

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

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Abstract

This paper studies 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.

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1 Introduction

In this paper, we 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 system¹. In previous studies, 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. Therefore, studying the portfolio structure of Japanese households is essential for understanding 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. I will argue that this

¹Hoshi and Kahsyap (2001) forcefully made this point.

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 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 finance². 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 the 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.

²For the summary of recent theoretical developments, see Campbell and Viceira (2001); Jagannathan and Kocherlakota (1996).

2 The Data

I use the annual survey data published by Nihon Keizai Shimbun, which is known as Nikkei Radar³. 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 nationwide 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 time⁴. 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

³This data was previously used in Muramoto eds. (1998) and others.

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

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 the summary statistics of our sample. It shows that Japanese households have experienced very sharp up and down of their wealth in last fifteen years. From 1987 to 1990, toward the peak of the bubble economy, the amounts of financial wealth and total wealth increased around 30%. Then, from 1990 to 1999, total wealth decreased nearly 50%, while financial wealth of households actually increased 5 to 10%. This implies that the majority of the wealth decline that Japanese household suffered in 1990s were the decline in real estate value.

3 Portfolio Choice over the Life Cycle by Japanese households

In our discussions of the Japanese household data, we treat U.S. empirical facts reported in Amerkis and Zeldes (2001) as the benchmark. First, I summarize their 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 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 Japanese equity shares after retirement are constant or decrease like in the U.S. But, one very clear 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 real estates. 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 the ownership of real estate was taken into account, the following trends in the relationship between home ownership and age are observed for Japanese households:

- (iv) **Real estate shares in total wealth (defined as the sum of financial assets and real estate) increase with age, but become 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 shares of real estate in total wealth conditional on ownership of real estate decrease with age. Conditional on ownership, real estates account 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 patter 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 shows the variation of equity shares in financial assets over the life cycle. Both panels present 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 simultaneously⁵. From the "Cohort view" panel, it is obvious that all cohorts recorded the largest shares of equities in their fi-

⁵See Amerkis and Zeldes (2001) for details of this identification problem.

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 of “financial wealth” are shown. Until very recently, insurance, especially life insurance, had been a very important way of saving for Japanese households⁶. Nikkei Radar data has been asking households about the amount of insurances in the survey and the inclusion insurances increased the total financial wealth up to 50%. The equity share in financial assets including life insurance and non-life insurance is represented by the dotted line in the last panel of Figure 1. The problem with this share is, however, the survey asked the question such as “At the time of maturity, how much will you receive from the insurance contract?” The value reported in Nikkei Radar represents neither market value nor net present value of a insurance contract. Hence, they 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. So we adopt a narrower definition of financial wealth without insurance in the following.

[Figure 1 about here]

Table 2 shows the percentage of households owning stocks in Nikkei Radar data, along with real estate. There was some certain increase during the bubble years, around 1990. 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 Nikkei Radar data used in this paper as discussed in the previous section. Figure 2 shows the proportion of population that owns stocks. While Japanese and U.S. numbers are comparable, the

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

Japanese shares seem not to decrease even after retirement age⁷. 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 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. Caplin, Chan, Freeman, and Tracy (1997) presents the most comprehensive examination, to my knowledge, 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]

⁷Our 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%.

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. 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, readers are 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 that many households own their homes, but do not own any stocks at all. So even after we incorporate the effect of housing tenure choice, the question remains that some households never hold stocks for no apparent reason. However, the real estate shares in total wealth (RE/TW) certainly explain some extent of the variation in S/FW, the equity shares in financial wealth. 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 runs from the origin to northeast. 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 houses by spending as much as they can afford. After they buy real estates, they invest additional incomes into equities.

[Figure 12 about here]

To confirm these observations, in Table 3, I ran regressions for stockholding of households separately for real estate owners and for non-owners. Table 3, panel (A-1) and panel (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, panel (A-2) and panel (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 households who decided that they are not going to purchase their houses than other sub samples. On the other hand, the subsample for (A-2), non-real estate owners holding no stocks, contains more households that are 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), the coefficients of age are positive and significant: there is a positive effect of age on equity investment are observed for the home-owners. All of these are consistent with our interpretations of the graphs above.

[Table 3 about here]

Table 4 is looking at the same problem from a different perspective. Households are divided into groups by “if they hold stocks or not” and by “if they own real estate or not.” This makes four groups of households and they are shown in two by two matrices. Table 4, panel (A) shows the transition of this matrix over the life cycle using the cross-section data of 1999. The difference between Age 30-32 group and Age 39-41 group — the smaller matrix at the right side of original matrices — suggest that there is a significant population shift from “no stock - no land” group (25.2% decrease) to “no stock - own land” group (19.3% increase) during the age of thirties. This pattern is observed in a less pronounced way for the difference between Age 39-41 group and Age 48-50 group, 12.8% decrease and 5.3% increase respectively. Instead, “own stock - own land” group increases by 10.5% during forties of age. Finally, the difference between Age 48-50 group and Age 57-59 exhibits 4.2% decline of “no stock - own land” group, while “own stock - own land” group continues to increase by 10.8%. Overall, the analysis of these matrices suggests that households start from “no stock - no land” group, move to “no stock - own land” group first, then move to “own both stock and land” group.

Table 4 panel (B) and panel (C) are looking at the same problem using the cohort data, tracking Age 30-32 cohort and Age 45-47 cohort in 1987. Basically, these tables confirm what we observed about panel (A). Households first buy their houses and then begin to buy stocks. Only the difference from the cross-section data is that the increase of “own both” group is relatively limited for the older cohort. From 1987 to 1999, there was only a 4.6% increase in “own both” group among the cohort who had been Age 45-47 in 1987. Instead, we observe a 6.3% increase in “own stock - no land” group in this cohort.

[Table 4 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 household data relied on the fact that the majority of Japanese households prefer to purchase, rather than rent, their 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 section⁸. For example, some might argue that households want to own houses because they want to hedge against the future volatility of rents. Such a story can explain the difference in financial portfolio choice between homeowners and non-owners. However, for the reasons that will be discussed in the following, I believe it is very unlikely that such an interpretation explains 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 quality rented housing in the Japanese housing market. A general consensus is that Japanese land and housing laws (Shakuchi

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

Ho and Shayakuya Ho) have 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 landlords to raise rents and even more difficult for them 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 Europe⁹. This means that the supply of large size houses, especially those for families with children, is extremely limited in Japan.

Overprotection of tenants in the Japanese legal system has been already pointed out as 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. Therefore, 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

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

if one is to carry out a bequest. Also, for residential real estate, there are huge tax deductions in general. Since there is a fairly solid consensus on strong bequest motives among Japanese¹⁰, 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.

Many economists, most notably Hoshi and Kashyap (1999, 2001), argue that the Japanese financial system should be becoming and is actually heading toward more market-oriented system. Though it is not so obvious that whether it will fully converge on the Anglo-Saxon model, 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 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

¹⁰See Horioka and Watanabe (1997).

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 why Japanese make few stock investments 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 research¹¹.

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 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, but prolonged 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 the 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 in-

¹¹For 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.

creasing 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, the investment behavior and the tenure decision of Japanese households are related to the Japanese employment system. When the average 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 a half of household expenses. Although the housing loan is usually backed by mortgage, if the household becomes unemployed, it will immediately experience a serious 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 investigated 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 might 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 economies. 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. For that reason, it is tempting to estimate the “structural” model of investor’s decisions by including both demand for owner-occupied housing 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. Cocco 1999). However, at least to my knowledge, there is no theoretical study that combine stock investment and housing-tenure decision at the same time. An 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.

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Table 1
Basic Statistics of Nikkei RADAR Data

TW=Total Wealth (ten thousand yen)=Financial Wealth +Real Estates

FW=Financial Wealth (ten thousand yen)

TW and **FW** are reported in real value (1999 yen value), normalized using GDP deflator at the third quarter each year.

1987 (No of Obs.: 1,183)	Mean of Cohort Means	Simple Mean
TW	5230.0	4870.3
FW	767.3	691.3
Equity in TW (%)	4.18	4.27
Equity in FW (%)	23.49	25.78
Real Estate in TW (%)	49.65	47.87

1990 (No of Obs.: 2,542)	Mean of Cohort Means	Simple Mean
TW	6790.5	6621.0
[Change from 1987 (%)]	[29.8]	[35.9]
FW	1046.5	955.4
[Change from 1987 (%)]	[36.4]	[38.2]
Equity in TW (%)	5.33	5.48
Equity in FW (%)	36.85	38.98
Real Estate in TW (%)	45.17	44.58

1993 (No of Obs.: 2424)	Mean of Cohort Means	Simple Mean
TW	5645.2	4950.7
[Change from 1990 (%)]	[△16.9]	[△25.2]
FW	1276.3	1106.0
[Change from 1990 (%)]	[22.0]	[15.8]
Equity in TW (%)	4.18	4.42
Equity in FW (%)	17.81	19.47
Real Estates in TW (%)	40.59	39.15

Table 1
Basic Statistics of Nikkei RADAR Data
(continued)

