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HOUSEHOLD PORTFOLIOS IN JAPAN

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ABSTRACT

This paper provides an in-depth review and analysis of household portfolios in Japan. (1) Using both aggregate and disaggregate data, it is shown that the shares of equities in household financial wealth have been decreasing throughout the 1990s. Stock market participations of Japanese households also have declined in the last decade. This is in sharp contrast to the U.S. and European countries in which increasing trends in household stock holdings are observed. (2) Using survey data, age-related variation in stock shares in financial wealth is analyzed. Equity shares in financial wealth increases 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 to other countries. Stock market participation varies in a way very similar to unconditional equity shares, while equity shares conditional on ownership exhibit no significant age-related pattern. This implies the age-related patterns are mostly explained by the decision to hold or not to hold stocks at all. Such a mechanism is the same as previous studies reporting about western countries. (3) Owner-occupied housing has significantly positive effect on stock market participation and stock shares in financial wealth. This suggests that the age-related pattern observed in stock holding cannot be analyzed separately from household's tenure choice of housing. Therefore any serious attempt at modeling Japanese households' dynamic portfolio choice should incorporate the effect of housing tenure choice.

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1 Introduction

This paper provides an in-depth review and analysis of household portfolios in Japan. Recently many empirical studies have been conducted about household portfolios in United States and European countries. Those studies include Amerkis and Zeldes (2001), Bodie and Crane (1997), and Poterba and Samwick (1995, 1997), and the chapters in Guiso, Haliassos, and Jappelli (2001). However, very little has been done about non-western countries in current literature.

Since there already exist a large number of studies on the same subject about other countries, here, I motivate the analyses of this paper paying attentions to the points particularly important to Japan. First, Japan is an aging economy just like other OECD countries. However, Japan will experience one of the fastest aging process around the world unless we observe mass immigration in the near future. The potential effects of the aging of the population on the level of Japan's national saving and its 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. At 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[1]. In previous studies, changing corporate financing decisions and corporate governance have been the main focus of analysis. However, in consideration of general equilibrium, if the way firms raise funds for their business (i.e., the

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

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, in the latter half of this paper, I find that equity share in financial wealth of Japanese households apparently peaks at the latter stage of their life cycle compared with U.S. households. I will argue that 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 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.

Although some important previous studies 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 before and after the bubble from a microeconomic point of view. The motivation of this paper is much more macro-oriented.

The remainder of this paper is organized as follows. In section 2, I describe and compare the alternative data and discuss general aspect of the Japanese households' asset allocation. In section 3, I investigate the relationship between age and portfolio choice of Japanese households. Section 4 extends the analysis in section 3 to the case in which the household decision about ownership of housing is included. Section 5 is the conclusion.

2 Asset Allocation by Japanese Households

In this section, I summarize numbers about Japanese households asset allocation from three different data sources, one aggregate and two disaggregate/survey data of Japanese household portfolios. The aggregate data is tabulated from the Bank of Japan's Flow of Funds account. One of the disaggregate data is the survey data conducted by Central Council for Savings Promotion, the Bank of Japan and is available from its website. However, only aggregate numbers are publicly available for now.

The second survey data is the annual survey data published by Nihon Keizai Shimbun, which is known as Nikkei Radar[2]. It contains information about households' portfolio allocation and characteristic such as age, income, and occupation. But, Nikkei data has various limitations. First, the observations are regionally limited to the Tokyo metropolitan area and surrounding prefectures[3]. Regional bias is likely to make the sample average younger than the nation-wide average. For the same reason, there might be a bias in occupation and/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 data are pooled cross-section data. So various interesting analyses that panel data structure would allow us to conduct cannot be examined.

