation or in income level. The sample contains too little agricultural workers, and the average income level is higher than the nation-wide average. Finally, Nikkei Radar is pooled cross-section data. So unfortunately, various interesting analyses that panel data structure would allow us to conduct cannot be examined.

The number of observations changes year by year, from 1,500 to 3,000. This is not a large number to form age groups by a single year. If 2,000 households are distributed uniformly over ages from twenty to seventy, each age/year contains only 40 observations. Since there are much fewer observations for younger and older generations, following Amerkis and Zeldes (2001), I constructed cohort data pooling for years. So, for example, the age 24 cohort in the year 1987 contains households at ages of 24, 25 and 26. We took the years 1987, 1990, 1993, 1996, and 1999 to be the sample years to track the portfolio decisions by cohort over time<sup>4</sup>. Even after we formed the age groups by this way, youngest and oldest age groups had too few observations. For this reason, I decided to drop households under the age of 23 and over the age of 72 from the sample.

We group the assets into four categories — namely, **safe assets**, **bonds**, **equities**, and **real estate**. We refer to the sum of the first three categories as **financial assets** or **financial wealth**. The sum of all four categories is called **total wealth**. The category of **bonds** includes bond-only mutual funds. All mutual funds contain any stock were included to the category of **equities**. The category of **real estate** consists mostly of owner-occupied housing, but in some rare cases, it also includes other types of real estate owned by households. Since the 1987 survey does not separate owner-occupied housing and other real estate, we have no choice other than to aggregate different real estates if we want to include data from the 1980s. After categorizing and aggregating their assets, I excluded households who did not provide answers about value or ownership of any one of the four asset categories. For example, those who answered they have zero equities are included, but those who left a blank are excluded from the sample. Such exclusions were made mostly in the categories of **equities** and **real estate**. It is more than likely that this exclusion results in the underestimation of stock and real estate shares in household portfolios. After all this, usable observations stand at around 1,200 for 1987 and around 2,400 for 1990, 1993, 1996, and 1999. Table 1 provides summary statistics of our sample.

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<sup>4</sup>The Nikkei Radar data start in the late 1970s, but the questions about real estate were only asked from the 1986 survey.

### 3 Portfolio Choice over the Life Cycle by Japanese households

We treat U.S. empirical facts reported in Amerkis and Zeldes (2001) as the benchmark in our discussions of the Japanese data. First, I summarize the main empirical findings about the U.S. data:

(I) Equity shares in financial assets have a hump-shaped pattern with age, peaking in the late forties and fifties for households.

(II) The proportion of population owning equity displays a hump-shaped pattern with age.

(III) Equity shares in financial assets conditional on ownership are mostly constant with age.

Regarding the Japanese data, I found similar age-related patterns for equity shares in financial assets:

(i) Equity shares in financial assets increase with age and become constant after the fifties age group.

(ii) The proportion of population owning equity seems to follow exactly the same pattern, increasing with age and becoming constant after the fifties age group.

(iii) Equity shares in financial assets conditional on ownership of equities are constant or decrease moderately with age.

Since the Japanese data do not have enough observations over the age of sixty and we did not use the samples over the age of 72, we cannot make a clear judgment about whether the equity shares after retirement are constant or decrease like in the U.S. But, one very obvious observation can be made from the Japan-U.S. comparison. That is Japanese equity shares in financial wealth peak much later in the life cycle compared with the U.S. However, the mechanism generating the age pattern in equity shares is the same for both Japan and the United States. If we break down the age-related pattern into ownership and asset allocation components, we find that the pattern is mainly due to the former, the decision to own or not to own stocks at all.

It is well known that for average Japanese households, their most important asset is their house. For example, according to Noguchi and Poterba (1994b), the average house price to average annual income ratio is 7.4 for

Japan and 3.2 for the U.S. in 1989. These numbers fluctuate, but on average, the amount that Japanese households spend on their owner-occupied house is about twice that of U.S. households. Therefore, if one wants to consider the portfolio decision of Japanese households in earnest, it is necessary to explore their decisions to hold or not to hold real estate, especially owner-occupied houses. When I take the ownership of real estate into account, I observe the following trend in the relationship between home ownership and age for Japanese households:

(iv) Real estate share in total wealth (defined as the sum of financial assets and real estate) increases with age, but becomes almost constant after the mid-fifties.

(v) The fraction of population owning real estate increases with age, but becomes almost constant after the mid-fifties.

(vi) The share of real estate in total wealth conditional on ownership of real estate decreases with age. Conditional on ownership, real estates accounts for about 70 to 90 percent of households' total assets.

(iv)-(vi) suggest that exactly the same mechanism is creating the age-related pattern of real estate shares in total wealth as that of equity shares in financial wealth. Virtually all of the age-related patterns are due to the decision to own or not to own real estate. Furthermore, equity shares in financial wealth and real estate shares in total wealth exhibit very similar life cycle patterns, peaking at the age of fifties and showing no significant decline after that. One noteworthy point in the discussion is that total wealth here is gross total wealth rather than net wealth. Since the majority of the households take out housing loans when they purchase a house, the net worth of home owners, especially among young households, is much smaller than the "total wealth" reported here.

When equity holdings of real estate holders and non-holders are considered separately, the following are observed.

(vii) Conditional on ownership of real estate, equities accounts for less than 5 percent of total wealth and around 10 percent of financial wealth. Both shares increase with age.

(viii) Conditional on that households do NOT own real estate at all, no significant age-related pattern is observed for equity

holdings. On average, equities make up about 5 percent of total wealth (which is equal to financial wealth in this case).

Our findings concerning the relationship between stock and real estate holdings will be summarized as follows. First, the age-related patterns are very similar for equity shares in financial wealth (S/FW), real estate shares in total wealth (RE/TW), and S/FW for those who own houses. However, no age-related pattern is observed in S/FW (equals to S/TW in this case) for those who do not own real estate. These findings suggest that demand for risky financial assets are strongly affected by the decisions to hold owner-occupied housing or not. Households who decide to purchase their own houses have to accumulate financial wealth to prepare large down payments. If demand for owner-occupied housing is strong enough, this prevents risk-taking in financial investments at early stages of their lives. When they purchase a house, they have to take leveraged positions by borrowing a large amount in housing loans. Again, households cannot take risky positions in their financial portfolios until they pay back substantial amounts of their housing loans and accumulate buffer-stock savings in safe assets. Only then, will they start stock investments. This is borne out also by the facts that the peak of Japanese S/FW comes in a later stage of life than in the U.S. and that RE/TW decreases with age for homeowners. It has been suggested that high real estate prices and large down payments provide some explanation for the high household saving rate in Japan (Hayashi, Ito, and Slemrod, 1988). The findings of this paper suggest, in addition to the effect on the amount of savings pointed out by Hayashi et.al., that high land prices and housing market imperfections very likely affect the allocation of Japanese households' financial wealth. In particular, demand for risky financial assets, such as equities, might have been suppressed by the heavy burden of housing loans borne by Japanese households.

In the remainder of this section, I will discuss the empirical findings (i)-(viii) in detail.

### 3.1 Equity Shares in Financial Assets and Equity Holdings

First, we examine the relationship between age and equity holding within the universe limited to financial assets alone. Figure 1 presents the shares of equities in financial assets. These are the same observations. In the panel titled "Cross-section view," the observations for the same year are connected by lines. In the panel titled "Cohort view," the same cohorts are tracked over the years. We are interested in the age-related pattern and cannot distinguish the age effect, the cohort effect, and the year effect

simultaneously<sup>5</sup>. From the “Cohort view” panel, it is obvious that all cohorts recorded the largest shares of equities in their financial wealth in 1990, at the peak of the bubble economy. The age-related pattern is more stable from a cross-section view of the data. This suggests that it is more appropriate to ignore the cohort effect and include the year effect. Hence we focus on the cross section view of the data in the following discussion.

In the last panel of Figure 1, the age-related pattern of equity shares for 1999 using different definitions are shown. For the share represented by the dotted line, life insurance and non-life insurance were included in the financial assets<sup>6</sup>. Until very recently, insurance, especially life insurance, had been a very important way of saving for Japanese households, and its inclusion increased the total value of financial assets about by 50%. Although the Nikkei Radar data ask households about the amount of insurances in the survey, the question asked was “At the time of maturity, how much will you receive from the insurance contract?” Hence, the figures reported as the amount of life insurance and non-life insurance are overly exaggerated compared with their current values. Basically, the inclusion of insurance did not change the age-related pattern of equity shares in financial wealth and real estate holdings in total wealth. As such, we adopt a narrower definition of financial wealth without insurance in the following.

[Figure 1 about here]

Table 2 indicates the percentage of households owning stocks in Nikkei Radar data, along with real estate. There was some increase around the bubble years, but on average, the percentage of Japanese households who do own any equity stands out about 25%-30%. This is actually comparable to the direct equity holdings of U.S. households, although there might be upward bias for Japanese numbers due to occupational and income level biases in the data used in this paper. Figure 2 shows the proportion of population that owns stocks. While Japanese and U.S. numbers are comparable, the Japanese shares seem not to decrease even after retirement age<sup>7</sup>. This is the sharp contrast to the U.S. case in which equity share peaks in the late forties to fifties in terms of household age. In Figure 3, we observe no significant

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<sup>5</sup>See Amerkis and Zeldes (2001) for details of this identification problem.

<sup>6</sup>I thank Charles Horioka for suggesting to me the importance of insurance as financial assets for Japanese households.

<sup>7</sup>Our categorization of equities corresponds to households owning equities through “direct + mutual funds” or “direct + mutual funds+trusts” in Amerkis and Zeldes (2001). The reported figures for U.S. are 22.3% and 24.7%.

age-related pattern in equity shares conditional on equity holding. Hence if we break down the age-related pattern of equity shares, we see that a large portion of the age-related pattern is due to the decision to own or not to own stocks at all. Overall, the source of the age-related pattern in equity shares is exactly same as that Amerkis and Zeldes (2001) found in U.S. data.

[Figure 2, Figure 3, and Table 2 about here]

### 3.2 Real Estate Shares and Real Estate Holdings

In Figure 4, 5, and 6, the same exercise was repeated about the real estate share in total wealth rather than for equity share in financial wealth. In Figure 4, we find that real estate shares in total wealth increase with age, but remain almost constant after the late fifties. As far as I know, Caplin, Chan, Freeman, and Tracy (1997) present the most comprehensive examination of home ownership and real estate share within total wealth for U.S. households. According to Caplin et.al. (1997, Figures 2.1-2.4; pp.22-24), the proportion of population owning their own houses in the year 1990 peaks in the late fifties and sixties at around 70 %. Therefore, in contrast to the case of the equity holding rate, the real estate ownership rates in Japan and the U.S. follow a very similar age-related pattern.

In the second panel of Figure 4, the real estate shares are compared according to different definitions of total wealth, with and without insurance. Like the case of equity shares in financial wealth, the age-related pattern does not change considerably even if insurance is included.