1996 (No of Obs.: 2440)	Mean of Cohort Means	Simple Mean
TW	4593.0	4107.0
[Change from 1993 (%)]	[Δ 18.6]	[Δ 17.0]
FW	1188.1	1008.4
[Change from 1993 (%)]	[Δ 6.9]	[Δ 8.8]
Equity in TW (%)	3.46	3.38
Equity in FW (%)	12.40	12.40
Real Estate in TW (%)	39.23	38.49
<hr/>		
1999 (No of Obs.: 2303)	Mean of Cohort Means	Simple Mean
TW	3600.6	3543.2
[Change from 1996 (%)]	[Δ 21.6]	[Δ 13.7]
FW	1106.6	1053.8
[Change from 1996 (%)]	[Δ 6.9]	[4.5]
Equity in TW (%)	3.63	3.68
Equity in FW (%)	7.22	7.33
Real Estate in TW (%)	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	-(1)	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 Holding

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

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

Number of observations: 710

Dependent Variable	age	TW	
ln(stock)	-0.0010 [0.0032]	0.7614** [0.0412]	$R^2 = 42.2\%$

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

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

Number of observations: 4162

Dependent Variable	age	TW	
ln(stock+1)	-0.0012 [0.0014]	0.3920** [0.0159]	$R^2 = 19.0\%$

Table 3 (continued)

B. Real Estate Owners

(B-1) Stock holders only

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

Number of observations: 1536

Dependent Variable	age	TW	
ln(stock)	0.0225** [0.0031]	0.5233** [0.0374]	$R^2 = 19.8\%$

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

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

Number of observations: 4172

Dependent Variable	age	TW	
ln(stock+1)	0.0271** [0.0026]	0.6698** [0.0313]	$R^2 = 15.0\%$

Table 4
Ownership of Stocks and Real Estates: Change by Age

(A) Cross-section of 1999

Age 30-32		Own	Land?											
		No	Yes											
Own	No	73.0%	13.8	[15.8] ¹										
Stocks?	Yes	10.2	3.0	[22.7] ²										
		[12.2] ³	[17.8] ⁴											
					<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">No</th> <th style="text-align: center;">Yes</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">No</td> <td style="text-align: center;">△25.2</td> <td style="text-align: center;">19.3</td> </tr> <tr> <td style="text-align: left;">Yes</td> <td style="text-align: center;">△1.3</td> <td style="text-align: center;">7.2</td> </tr> </tbody> </table>		No	Yes	No	△25.2	19.3	Yes	△1.3	7.2
	No	Yes												
No	△25.2	19.3												
Yes	△1.3	7.2												
Age 39-41		Own	Land?											
		No	Yes											
Own	No	47.8%	33.1	[40.9]										
Stocks?	Yes	8.9	10.2	[53.3]										
		[15.7]	[23.5]											
					<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">No</th> <th style="text-align: center;">Yes</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">No</td> <td style="text-align: center;">△12.8</td> <td style="text-align: center;">5.3</td> </tr> <tr> <td style="text-align: left;">Yes</td> <td style="text-align: center;">△3.0</td> <td style="text-align: center;">10.5</td> </tr> </tbody> </table>		No	Yes	No	△12.8	5.3	Yes	△3.0	10.5
	No	Yes												
No	△12.8	5.3												
Yes	△3.0	10.5												
Age 48-50		Own	Land?											
		No	Yes											
Own	No	35.0%	38.4	[52.4]										
Stocks?	Yes	5.9	20.7	[77.8]										
		[14.5]	[35.0]											
					<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">No</th> <th style="text-align: center;">Yes</th> </tr> </thead> <tbody> <tr> <td style="text-align: left;">No</td> <td style="text-align: center;">△8.1</td> <td style="text-align: center;">△4.2</td> </tr> <tr> <td style="text-align: left;">Yes</td> <td style="text-align: center;">1.5</td> <td style="text-align: center;">10.8</td> </tr> </tbody> </table>		No	Yes	No	△8.1	△4.2	Yes	1.5	10.8
	No	Yes												
No	△8.1	△4.2												
Yes	1.5	10.8												
Age 57-59		Own	Land?											
		No	Yes											
Own	No	26.9%	34.2	[56.0]										
Stocks?	Yes	7.4	31.5	[81.0]										
		[21.6]	[48.0]											

1. Percentage of land owners among households do not own stocks.
2. Percentage of land owners among stock holders.
3. Percentage of stock holders among households do not own land.
4. Percentage of stock holders among land owners.

Table 4
Ownership of Stocks and Real Estates: Change by Age
(continued)

(B) Younger Cohort (Age 30-35 in 1987)

1987		Own	Land?		
Age 30-32		No	Yes		
Own	No	51.4%	24.3	[32.1]	
Stocks?	Yes	14.3	10.0	[41.2]	
		[21.7]	[29.2]		
change from 1987 to 1993					
[age 30-32 to 36-38]					
		No	Yes		
No		3.1	△2.0		
Yes		△3.6	2.5		
1990		Own	Land?		
Age 33-35		No	Yes		
Own	No	47.8%	25.2	[34.4]	
Stocks?	Yes	13.8	13.0	[48.5]	
		[22.4]	[34.0]		
1993		Own	Land?		
Age 36-38		No	Yes		
Own	No	54.5%	22.3	[29.1]	
Stocks?	Yes	10.7	12.5	[53.9]	
		[16.4]	[35.9]		
change from 1993 to 1999					
[age 36-38 to 42-44]					
		No	Yes		
No		△17.0	15.9		
Yes		△1.0	2.1		
1996		Own	Land?		
Age 39-41		No	Yes		
Own	No	41.9%	36.6	[46.6]	
Stocks?	Yes	11.8	9.68	[45.0]	
		[22.0]	[20.9]		
1999		Own	Land?		
Age 42-44		No	Yes		
Own	No	37.5%	38.2	[50.5]	
Stocks?	Yes	9.7	14.6	[60.0]	
		[20.6]	[27.6]		
total change from 1987 to 1999					
[age 30-32 to 42-44]					
		No	Yes		
No		△13.9	13.9		
Yes		△4.6	4.6		

Table 4
Ownership of Stocks and Real Estates: Change by Age
(continued)

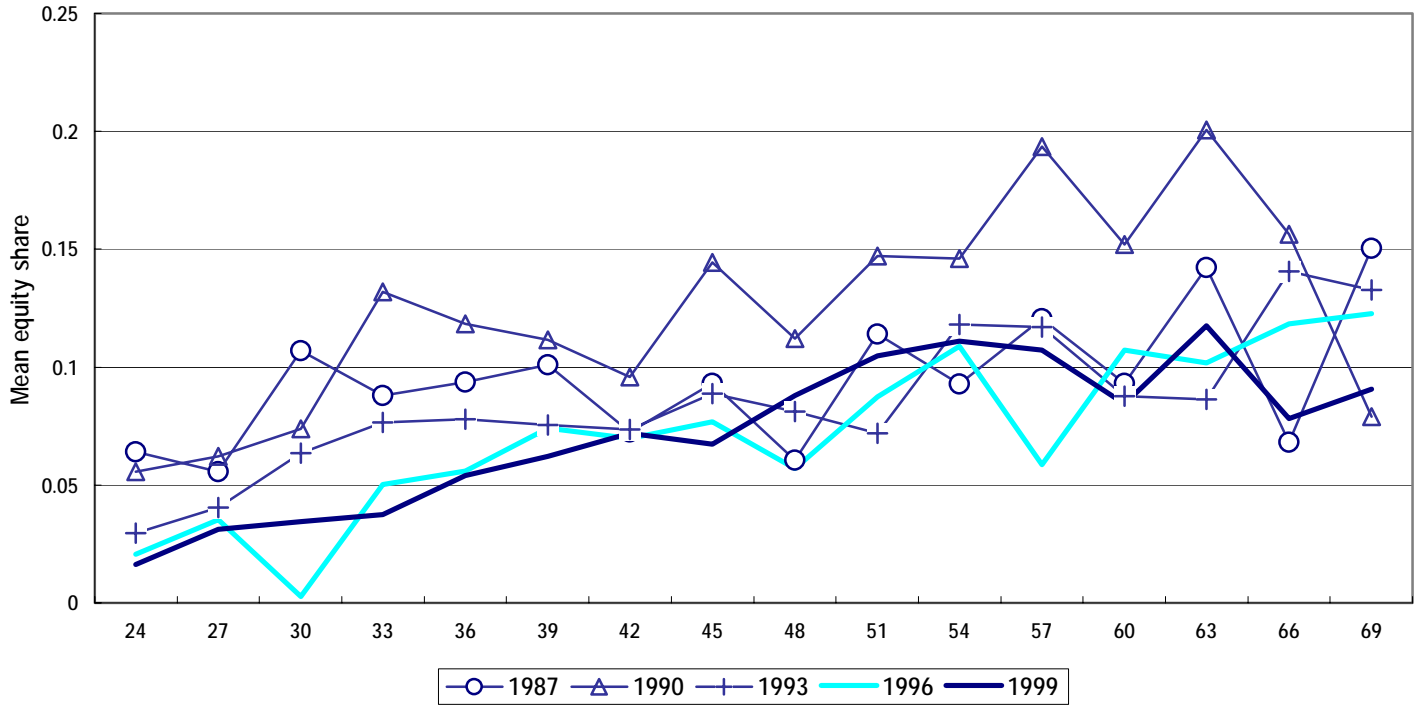
(C) Older Cohort (Age 45-47 in 1987)

Age 45-47 1987		Own No	Land? Yes				
Own	No	25.8%	46.2	[64.2]			
Stocks?	Yes	1.1	26.9	[96.1]			
		[4.0]	[36.8]				
					change from 1987 to 1993		
					[age 45-47 to 51-53]		
Age 48-50 1990		Own No	Land? Yes		No	Yes	
Own	No	29.8%	42.9	[59.0]	No	8.4	△10.5
Stocks?	Yes	6.0	21.4	[78.3]	Yes	3.8	△1.7
		[16.7]	[33.3]				
Age 51-53 1993		Own No	Land? Yes				
Own	No	34.2%	35.8	[51.2]			
Stocks?	Yes	4.9	25.2	[83.8]			
		[12.5]	[41.3]				
					change from 1993 to 1999		
					[age 51-53 to 57-59]		
Age 54-56 1996		Own No	Land? Yes		No	Yes	
Own	No	25.6%	40.0	[61.0]	No	△7.3	△1.6
Stocks?	Yes	4.4	30.0	[87.1]	Yes	2.5	6.3
		[14.8]	[42.9]				
Age 57-59 1999		Own No	Land? Yes				
Own	No	26.9%	34.2	[56.0]			
Stocks?	Yes	7.4	31.5	[81.0]			
		[21.6]	[48.0]				
					total change from 1987 to 1999		
					[age 45-47 to 57-59]		
					No	Yes	
					No	1.1	△12.0
					Yes	6.3	4.6

Figure 1

Equity Shares in Financial Wealth: 1987-1999

Cross-section View



Cohort View

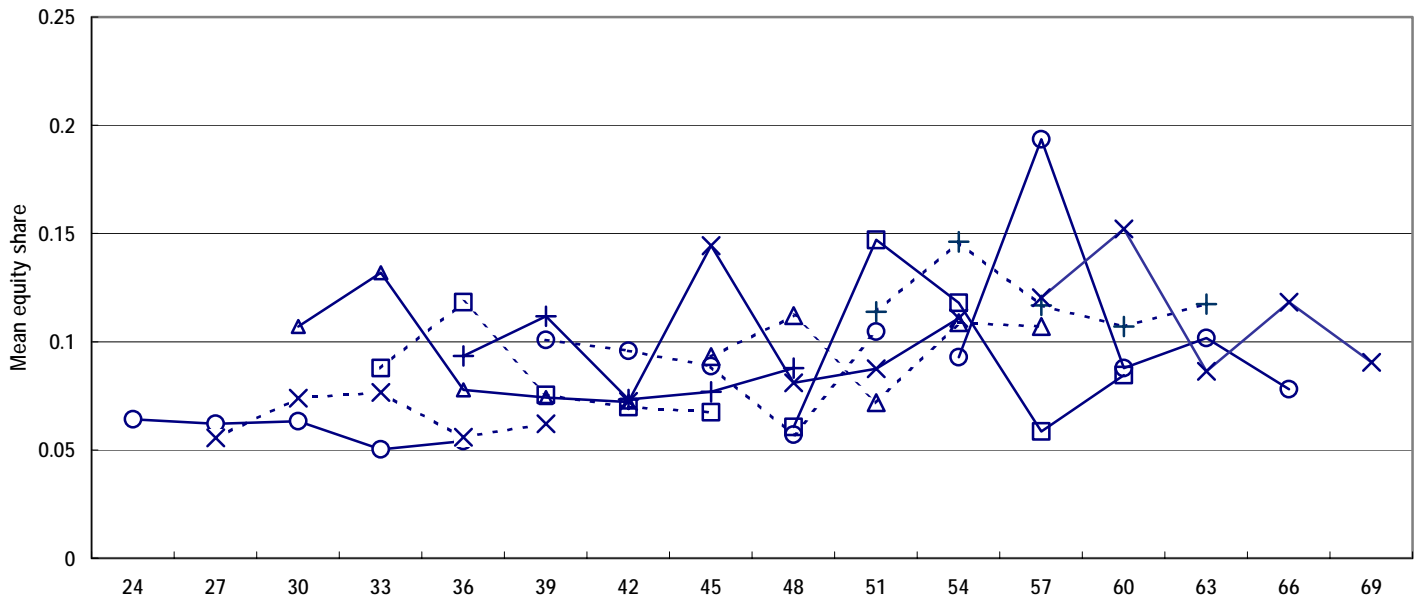


Figure 1 (continued)

Different Definitions of Financial Wealth

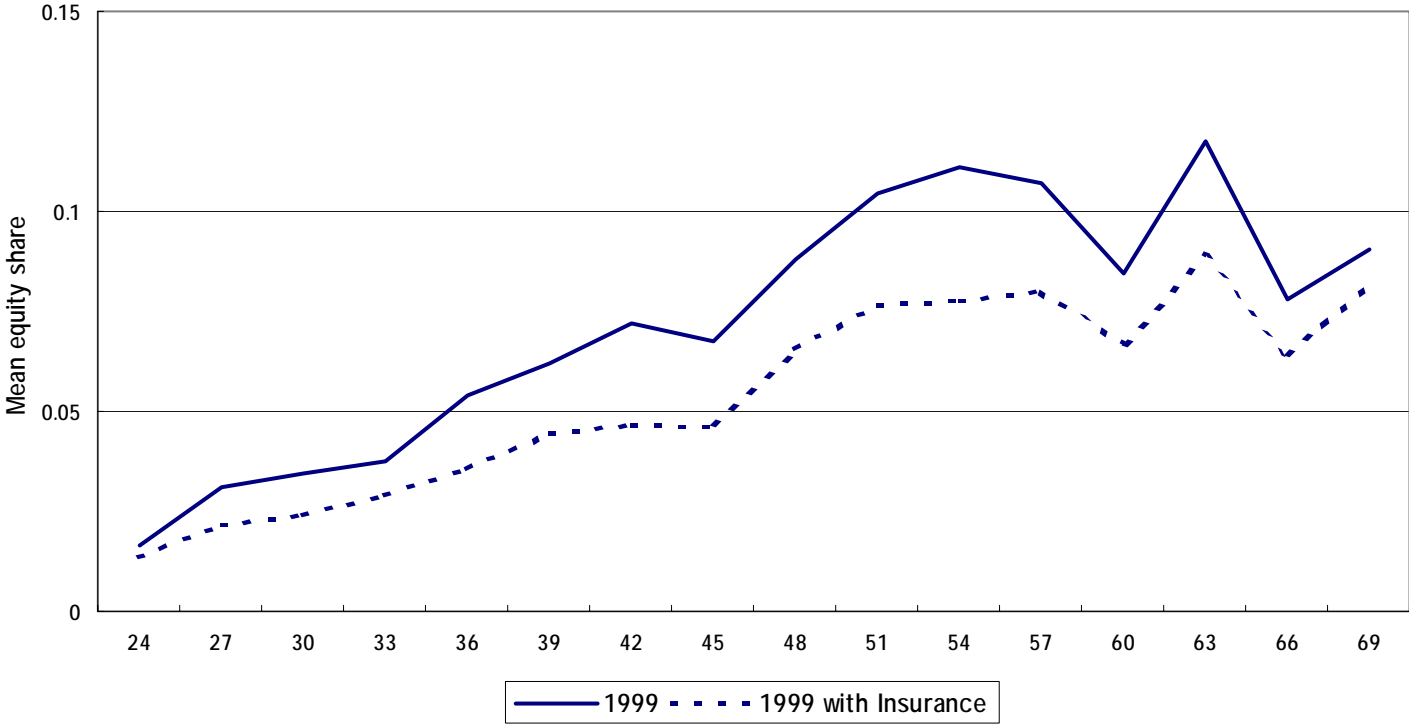
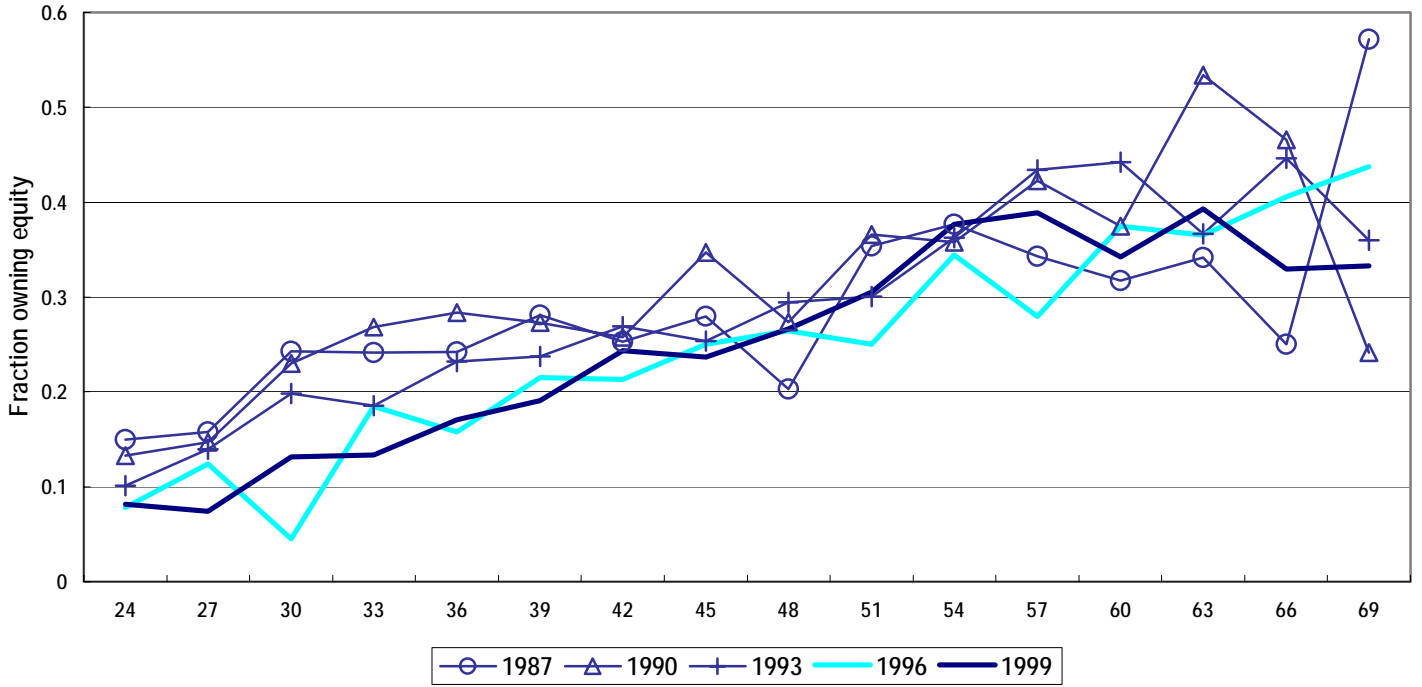