[Figure 4, Figure 5, and Figure 6 about here]

I found exactly the same pattern regarding the proportion of population owning real estate in Figure 5. In Figure 6, the age-related pattern of real estate share in total wealth steadily decreases with age, when real estate owners alone are considered. So if we decompose the pattern of real estate share, the age-related pattern can be completely explained by the decision to purchase or not to purchase real estate. This mechanism is more evident for real estate shares than for equity shares. It is not surprising since most households will make the decision to buy real estate only a few times in their lives and rarely own more than one piece of real estate at the same time. After they purchase their living places, the accumulation of wealth takes the

form of financial assets. This explains why real estate shares decrease with age for home-owners.

However, an important assumption in interpreting Figure 4 and Figure 6 — the graphs of real estate shares in total wealth — is that the definition of total wealth here corresponds to gross total wealth rather than the net worth of households. Since most households take out housing loans when they buy their house, the denominator of the real estate/total wealth ratio is smaller in the early stage of the life cycle. Therefore, if we could use net worth rather than gross wealth of households, the slope of the age-related pattern would be flatter in Figure 4. On the other hand, the ratio of real estate to the net worth of households will decline more sharply than in Figure 6.

### 3.3 Relationship between Age, Equity Holding, and Real Estate Ownership

Figure 7 through Figure 11 show the difference between equity shares of real estate owners and of those who do not own any real estate. First, Figure 7, Figure 8, and Figure 9 dealt with equity shares in financial and total wealth of homeowners. Figure 7 plots real estate owners' equity shares in financial wealth and in total wealth. Although less evident for equity share in financial wealth, both figures are increasing with age. Since the number of observations is much smaller than the full sample case, the lines in these figures are jagged. Figure 8 plots the proportion of stockholders among real estate owners. It increases with age, just as in the full sample case in Figure 2. But, the average of stockholders' population is higher among homeowners than in the full sample.

[Figure 7, Figure 8, and Figure 9 about here]

In Figure 9, equity shares in financial wealth and in total wealth among households who hold both equities and real estates are shown. The equity shares in financial wealth are almost constant with age, just as in the full sample containing both owners and non-owners of real estates. However, the equity share in total wealth increases with age. Once again, please be reminded that total wealth in the second panel is not net worth of households. It is gross total wealth. As such, Figure 8 and the graphs in Figure 9 suggest the following interpretation: The age-related pattern of equity shares in financial assets ( $S/FW$ ) are mostly explained by the decision to hold or not to hold equity. Those who own stocks keep the ratio of  $S/FW$  mostly

constant at around 30-35%. Equity shares in total wealth ( $S/TW$ ) increase with age, but this will be less evident if we could use equity shares in net worth instead of  $S/TW$  here since younger households must be taking out housing loans.

Figure 10 and 11 describe the portfolio allocation of non-homeowners. Note that, for non-owners, financial wealth equals total wealth by definition. According to Figure 10, equity consists of only about 5% and no clear age-related pattern is observed. Figure 11 shows the proportion of stockholders among non-homeowners and equity shares in their portfolios. Again no age-related pattern is observed. The absence of age-related patterns in Figure 10 and 11 suggest that the observed age-related pattern in stock shares in financial wealth is mainly attributed to the decision to buy a house. First, a household has to decide whether to own a house or not. Then, if it decide to buy a home, it has to prepare large down payments and take out housing loans. Homeowners will be able to accumulate risky financial asset mostly after the purchase of housing and this causes the seemingly age-related pattern in  $S/FW$ . On the other hand, those who decide not to own real estate begin to buy equities from the early stages of their lives.

[Figure 10 and Figure 11 about here]

Figure 12 plots the equity shares in financial wealth ( $S/FW$ ) against the real estate shares in total wealth ( $RE/TW$ ). We see many observations are right on the horizontal axis on Figure 12. This means many households own their homes but do not own any stocks. So even after we incorporate the effect of housing tenure choice, the question remains that some households never buy stocks for no apparent reason. However, the real estate shares in total wealth ( $RE/TW$ ) explain some aspects of the equity shares in financial wealth ( $S/FW$ ). Except those households who do not own any real estates (the observations right on the vertical axis), the observations are concentrated to the region below the diagonal line which runs from the origin to the upper-right side. This means that, as  $RE/TW$  increases,  $S/FW$  takes on higher values more often, suggesting that there is a nonlinear relationship between  $S/FW$  and  $RE/TW$ . However, a natural interpretation of this graph is that households first purchase their house by spending as much as they can afford. After they buy real estate, they invest additional incomes into equities.

[Figure 12 about here]

To confirm the observations, I ran regressions for stockholding of households separately for real estate owners and for non-owners. The results are reported in Table 3. (A-1) and (B-1) regress the natural log of stockholding on log of total wealth only for those holding stocks. In these regressions, the coefficient of  $TW$ , total wealth, is larger for non real estate owners. On the other hand, (A-2) and (B-2) are the same regressions for both stockholders and non-holders. In this case, the coefficient of  $TW$  is larger for real state owners. More than other subsamples, the sub sample for (A-1), non-real estate owners holding stocks, is likely to contain more households who decided that they are not going to purchase their houses than other sub samples. The sub sample for (A-2), non-real estate owners holding no stocks, contains more households saving in safe assets in order to purchase houses in the near future. Hence, it is natural that the coefficient of  $TW$  is highest for (A-1) and lowest for (A-2). Furthermore, in both (B-1) and (B-2), positive and significant effects of age on equity investment are observed. All of these are consistent with our interpretations of the graphs above.

[Table 3 about here]

The empirical findings in this section are summarized as follows. First, with respect to both equity shares in financial wealth and real estate shares in total wealth, we observe that the shares increase with age among young households, then become constant. Equity shares might decrease in the late sixties and seventies and have a hump shape, but there is no conclusive evidence due to limitation of Japanese data. Second, for both equity shares in financial wealth and real estate shares in total wealth, the age-related patterns are almost completely explained by the decision to purchase or not to purchase stocks/real estate. Third, we do not observe any significant age-related pattern in the equity holding of households that do not own real estate. Also equity shares in total wealth increase with age for households that own both equities and real estate, while real estate share in total wealth decreases with age. These findings suggest that households become more willing to hold equities once they purchase their own homes and that the age-related patterns in both equity and real estate shares are mostly caused by the decision to hold real estate or not.

## 4 Institutional Background

In the previous section, the age-related pattern of Japanese households' portfolio choice was described and some explanations of such patterns were provided. However, my explanation of the Japanese data relied on the fact that the majority of Japanese households prefer to purchase, rather than rent, houses. There are many important structural factors that explain why renting houses is not an attractive alternative for Japanese households. A couple of those factors which I believe are most important will be discussed in this section<sup>8</sup>. For example, one might argue that households want to own houses because they want to hedge against the future volatility of rents. This explains the difference in financial portfolio choice between homeowners and non-owners. However, for reasons that will be apparent in the following discussion, I believe it is very unlikely that such an interpretation can be applied to the Japanese case.

### 4.1 Housing Laws and Inadequate Supply of Rented Housing

The biggest structural problem preventing Japanese households from renting houses is the shortage of good-quality rented housing in the Japanese housing market. There is a general consensus that Japanese land and housing laws (Shakuchi Ho and Shayakuya Ho) contributed to this problem. Japanese real estate laws take the side of tenants and are very protective towards their rights. It is therefore difficult for existing owners to raise rents and even more difficult for landlords to remove tenants. Such overprotection of tenants makes land owners afraid of large investments that might turn sour and of re-development of old existing rented houses. As a result, the supply of rented housing in Japan is limited and the quality of this supply is worse than owner-occupied houses. Owners of real estate prefer students and young singles who change residences frequently. According to the international comparison by Yamazaki (1999), while the average size of owner-occupied houses are almost the same in Japan, France, and Germany, the average size of rented houses in Japan is only two-thirds of those in Europe<sup>9</sup>. This means that the supply of large size houses, especially those for families with children, is limited in Japan.

Overprotection of tenants in the Japanese legal system has been already

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<sup>8</sup>For a comprehensive discussion of this issue, see Ito (1994) and, especially, Yamazaki (1999).

<sup>9</sup>Yamazaki (1999) reports that average size of owner-occupied houses is 122.1m<sup>2</sup> in: Japan, 101.4m<sup>2</sup> in France, and 112.7m<sup>2</sup> in Germany. On the other hand, the average size of rented houses is 45.1m<sup>2</sup> in Japan, 68.1m<sup>2</sup> in France, and 69.2m<sup>2</sup> in Germany.

pointed out to be a structural impediment causing the inefficient use of land resources in Japan and giving rise to real estate prices. The point that I would like to make here is that the inefficiencies in the Japanese housing market limit the supply of quality rented housing, forcing households to hold a very large shares of their assets in the form of owner-occupied housing and to take risky positions in their portfolios. As such, the willingness of households to take risky positions in the financial market is intimately related to their positions in the housing market.

## 4.2 Bequest Tax

The inheritance tax burden in Japan is much heavier than in the United States and most developed economies. At the same time, if one plans a bequest, it is preferable, from the stand point of tax saving, to hold real estate rather than financial wealth. This is because financial assets have been evaluated at market value and real estate has historically been evaluated below market value in the assessment for bequest taxes until early the 1990s. So there is a strong tax incentive for Japanese households to hold real estate and take out housing loans, since the later is tax deductible at market value if one is to carry out a bequest. Also, for residential real estate, there are huge tax deductions in general. There is a fairly solid consensus on strong bequest motives among Japanese<sup>10</sup>. Such a tax system explains why Japanese households prefer to hold owner-occupied houses rather than rent houses. It also helps to explain why the elderly in Japan retain houses and other real estate until their death.

## 5 Policy Implications

With structural problems in the Japanese housing market as explained in the previous section, some important policy implications can be drawn from the empirical findings in section 2 and 3 of this paper.

Hoshi and Kashyap (1999, 2001) and many economists believe that the Japanese financial system should be and is heading toward becoming more market-oriented, although it is not so obvious that whether it will fully converge on the Anglo-Saxon model. But it is unquestionable that the Japanese firms will keep shifting their sources of funds and households will shift their portfolios from financial intermediaries to market instruments. It should be noted that even the U.S. financial system which is often considered as the model of the future Japanese system, has experienced major structural

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<sup>10</sup>See Horioka and Watanabe (1997).

changes in the past. In particular, in the 1970s and the 80s, the U.S. financial system experienced “disintermediation,” a major shift of funds from indirect financing through banks to direct financing through markets (Edwards 1996; Hubbard 1999, Chapter 15). In the past thirty years, U.S. banks have lost their advantages simultaneously on the both sides of their balance sheets. As a result, banks were squeezed out and simply lost their share in the U.S. financial system. While the way Japanese non-financial firms finance their businesses is becoming similar to that of U.S. firms, Japan has yet to experience major “disintermediation” on the investor/depositor side. It seems that Japanese banks still retain their advantage over financial markets in attracting household wealth.