Figure 2

Faction of Population Owning Equity: 1987-1999

Cross-section View



Cohort View

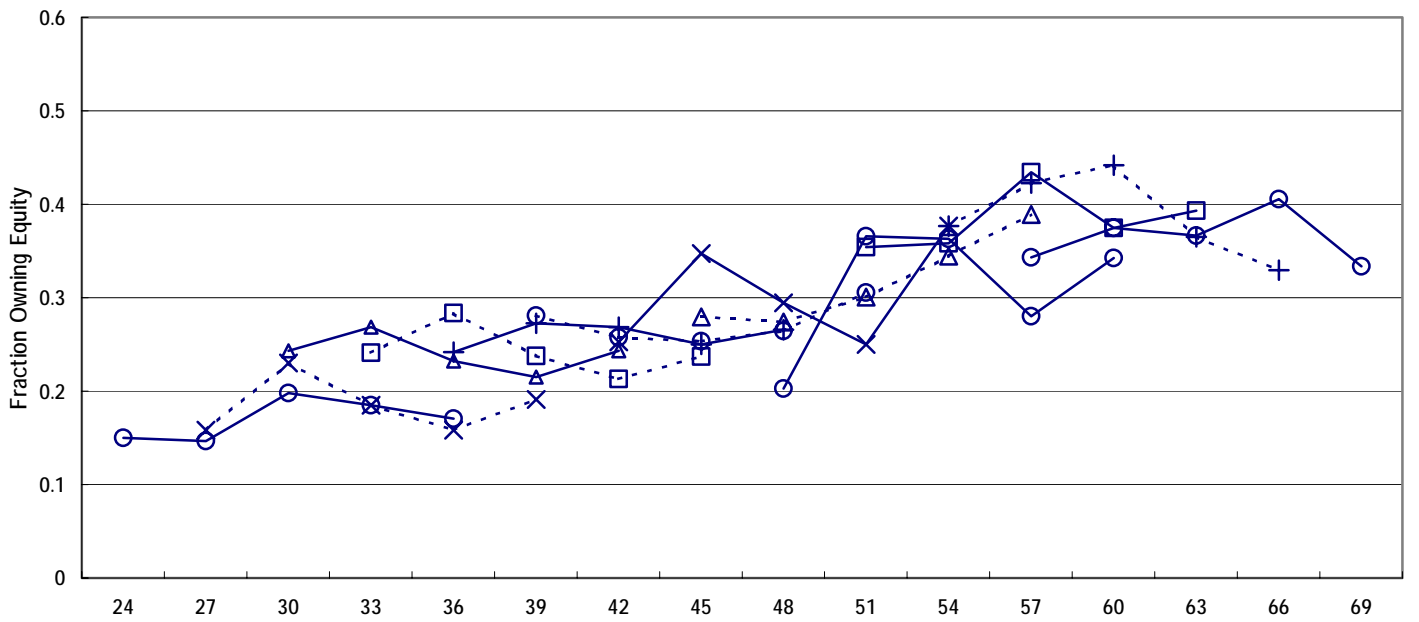
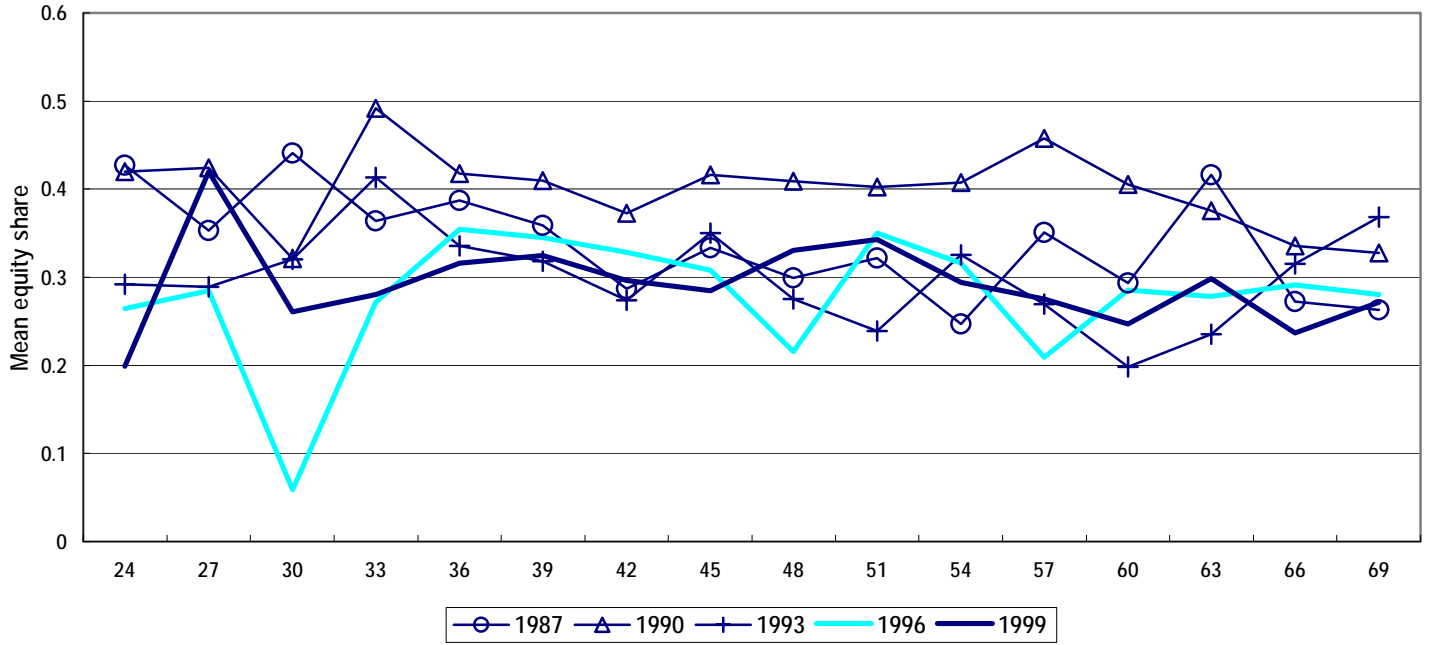


Figure 3

Equity Shares among Equity Owners: 1987-1999

Cross-section View



Cohort View

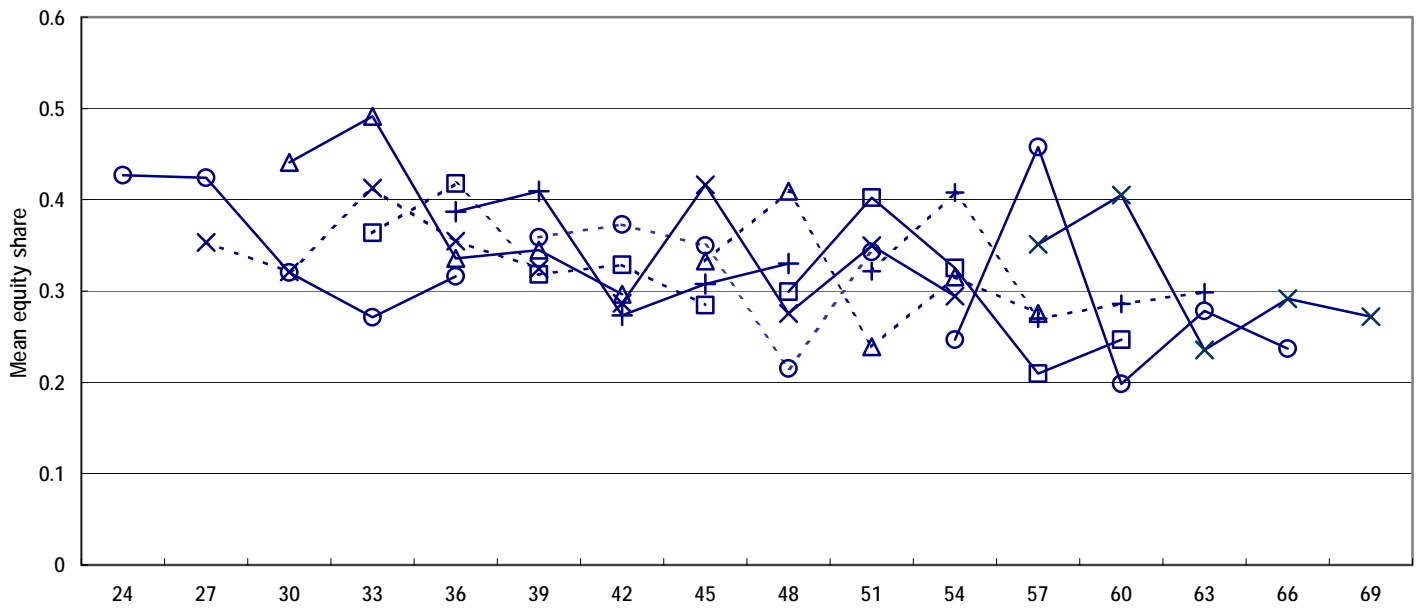


Figure 4

Real Estate Shares in Total Wealth: 1987-1999

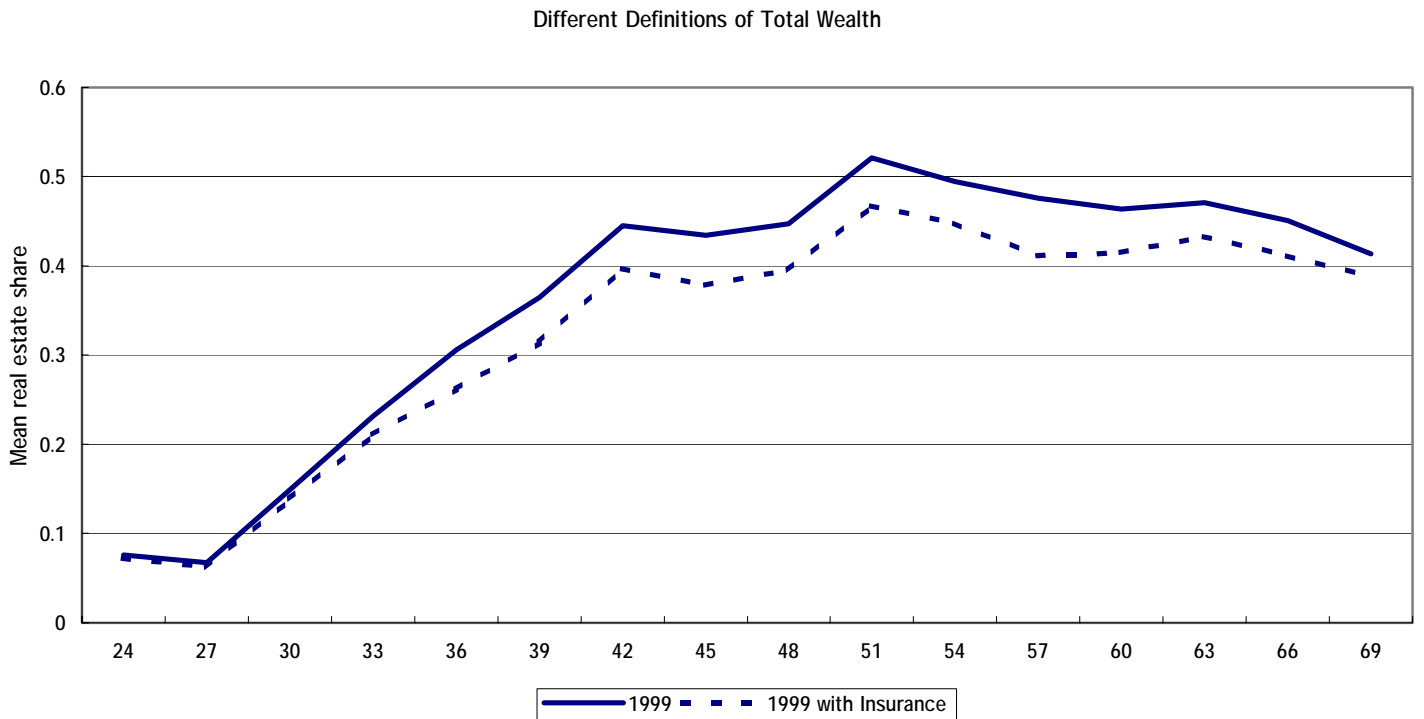
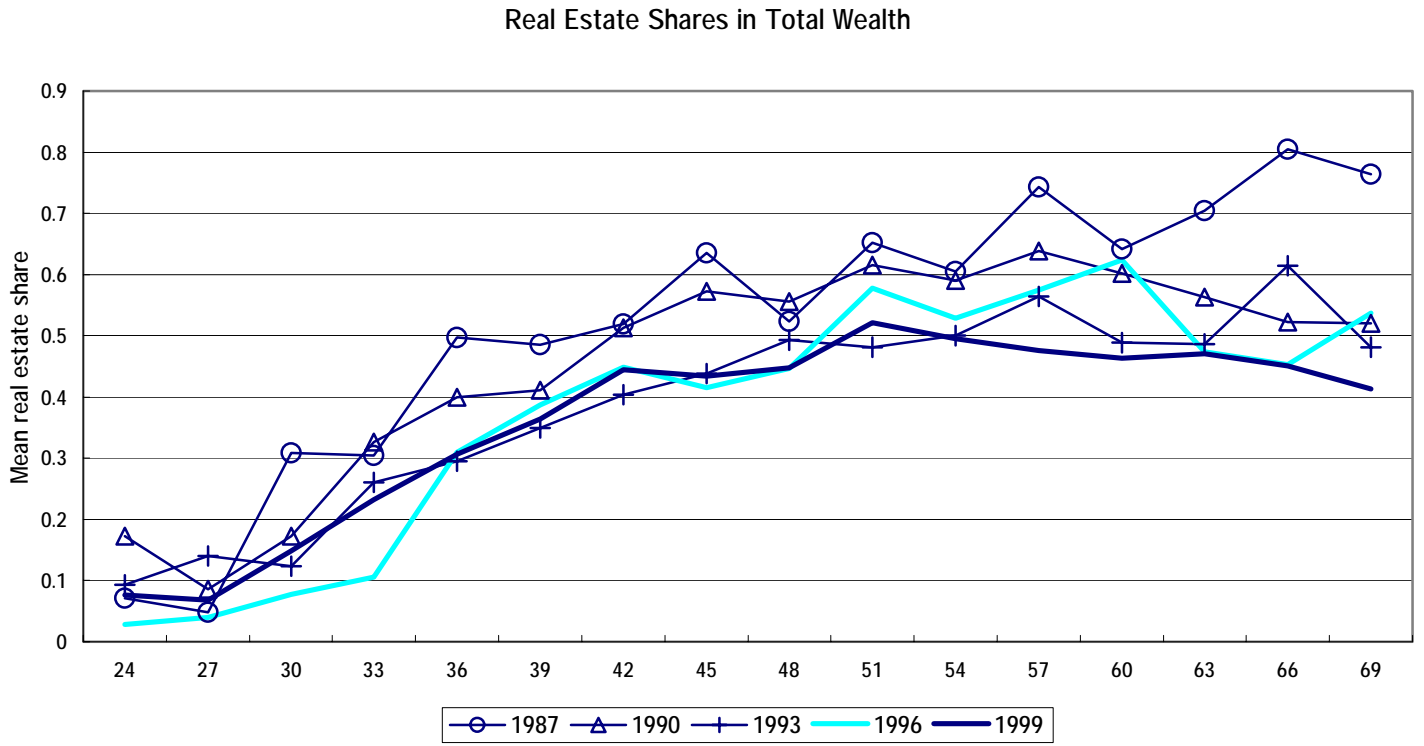


Figure 5

Real Estate Ownership (1)