This is not surprising. Many factors, including slow deregulation, high transaction costs, and tax incentives, explain why Japanese households have traditionally preferred bank deposits over market financial assets. The poor performances of Japanese mutual funds in the past also has discouraged individual stock investments (Cai, Chan, and Yamada, 1997). Policy recommendations have been made to promote household stock investments by changing the tax systems and removing obsolete regulations. However, one potentially important explanation is that, since they have already taken extreme positions by purchasing their residence, many Japanese households simply cannot take risky positions in financial investments. If so, removing obstacles to stock investment alone will not be sufficient to induce individual investors’ equity holdings. Legal and structural reforms in the housing market might be an important factor for promoting stock investment by individuals and enhancing the efficiency of the financial system in Japan. This is a potentially very important policy implication and should be explored more carefully in future research<sup>11</sup>.

When I pointed out that Japanese households are taking extreme portfolio positions, I meant that they are borrowing in an excessive amount. Taking a highly leveraged position makes households vulnerable to labor income risk. In addition, it should be noted that households have real estate, which is a real asset on their asset side of the balance sheets, and have a large nominal debt contract on the liability side. Purchasing houses by taking out bank loans implies that households have particularly extreme positions toward inflation risk. Subsequent inflation is good news for households who

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<sup>11</sup>For this purpose, it is essential that we have panel data of the household portfolio choice before and after the purchase of a house. Since the Nikkei Radar data I examined in this paper are a pooled cross-section, I cannot tell when households bought homes. Also there is no dynamic portfolio choice model in which housing tenure choice decision and financial portfolio choice are made simultaneously.

have purchased houses since the real value of real estate remains constant while inflation reduces the real amount of housing loans. This happened to Japanese households who had bought homes in 1960s, then experienced high inflation in the early 1970s. However, if deflation occurs, the real amount of housing loans increases. This occurred to those who bought houses in the late 1980s and the early 1990s, then have had to face the mild deflation since the mid-1990s. Therefore, the general price level deflation since the late 1990s might have been much more costly to Japanese households than it has been thought. Deflation has a negative impact on the household in two ways. First, under current situation in Japan, deflation is making real interest rates higher. However, deflation probably hit the households that already own real estate much more directly by increasing the real value of their liabilities. It is the subsequent low inflation rate, which is lower than the inflation rate expected when loan contracts are made, that increases the real amount of housing loans.

Finally, when the average Japanese household takes out housing loans, the lender has to be convinced about the prospects of the household's future loan payments. In Japan, it is not unusual that the monthly repayment of housing loan exceeds half of household expenses. Although the housing loan is usually backed by mortgage, if the household becomes unemployed, it will immediately experience deep financial trouble since housing expenses accounts for such a large proportion of living expenses. So given the high real estate prices in Japan, it is very important that workers have a relatively stable and safe future labor income to be able to finance housing purchases. Without the conventional lifetime employment system, this will be very difficult. The collapse of the lifetime employment system, combined with the lingering recession of the 1990s, is likely to depress demand for stocks by Japanese households.

## 6 Conclusions

This paper examined the portfolio choice of Japanese households over the life cycle, paying particular attention to the relationship between equity and real estate holdings. The findings of this paper suggest that a substantial part of the age-related pattern observed in stock investments can be explained by the households' tenure decisions concerning housing. Younger households tend to accumulate their wealth in safe assets to save for purchasing houses. After they purchase a house, they restrained from taking risks in financial investments because of highly leveraged positions from housing loans. So demand for equity is more elastic to the wealth level for homeowners than

for non-owners. Such interpretation of the findings in this paper is very intuitive and also potentially very important because, given the large share of real estate in average Japanese households' total wealth, the regulations and tax policies related to the housing market can have a big impact on equity demand by individual investors.

It is not certain whether the findings of this paper can be generalized for the U.S. and other developed countries. However, there is no doubt that the equity share in total wealth will be lower, especially in the early stage of the life cycle, if owner-occupied houses is included in the model of dynamic portfolio choice. It is tempting to estimate the "structural" model of investor's decisions by including both demand for owner-occupied houses and risky financial assets. However, in this paper, I intentionally avoided statistically testing this, because such an ambitious model has not been worked out yet. There are a number of studies on dynamic portfolio choice between stocks and safe assets with labor income risk (e.g. Bodie et.al. 1991; Campbell and Viceira 1991 and forthcoming book) and a limited number of studies on saving for purchasing owner-occupied housing with labor income risk (e.g. Coco 1999). However, at least to my knowledge, there are no studies that combine stock investment and housing-tenure decision at the same time. An most important message I would like to convey in this paper is the need for a model in which the choice of housing tenure and financial portfolio choice are determined simultaneously. A formal theoretical model is needed to quantitatively examine the importance of housing tenure decision on the financial portfolio choice.

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Table 1  
Basic Statistics of Nikkei RADAR Data

1987		
No of Samples: 1183	Mean of Cohort Means	Simple Mean
Total Wealth (ten thousand yen)	5622.5	5235.8
Financial Wealth	824.9	743.2
Equity in Total Wealth (%)	4.18	4.27
Equity in Financial Wealth	23.49	25.78
Real Estate in Total Wealth	49.65	47.87
1990		
No of Samples: 2542	Mean of Cohort Means	Simple Mean
Total Wealth (ten thousand yen)	6942.5	6769.2
Financial Wealth	1069.9	976.8
Equity in Total Wealth (%)	5.33	5.48
Equity in Financial Wealth (%)	36.85	38.98
Real Estate in Total Wealth (%)	45.17	44.58
1993		
No of Samples: 2424	Mean of Cohort Means	Simple Mean
Total Wealth (ten thousand yen)	5496.8	4820.5
Financial Wealth	1242.7	1076.9
Equity in Total Wealth (%)	4.18	4.42
Equity in Financial Wealth (%)	17.81	19.47
Real Estates in Total Wealth (%)	40.59	39.15
1996		
No of Samples: 2440	Mean of Cohort Means	Simple Mean
Total Wealth (ten thousand yen)	4531.6	4052.1
Financial Wealth	1172.1	994.9
Equity in Total Wealth (%)	3.46	3.38
Equity in Financial Wealth	12.40	12.40
Real Estate in Total Wealth	39.23	38.49
1999		
No of Samples: 2303	Mean of Cohort Means	Simple Mean
Total Wealth (ten thousand yen)	3600.6	3543.2
Financial Wealth	1106.6	1053.8
Equity in Total Wealth (%)	3.63	3.68
Equity in Financial Wealth	7.22	7.33
Real Estate in Total Wealth	36.30	36.73

Table 2  
Percent of Japanese Households Owning Stock and Real Estate

	1987	1990	1993	1996	1999
(1a) Direct ownership	22.8 (%)	26.5	26.5	22.0	23.6
(1b) Mutual funds	7.0	9.6	7.3	6.0	4.9
(1c) Direct + mutual funds	25.9	30.2	29.3	24.0	25.2
(2a) Owner-occupied housing	-( <sup>1</sup> )	44.6	38.8	39.6	39.0
(2b) Real estates	47.0	50.5	44.4	44.5	46.3
Correlation (1c, 2a)	-	17.6	17.3	22.6	20.4
Correlation (1c, 2b)	16.0	21.2	21.7	23.3	24.0

(1) There is no distinction in types of real estates in 1987.

Table 3  
Relationship between Stock and Housing Hoolding

Definition of Variables

stock: Real value of stock holdings in yen (adjusted by CPI).

TW: Real total assets in yen (adjusted by CPI).

age: age of the household

S/FW: The ratio of stock holding to financial wealth

A. Non Real Estate Owners

(A-1) Stock holders only

$$\ln(\text{stock}) = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}) + \text{year dummies}$$

Number of observations: 710

Dependent Variable	age	TW	
stock	-0.0010 [0.0032]	0.7614** [0.0412]	$\overline{R^2} = 42.2\%$

(A-2) Both stock holders and non-holders

$$\ln(\text{stock}+1) = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}+1) + \text{year dummies}$$

Number of observations: 4162

Dependent Variable	age	TW	
stock	-0.0012 [0.0014]	0.3920** [0.0159]	$\overline{R^2} = 19.0\%$

(A-3) Both stock holders and non-holders

$$\text{S/FW} = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}) + \text{year dummies}$$

Number of observations: 4162

Dependent Variable	age	TW	
S/FW	-0.0006** [0.0002]	0.0277** [0.0015]	$\overline{R^2} = 7.6\%$

Table 3 (continued)

B. Real Estate Owners

(B-1) Stock holders only

$$\ln(\text{stock}) = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}) + \text{year dummies}$$

Number of observations: 1536

Dependent Variable	age	TW	
stock	0.0225** [0.0031]	0.5233** [0.0374]	$\overline{R^2} = 19.8\%$

(B-2) Both stock holders and non-holders

$$\ln(\text{stock}+1) = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}+1) + \text{year dummies}$$

Number of observations: 4172

Dependent Variable	age	TW	
stock	0.0271** [0.0026]	0.6698** [0.0313]	$\overline{R^2} = 15.0\%$

(B-3) Stock holders only

$$\text{S/FW} = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}) + \text{year dummies}$$

Number of observations: 4162

Dependent Variable	age	TW	
S/FW	-0.0006 [0.0007]	-0.0013** [0.0006]	$\overline{R^2} = 4.1\%$

(B-4) Both stock holders and non-holders

$$\text{S/FW} = \alpha + \beta_1 \text{ age} + \beta_2 \ln(\text{TW}) + \text{year dummies}$$