Fraction of Population Owning Real Estates

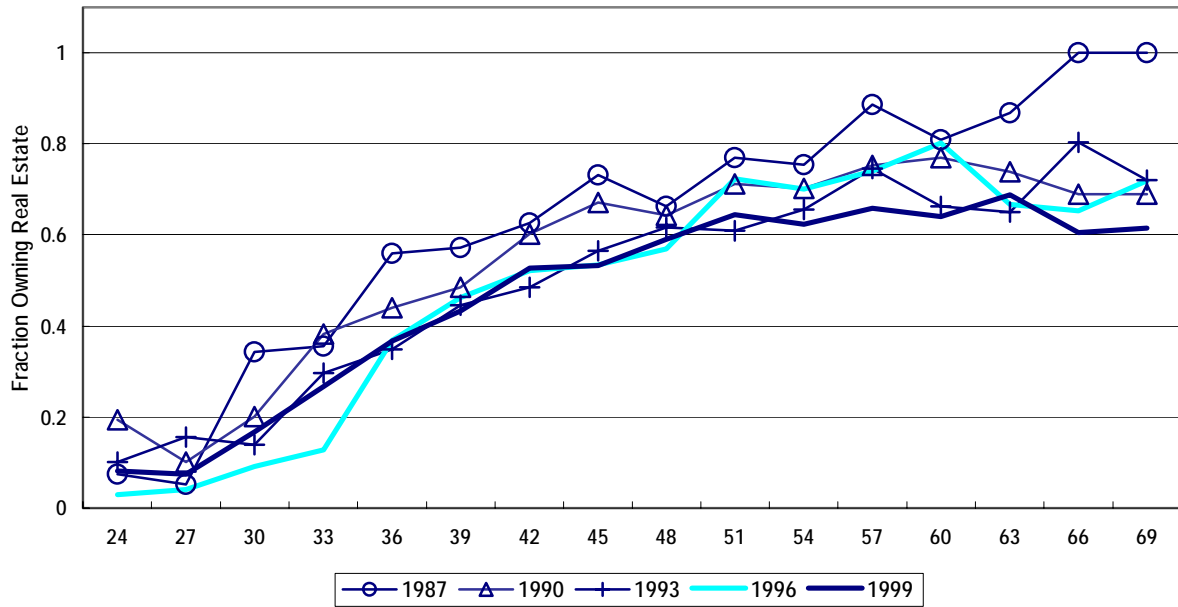


Figure 6

Real Estate Ownership (2)

Real estate shares among owners

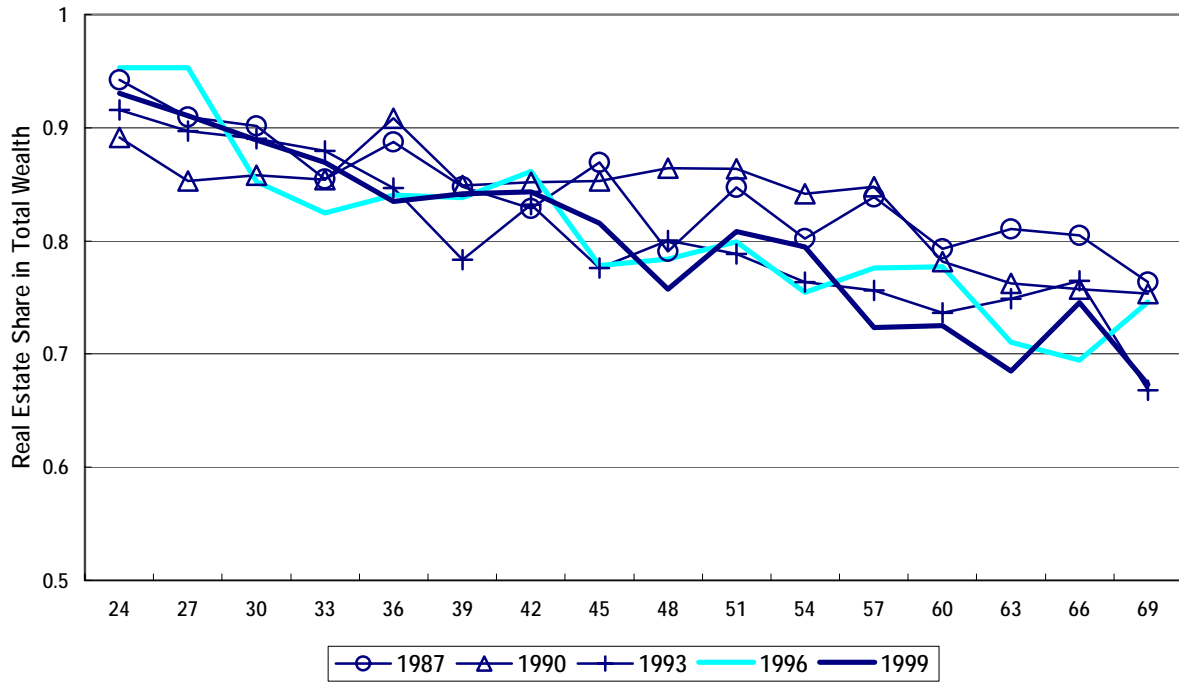
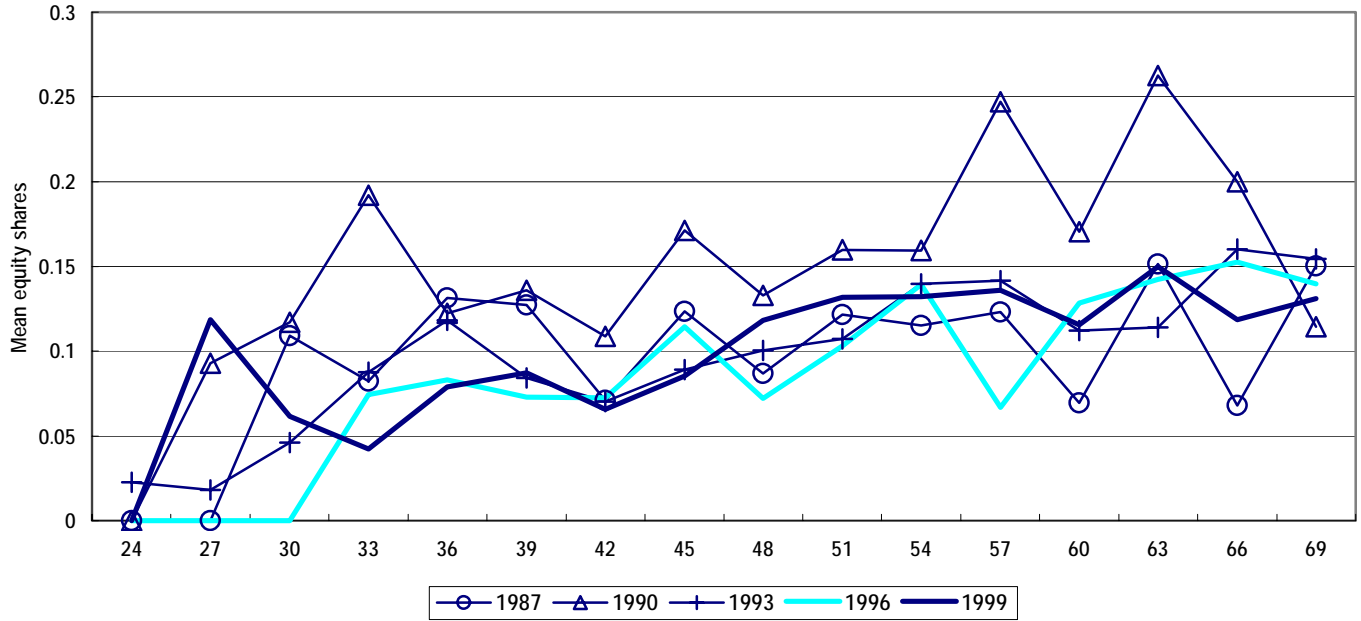