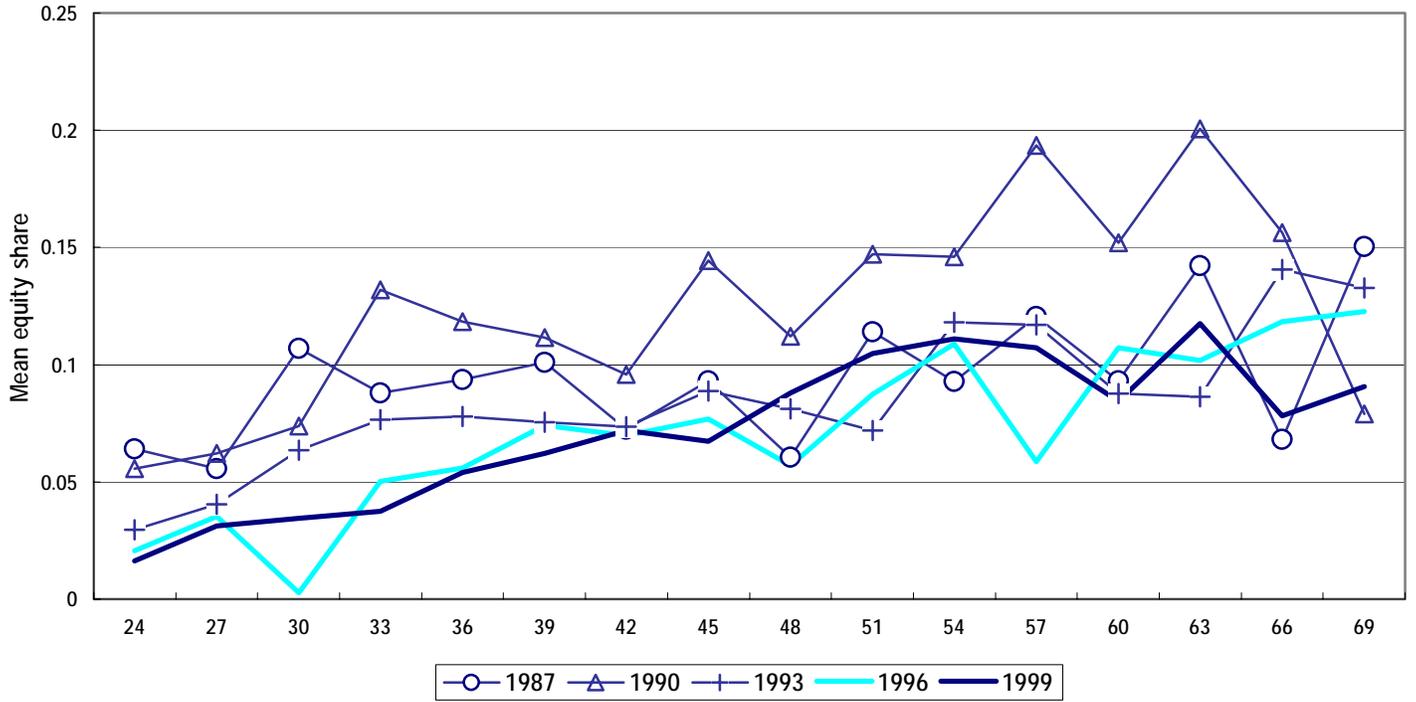
Number of observations: 4162

Dependent Variable	age	TW	
S/FW	0.0013** [0.0003]	0.0459** [0.0038]	$\overline{R^2} = 5.5\%$

# Figure 1

## Equity Shares in Financial Wealth: 1987-1999

### Cross-section View



### Cohort View

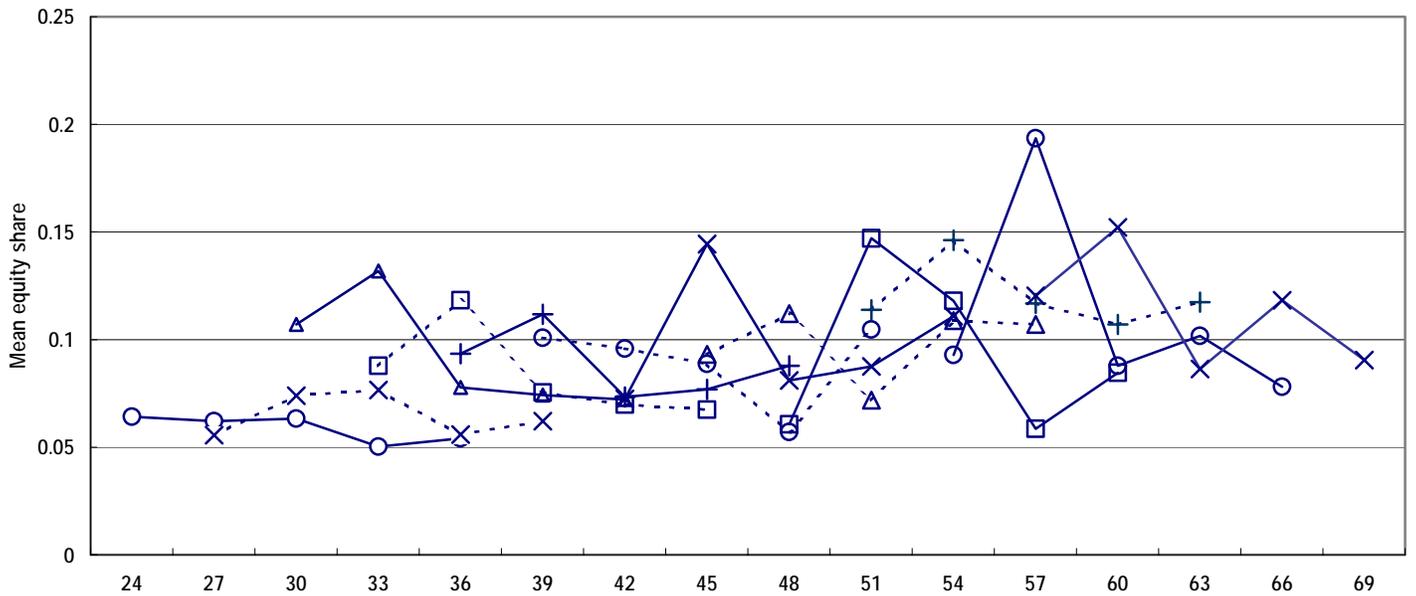
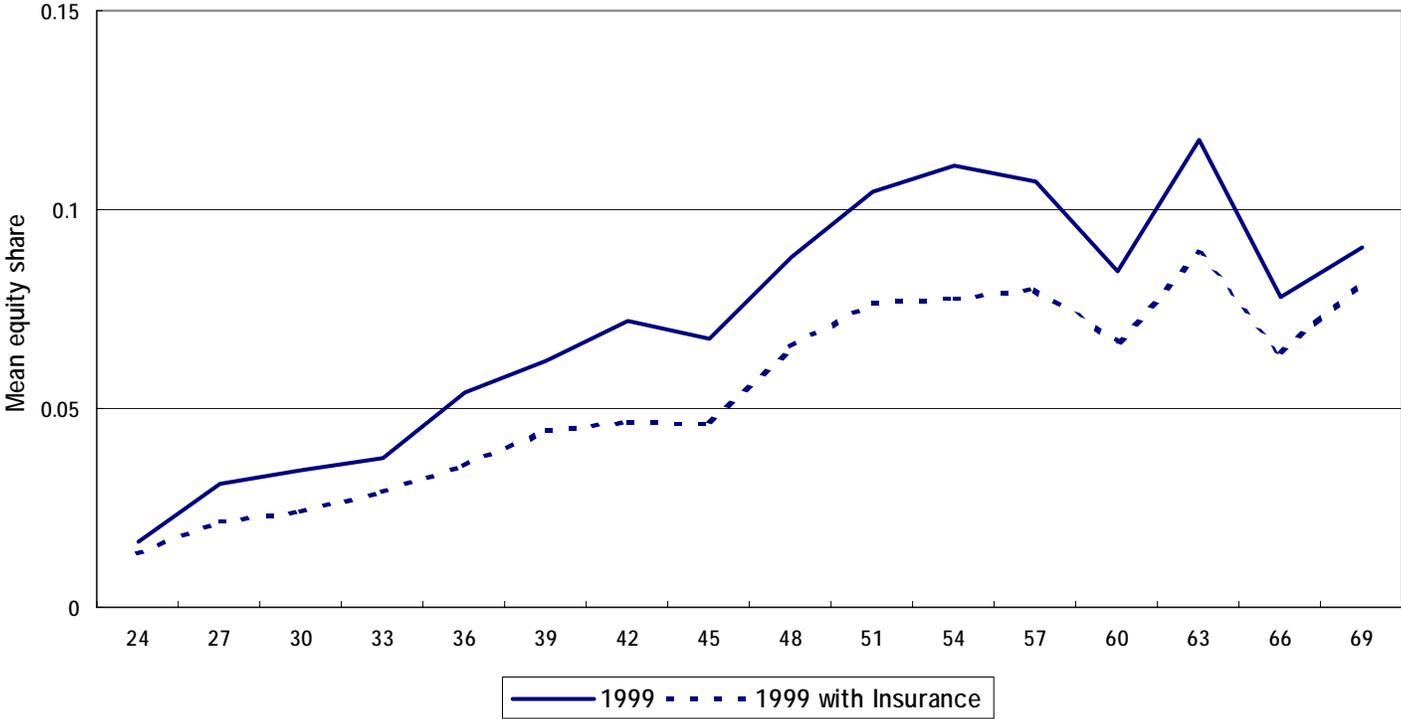


Figure 1 (continued)

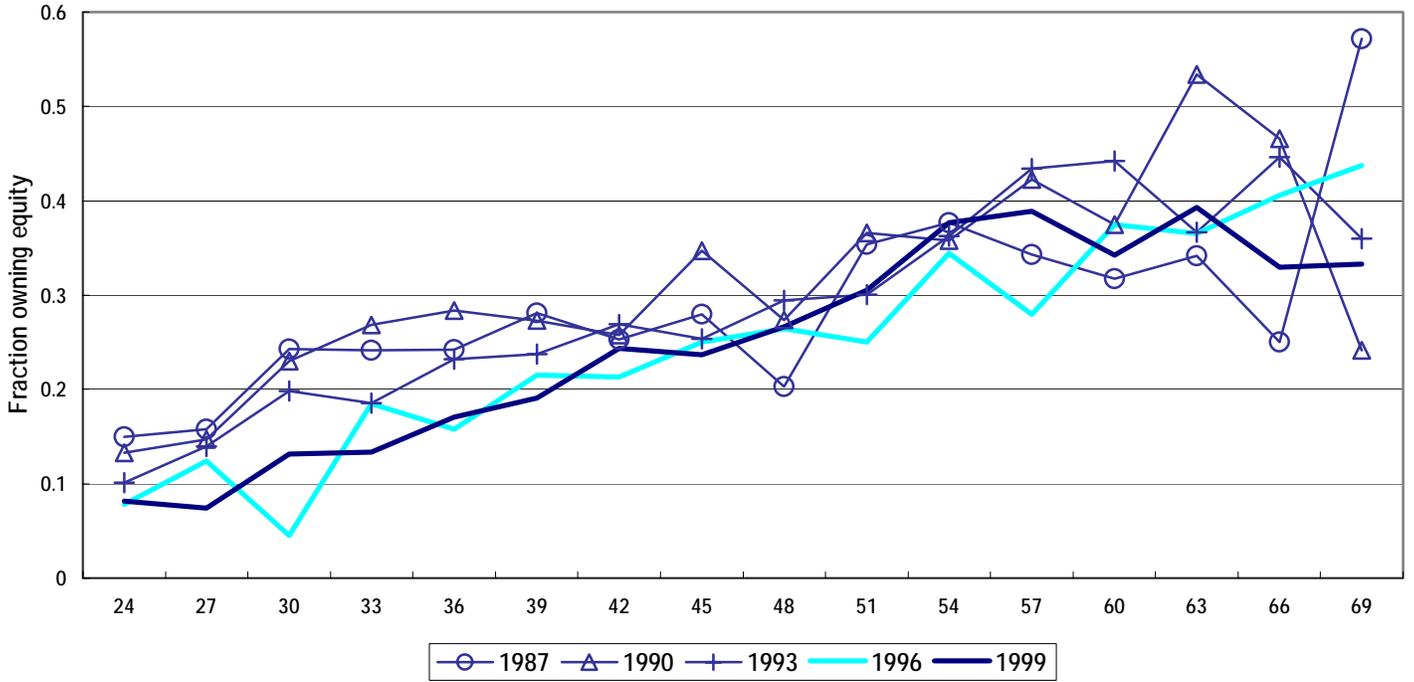
Different Definitions of Financial Wealth



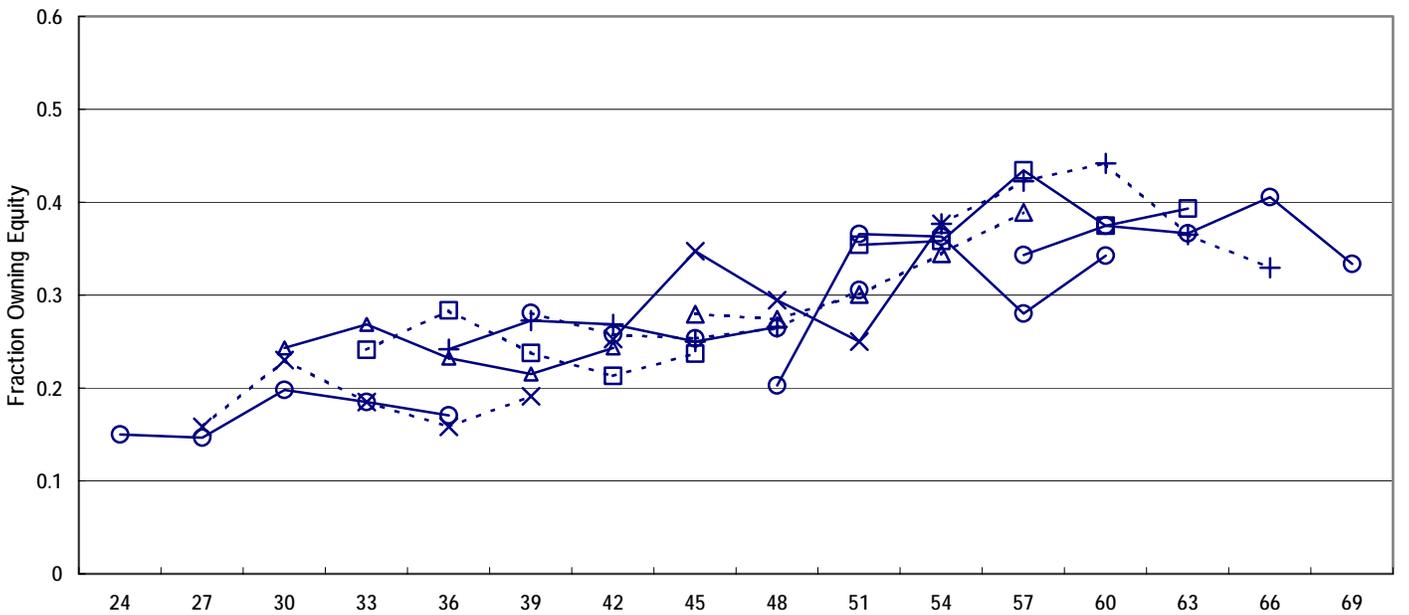
# Figure 2

## Faction of Population Owning Equity: 1987-1999

### Cross-section View



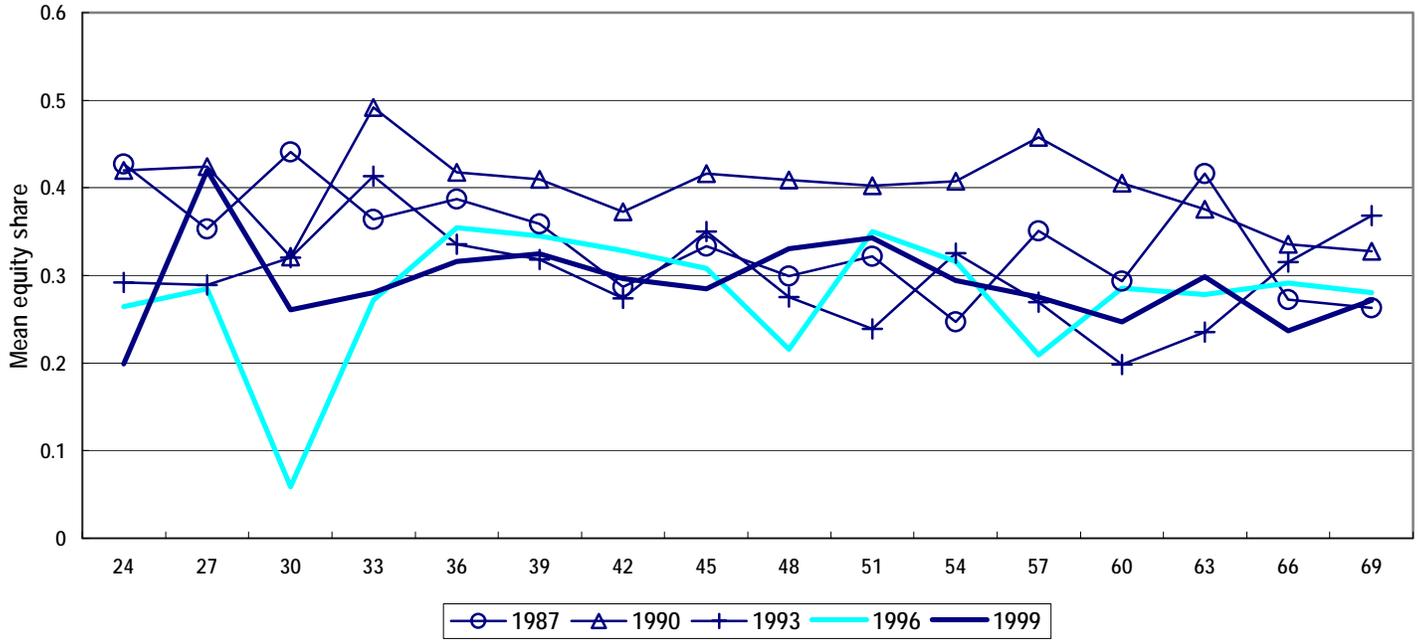
### Cohort View



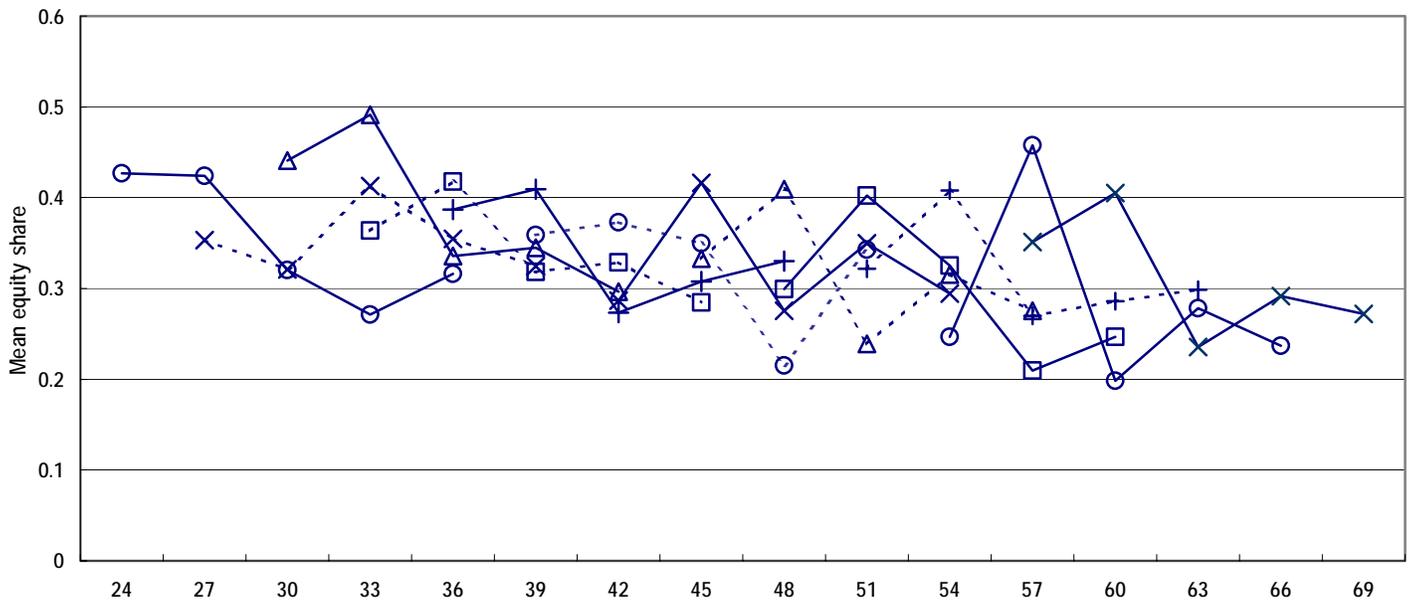
# Figure 3

## Equity Shares among Equity Owners: 1987-1999

### Cross-section View

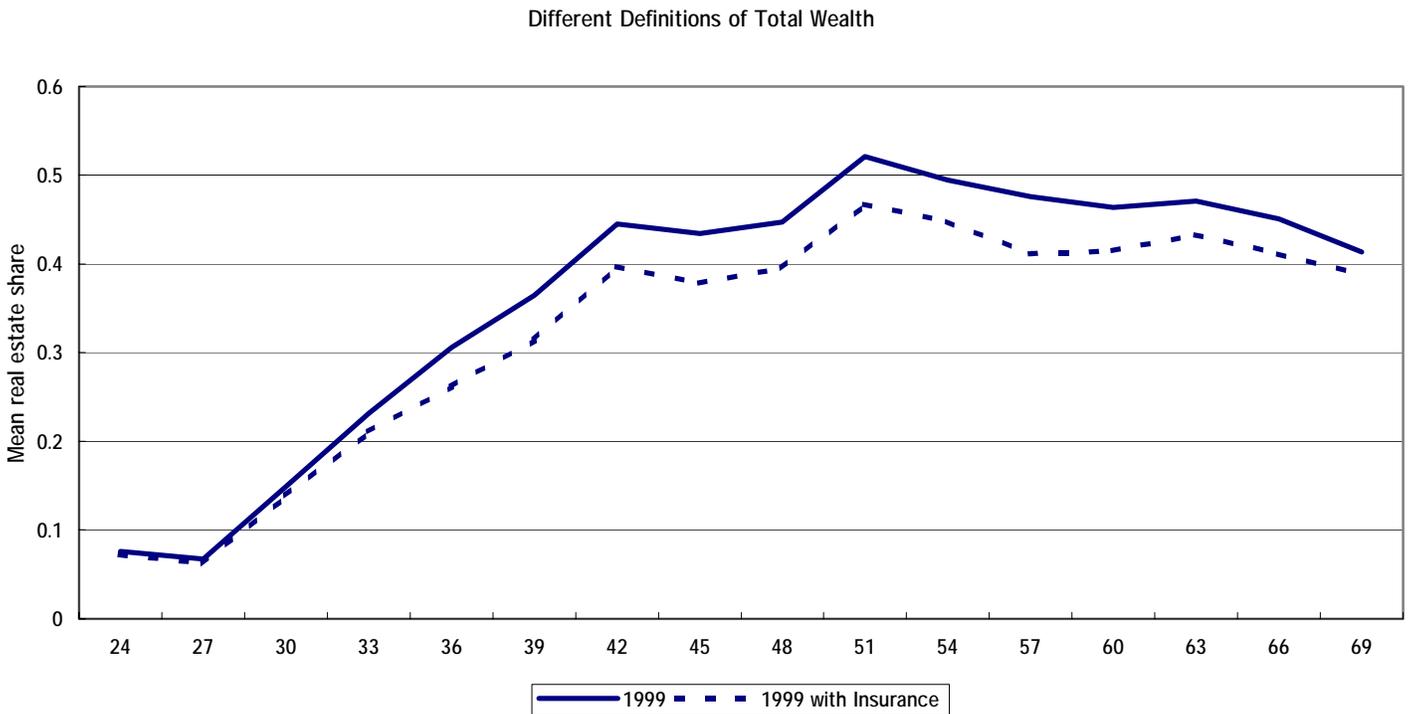