Figure 7

Equity Shares in Real Estate Owners Portfolio

(1) Equity Shares in Financial Wealth



(2) Equity Shares in Total Wealth

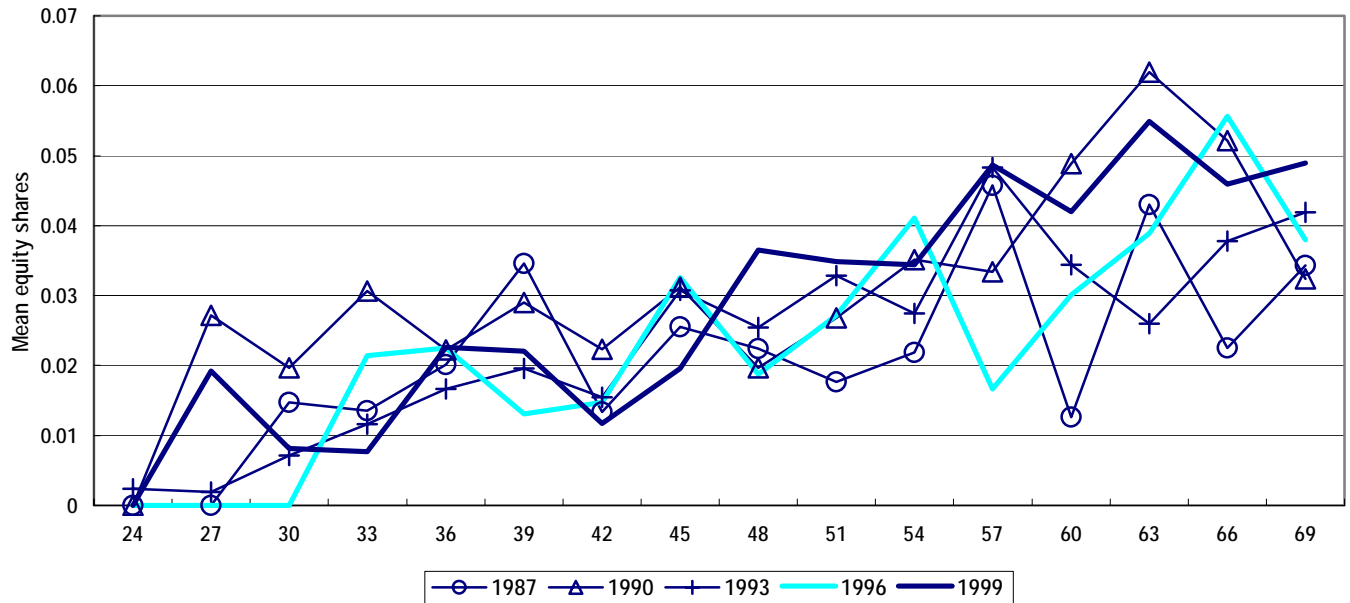


Figure 8

Equity Holding by Real Estate Owners

Fraction of Equity Holders among Real Estate Owners

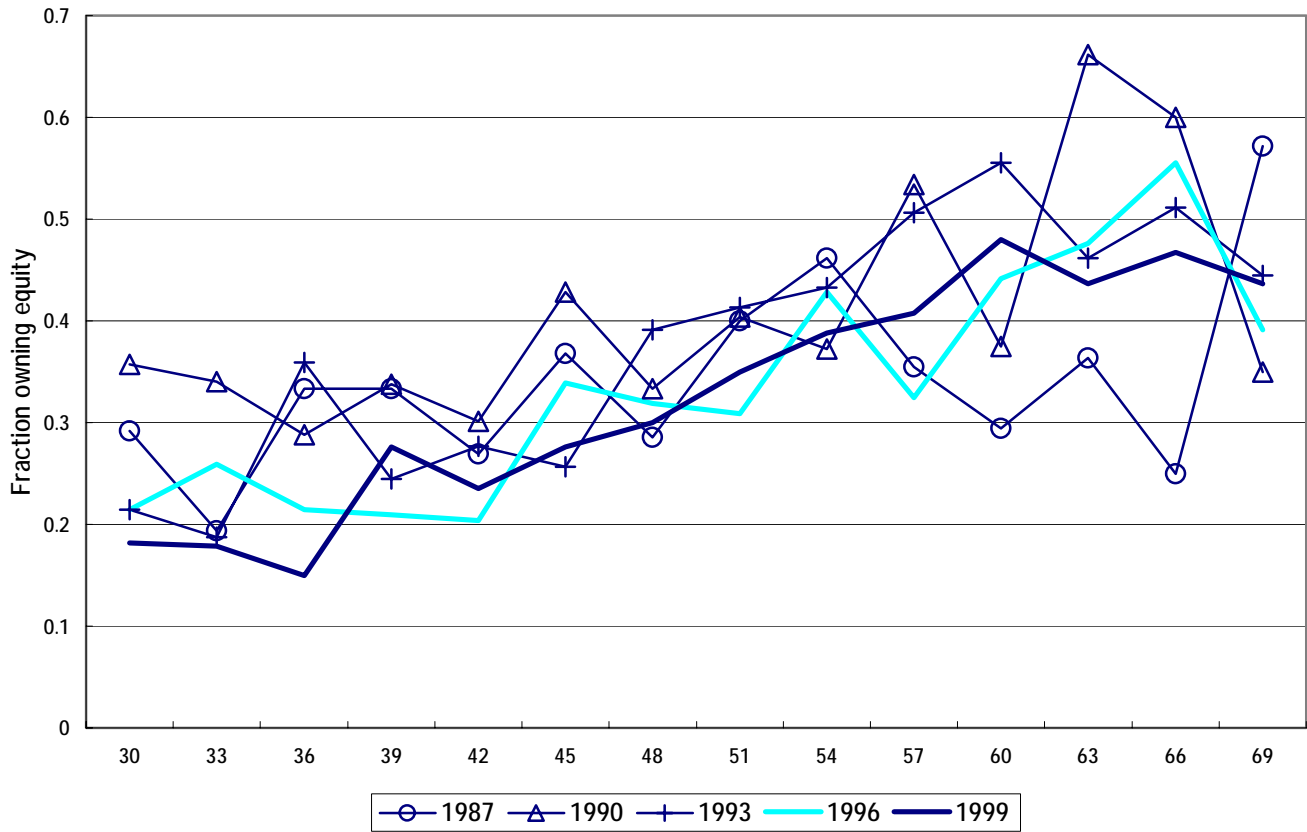
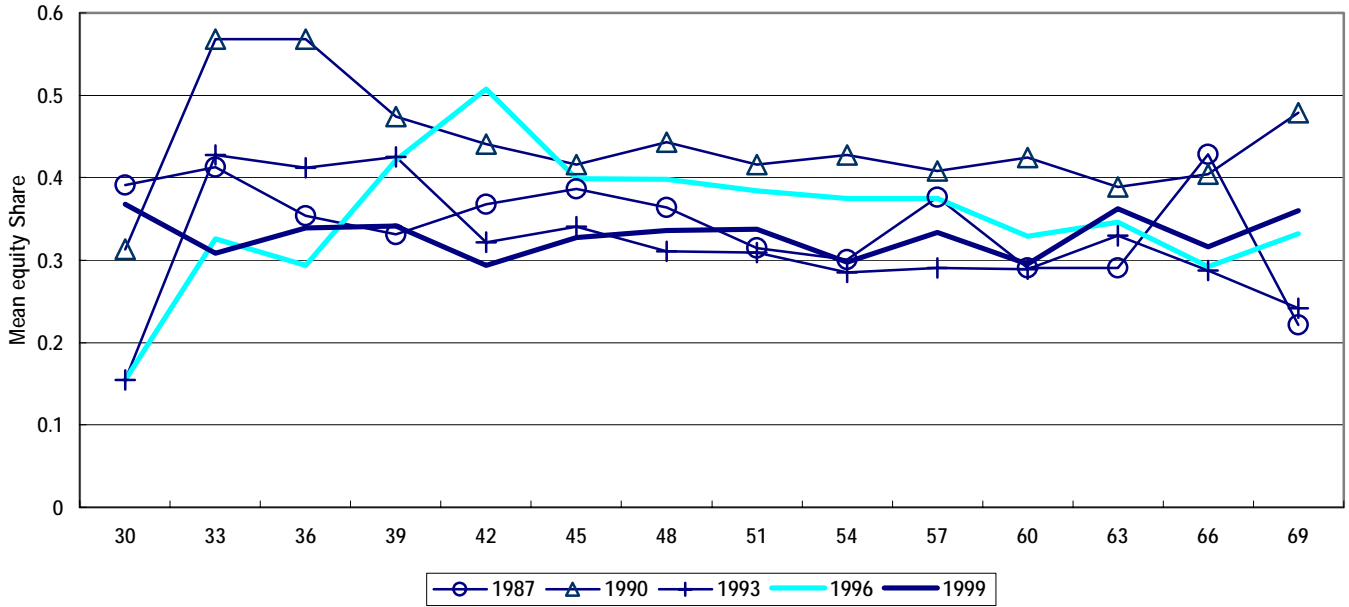