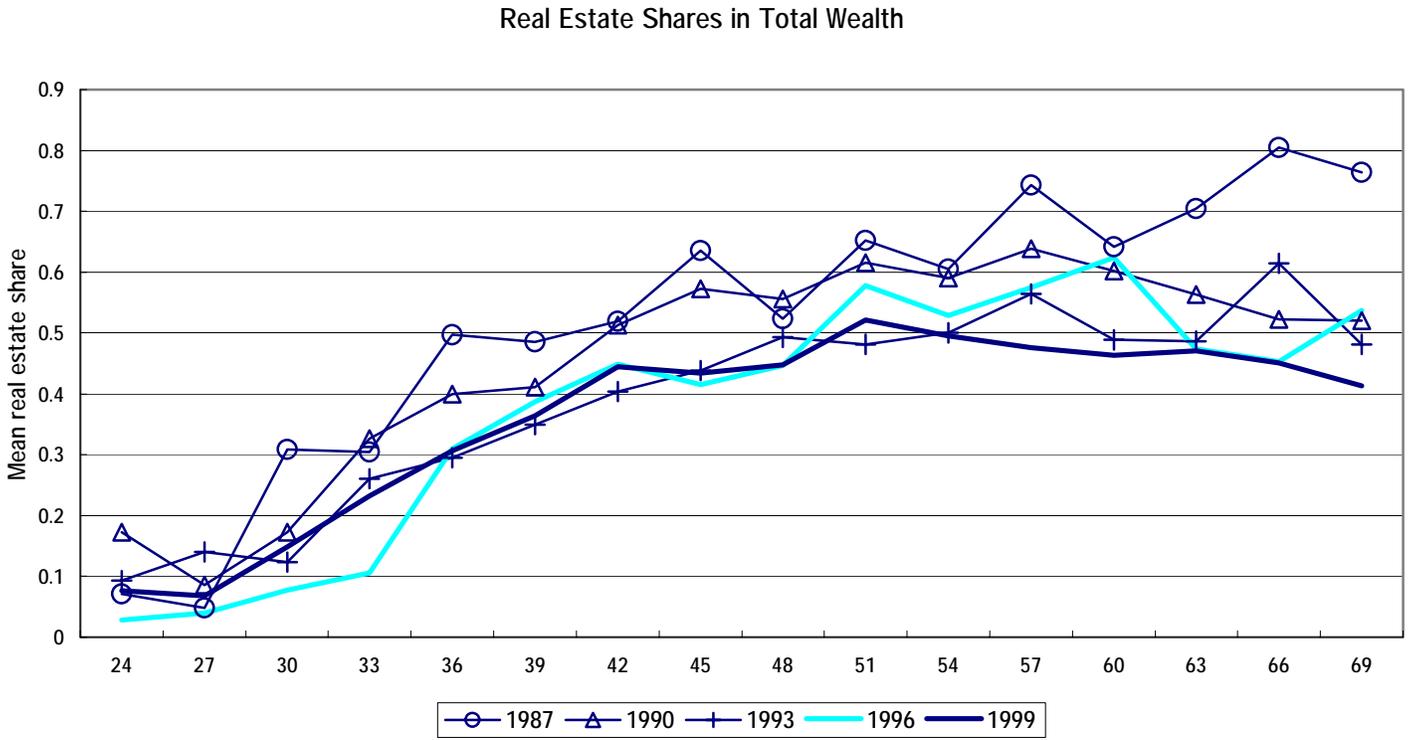


### Cohort View



# Figure 4

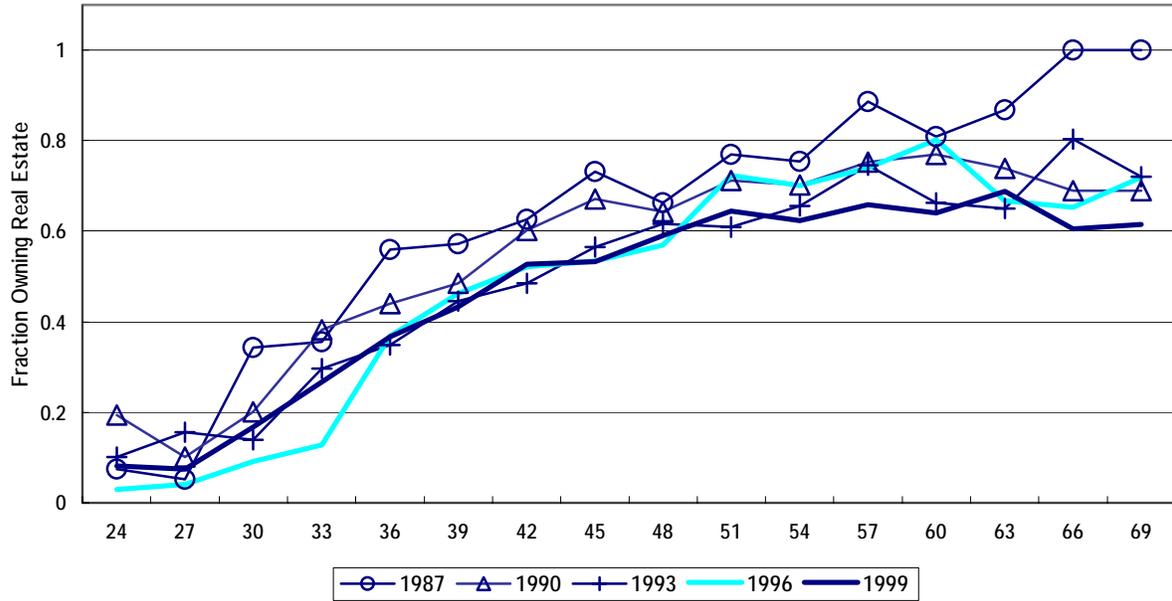
## Real Estate Shares in Total Wealth: 1987-1999



# Figure 5

## Real Estate Ownership (1)

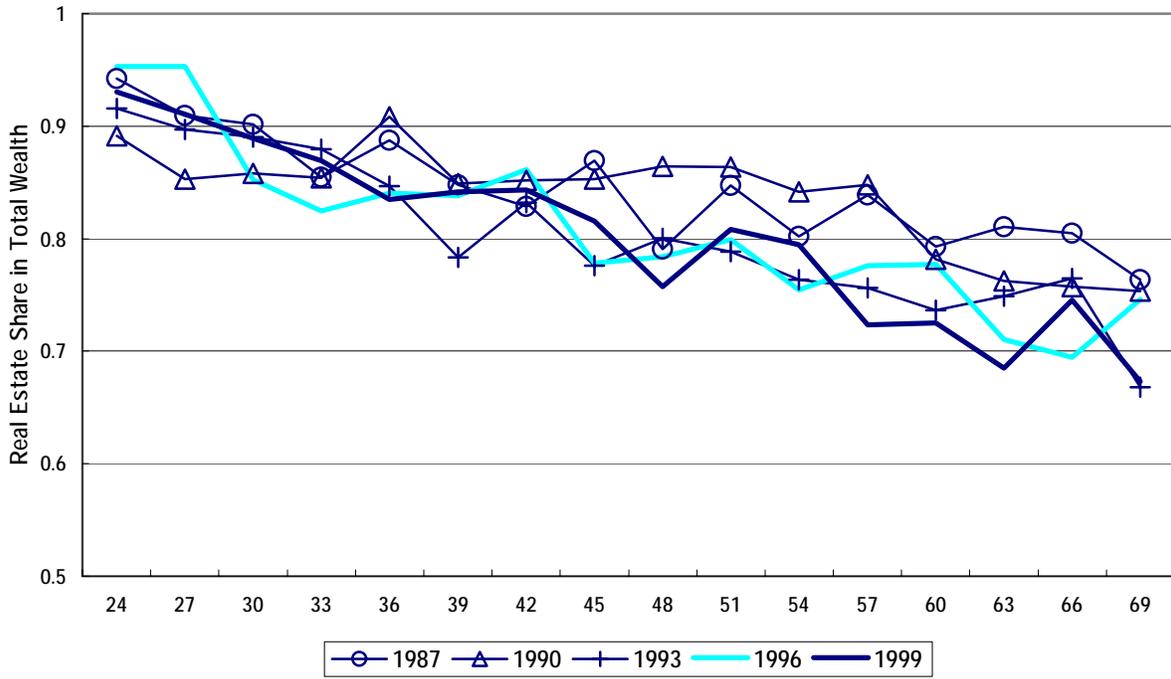
### Fraction of Population Owning Real Estates



# Figure 6

## Real Estate Ownership (2)

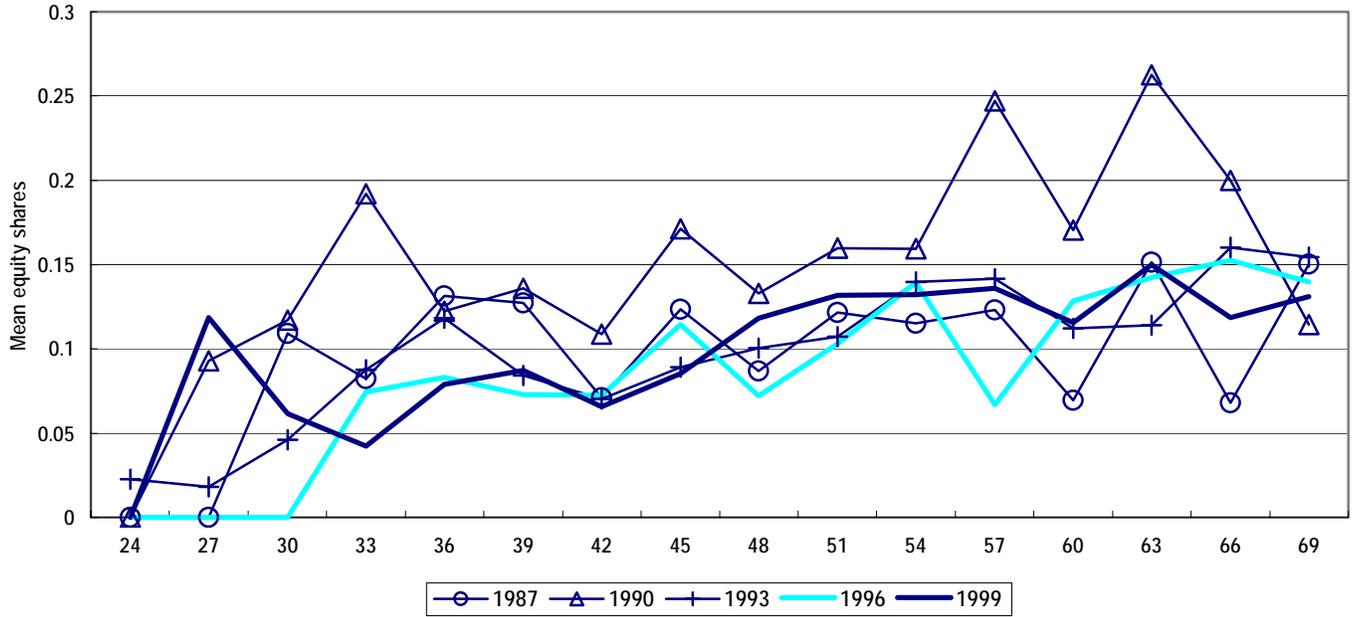
### Real estate shares among owners



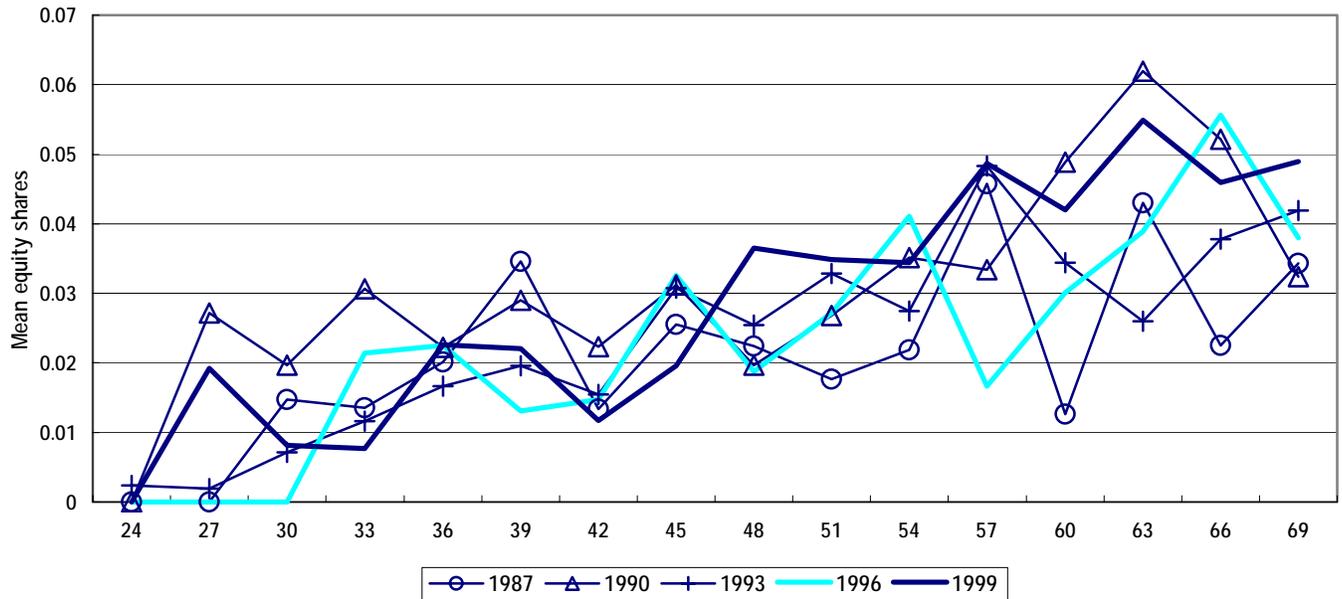
# Figure 7

## Equity Shares in Real Estate Owners Portfolio

### (1) Equity Shares in Financial Wealth



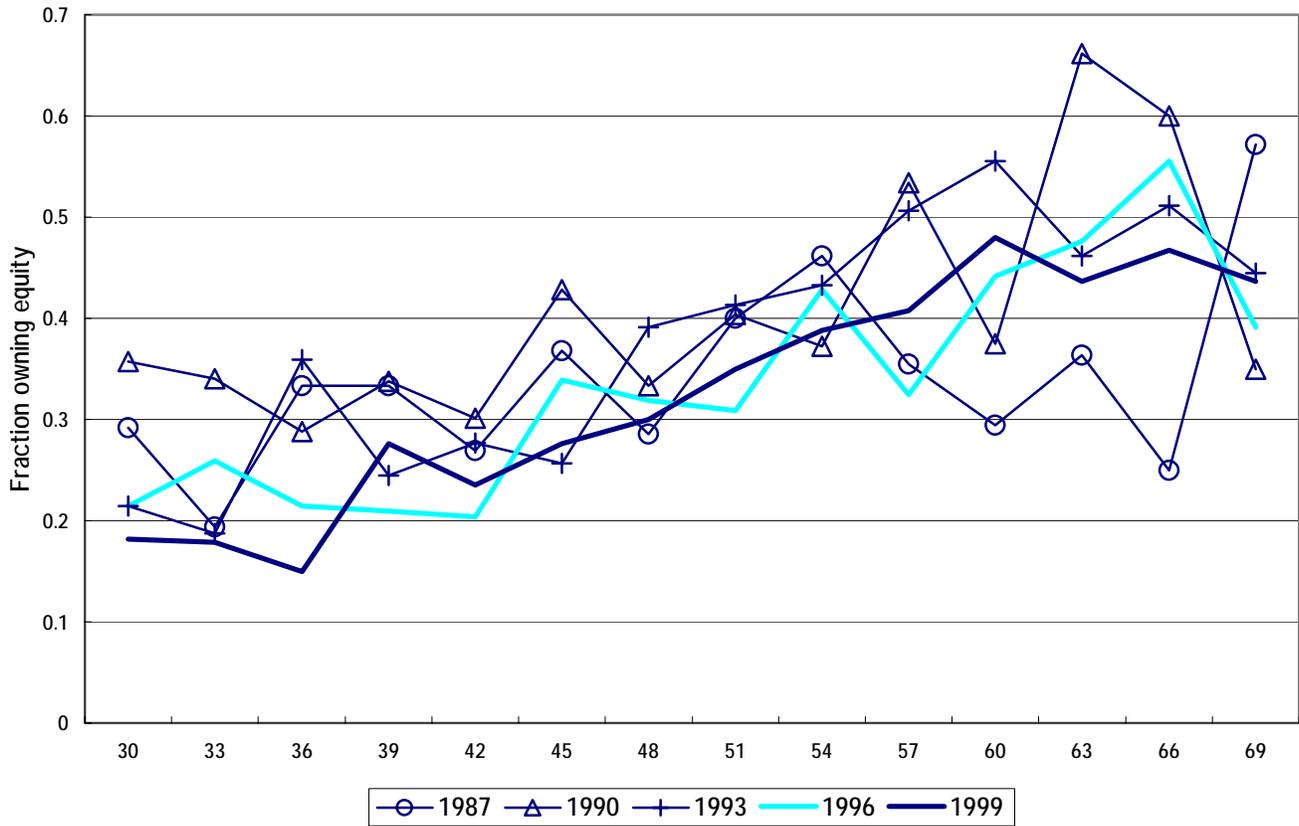
### (2) Equity Shares in Total Wealth



# Figure 8

## Equity Holding by Real Estate Owners

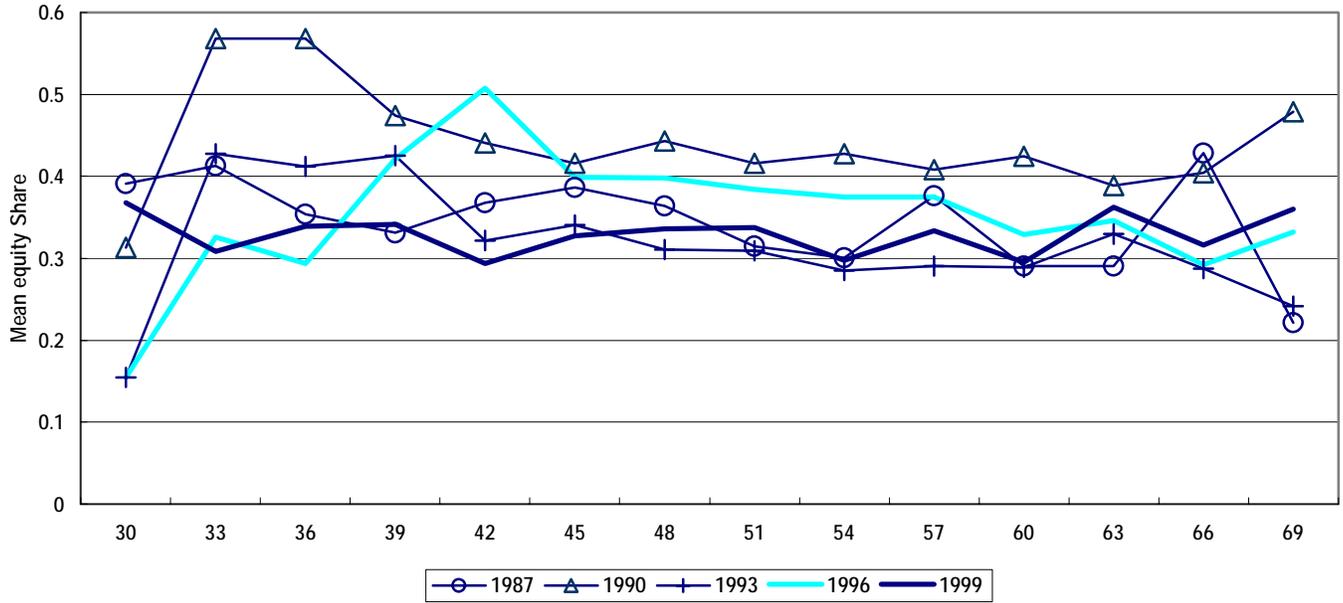
Fraction of Equity Holders among Real Estate Owners