Figure 9

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

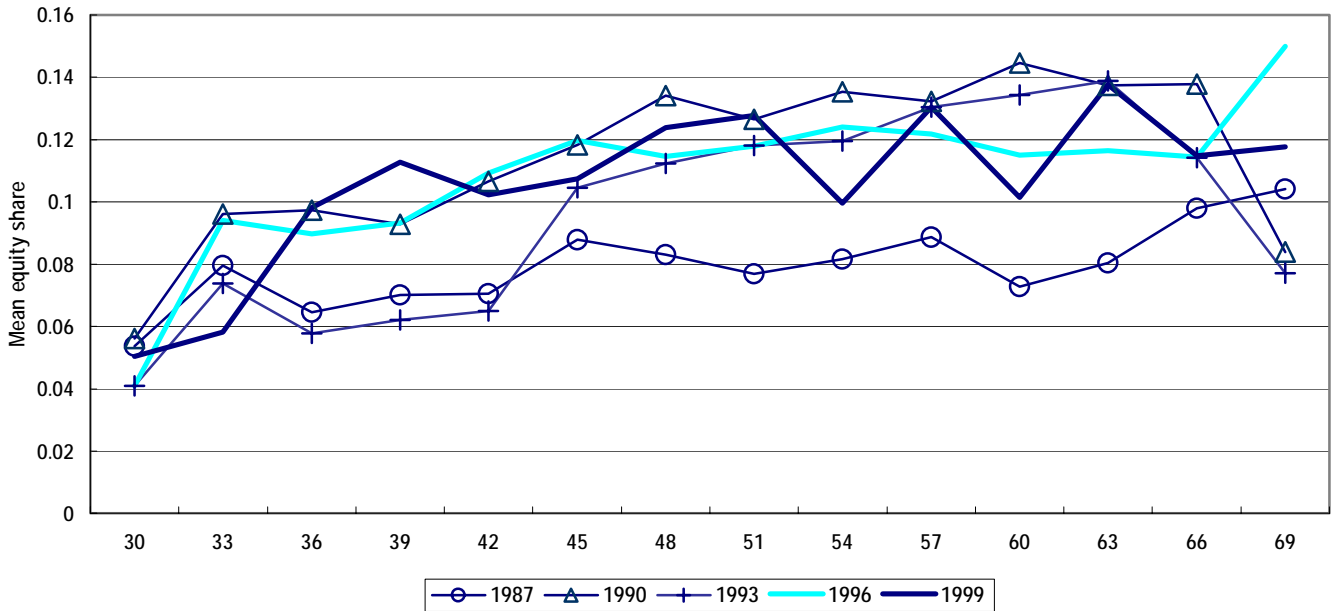


Figure 10

Equity Shares of Households Do Not Own Real Estates

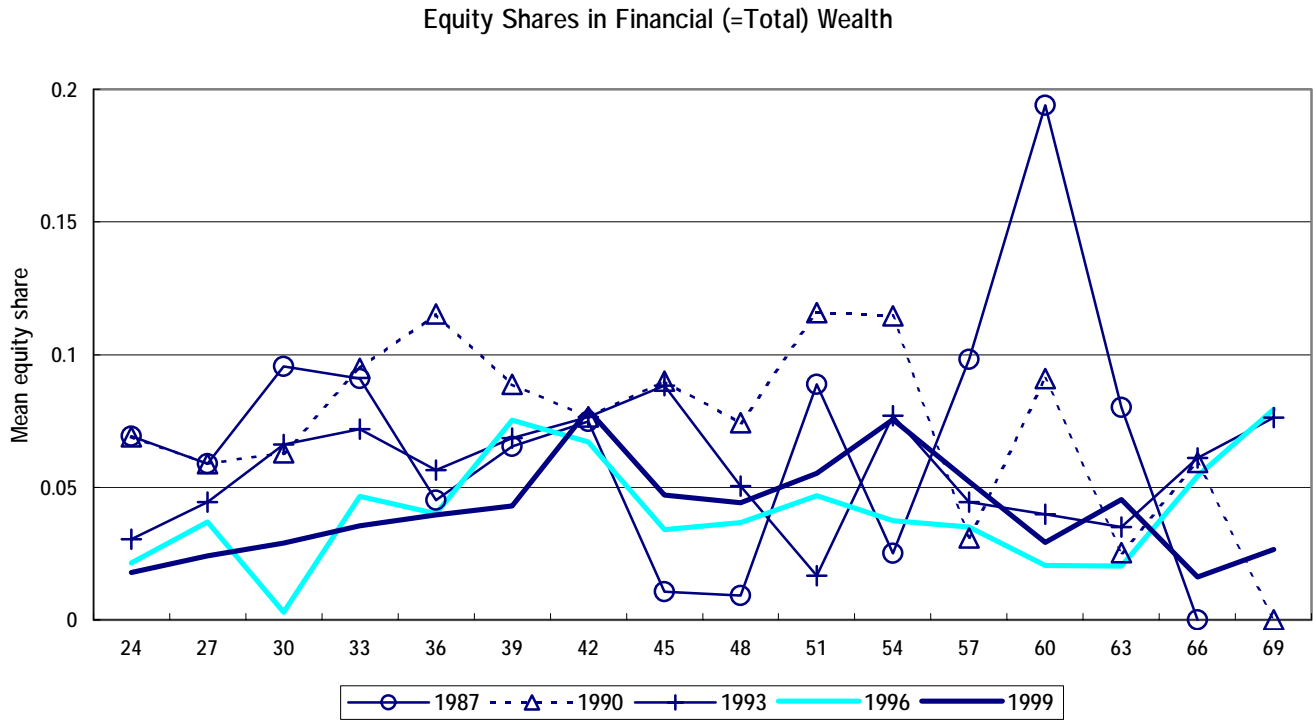
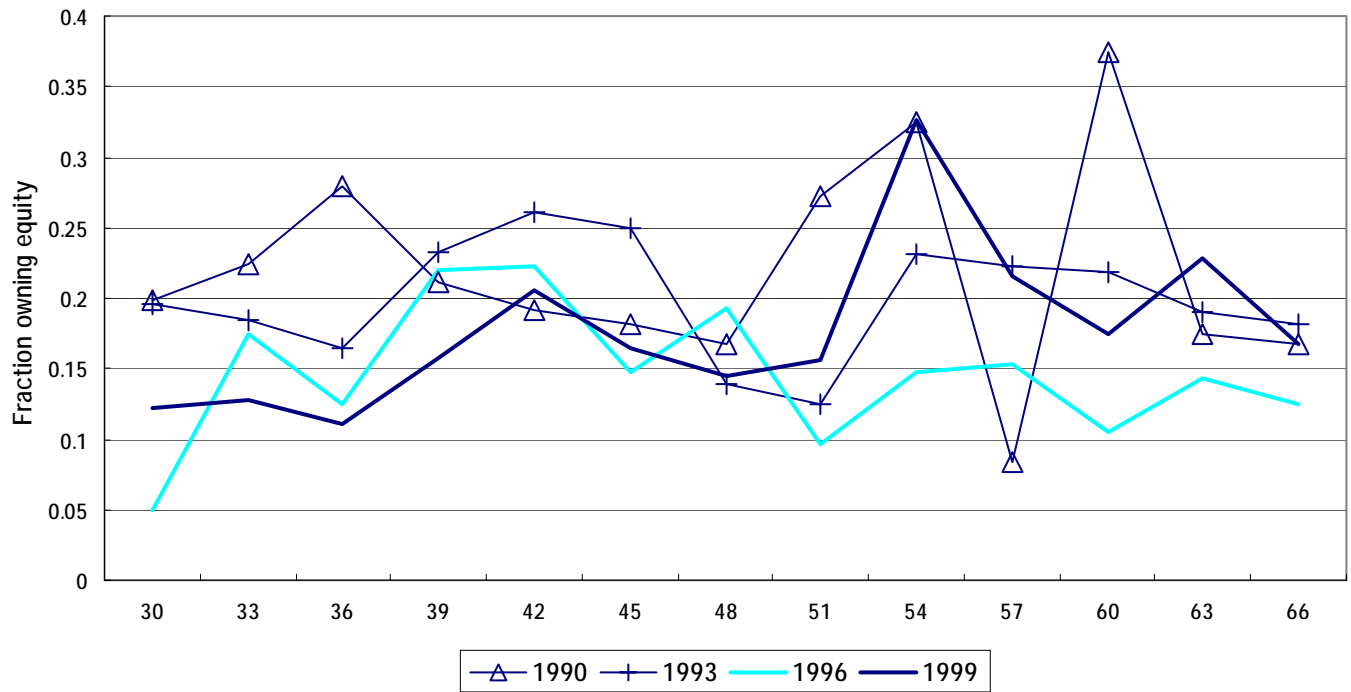


Figure 11

Equity Holding by Households Do Not Own Real Estates

Equity Holders among Non-Home Owners



Equity Shares among Equity Owners

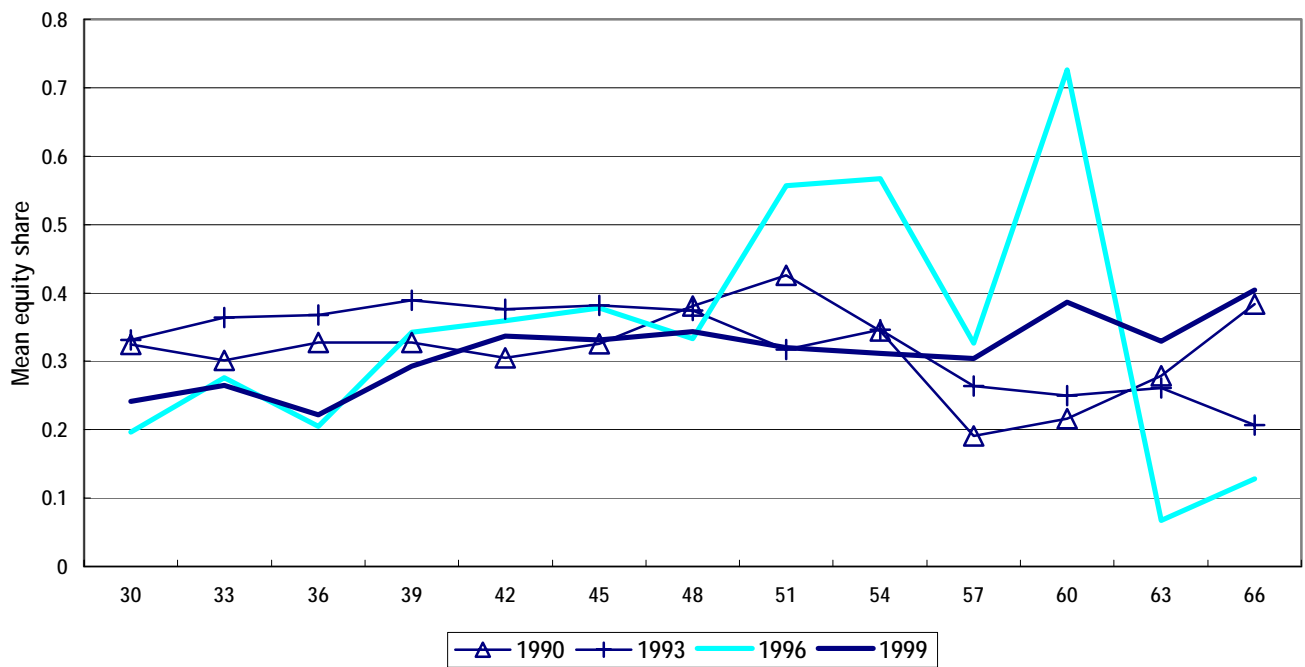


Figure 12

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