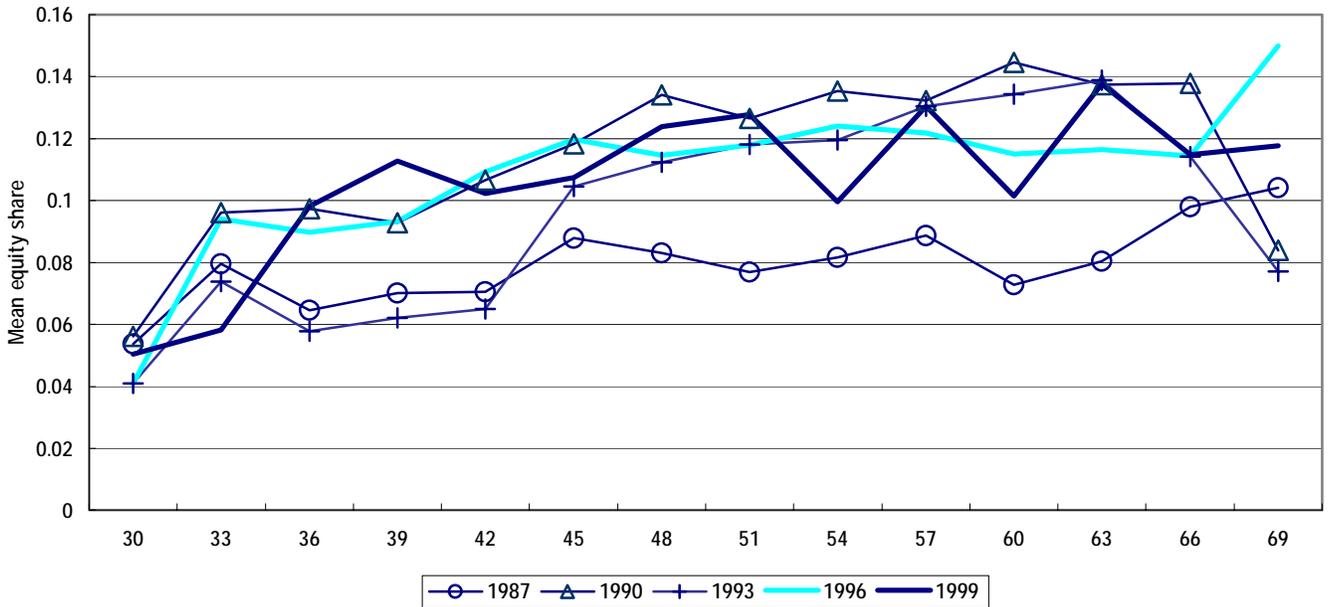
# Figure 9

## Equity Shares of Households Owning both Equity and Real Estates

### Equity Share in Financial Wealth / Owning both Equity and Real Estates

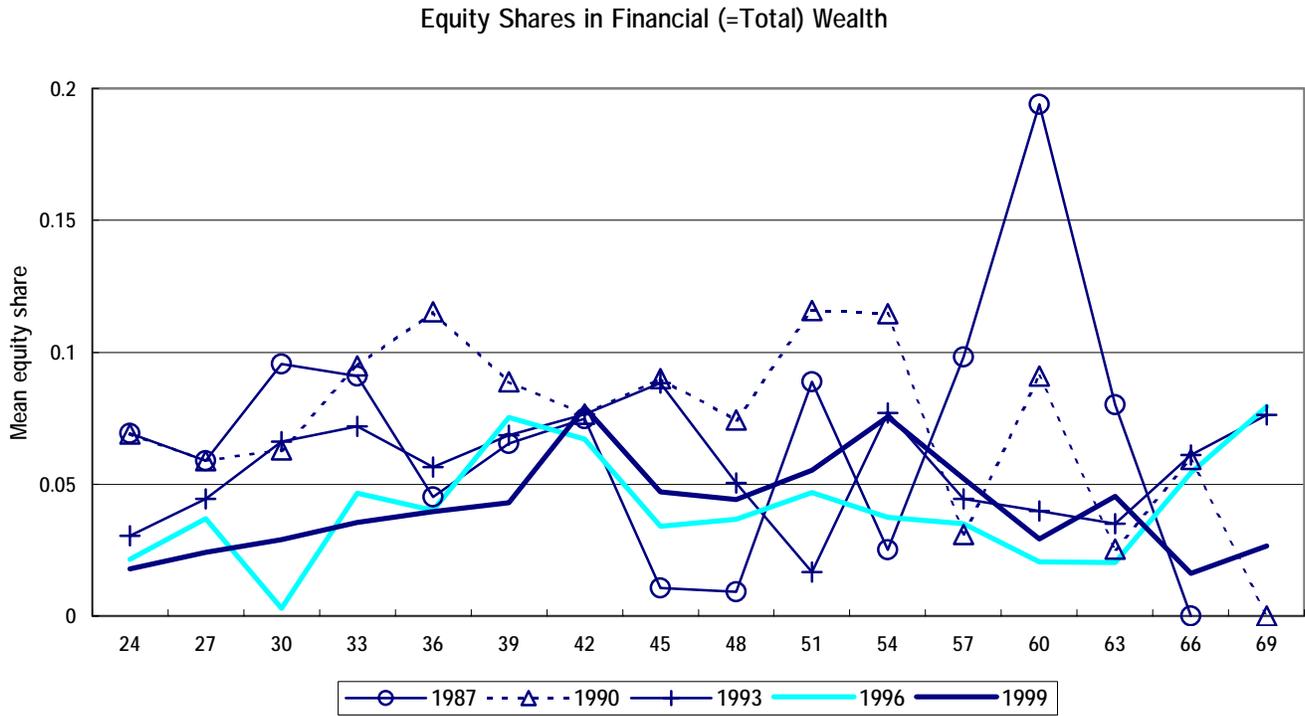


### Equity Share in Total Wealth / Owning both Equity and Real Estates



# Figure 10

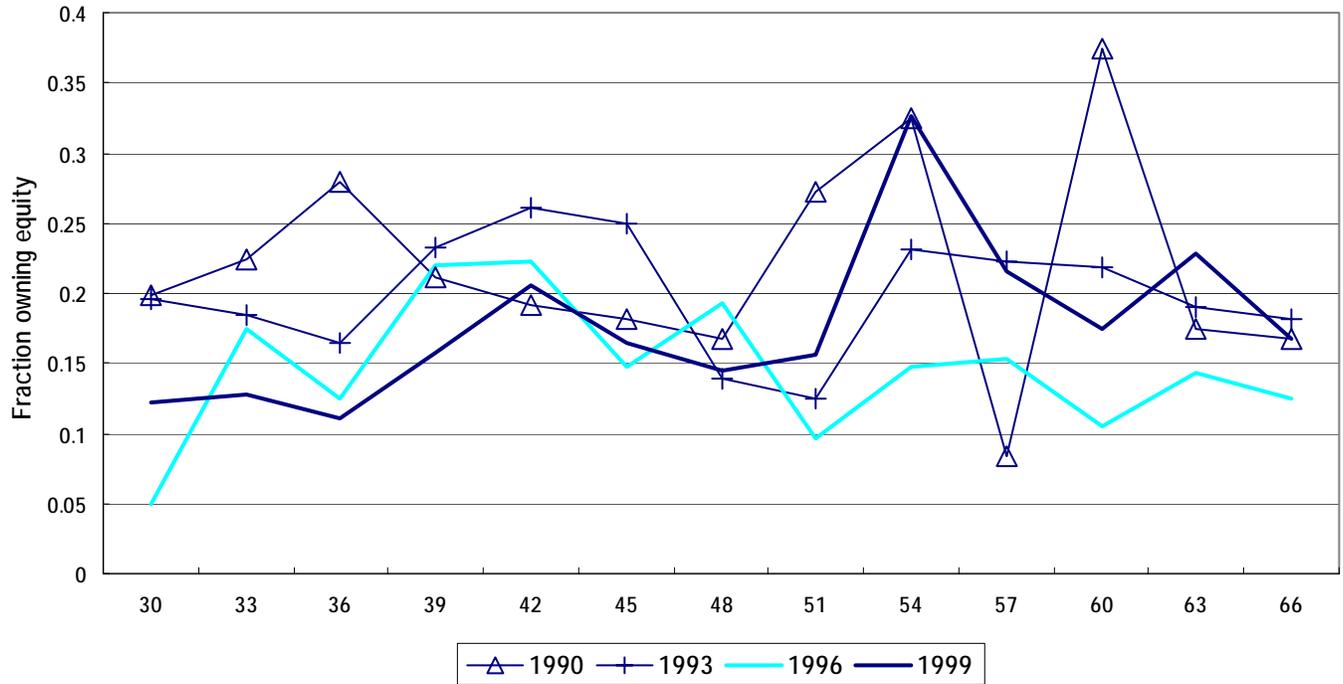
## Equity Shares of Households Do Not Own Real Estates



# Figure 11

## Equity Holding by Households Do Not Own Real Estates

### Equity Holders among Non-Home Owners



### Equity Shares among Equity Owners

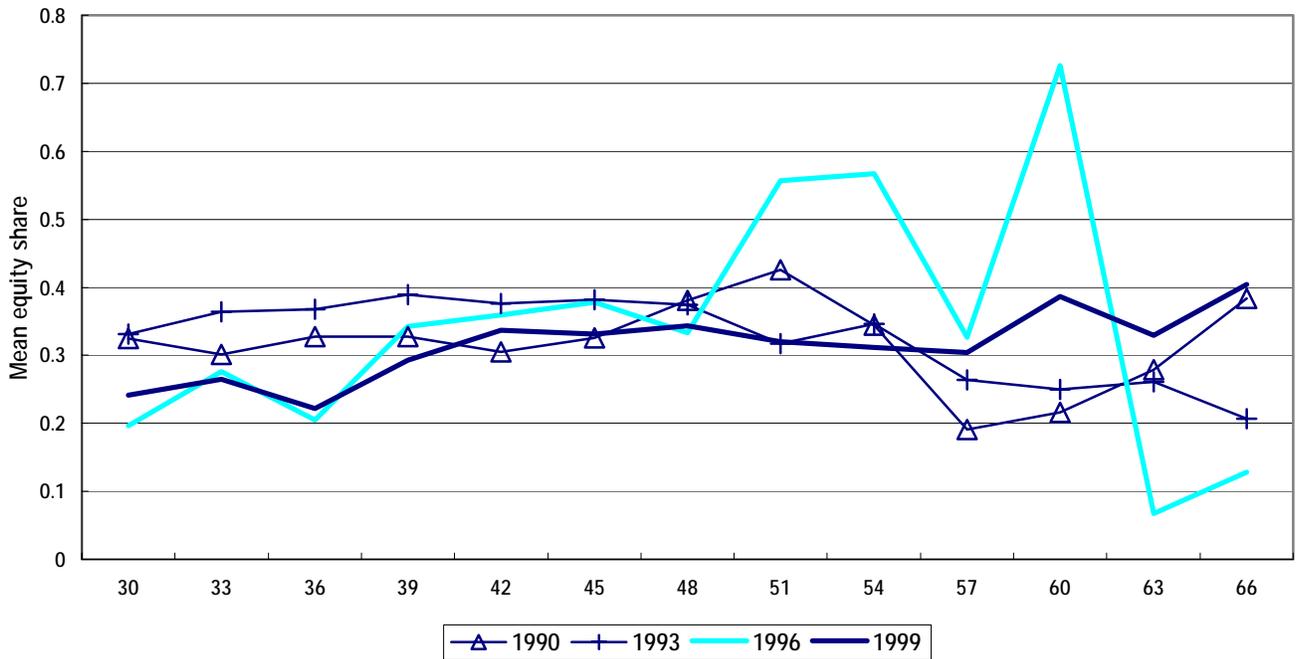


Figure 12

Equity Shares in Financial Wealth against Real Estate Shares in Total Wealth