To provide basic ideas about what has been going on with the Japanese economy in our sample period, Figure 1 shows broad trends in Japanese macro and financial variables. In last three years in the 1980s and first two years in the 1990s, growth rate of real GDP in Japan were as high as 4% on average. Then from 1992, Japan has been trapped in the prolonged recession for a decade. There were slight recoveries in 1996 and 2000, but output growth rate has been about 1% on average. Inflation rate followed a similar path lagging little behind GDP growth. Deflation was first recorded in 1995 and 1996 for GDP deflator. However, this time, rapid increase in yen's value and decrease of import goods prices in 1995 are behind deflation and CPI inflation did not turn negative in 1995 and 1996. On the other hand, the deflation since 1999 has been persistent and a serious economy-wide phenomena.

[Insert Figure 1 here]

Short-term interest rate peaked in late 1989 and in the first half of 1990, when the Bank of Japan tried to bring asset prices down to "normal" level. After real economy had slowed down, short-term rate was cut, eventually brought down to zero in 1995, and has been at that level since then. The long-rate also slowly converged toward short-rate though the second half of the 1990s. If one draw the yield curve, it gets

[2]This data was previously used in Muramoto eds. (1998) and others.

[3]These prefectures are: Tokyo, Chiba, Ibaraki, Kanagawa, and Saitama.

flatter and flatter in the second half of the 1990s. It is not too difficult to imagine that inflation expectation by public got lower and lower in this period.

Stock prices tripled from 1985 to the end of 1989, then it halved in next couple of years and have stayed around at that level since 1994. Real estate prices followed stock prices with a lag of twelve to eighteen months and peaked in 1990 or early 1991, then went down throughout the 1990s to the level of 1985. By all respects, this has been one of the most dramatic tales of asset price fluctuation in economic history.

Table 1 through 3 summarize household portfolio data from three different sources. In Table 1, the survey data by the Bank of Japan are reported. The first three items are the levels of financial wealth measured in 1999 yen value (ten-thousand yen). In 1999, average financial asset per household is 14,791 thousand yen, median assets 9,397 thousand yen, and average net financial worth is 9,686 thousand yen. Assuming the exchange rate of 125 yen per dollar, financial asset in 1999 roughly corresponds to 120 thousand US dollar, median asset is 75 thousand dollar, and average net-worth is 77 thousand dollar.

Items below are the shares of particular financial assets in total financial wealth. If we look at deposits, their share had been nearly 70% at the beginning of the 1980s and then declined throughout the 1980s to less than a half of total assets in 1990. Then deposit regained their share throughout the 1990s, back to 60%, about the level of the mid-1980s. On the other hand, the share of stocks followed a completely opposite pattern. It peaked at 1990, at little more than 10%. Then it has been declining throughout the 1990s. These patterns are consistent with Japanese macroeconomic conditions in this period. Households increased the share of risky assets in booms and cut it in recessions.

[Insert Table 1, Table 2, and Table 3 here]

Table 2 shows aggregate figures from the flow of funds data of the Bank of Japan. In this table, we only have the data from the 1990s so that it corresponds to the right-hand side half of Table 1. As in Table 1, deposits keep increasing its share. On the

other hand equity share has been decreasing except in 1999, which corresponds to the time of a small bubble on the IT related stocks in 1999 and early year 2000.

Table 3 is the Nikkei's survey data, which I am going to use extensively in the following sections. It seems like this data is more sensitive to market valuation or perhaps oversensitive to it. In the other two data, average financial wealth of Japanese households have increased mildly throughout the 1990s. In Nikkei's data, it remains almost constant since 1993. Average total wealth, which is defined as the sum of financial wealth and real estates, moves more dramatically. It increased about fifteen percent in the late 1980s. Then, from 1990 to 1999, it declined to less than a half of 1990 value. This fluctuation apparently reflects the movement in real estate prices. On the other hand equity share moved, but we see no obvious trend in Nikkei data.

Several items in these tables need careful explanations. First, life insurance, in addition to its original role as insurance, has been an extremely popular form of savings in Japan. Insurance companies assured customers to payout certain amounts at the maturity of insurance. The rate of return for this payout was pre-committed and fixed, so that life insurance company can invest that money in their discretions until maturity. Excess returns are their profits. Combined with high private saving rate, this is why Japanese insurance companies have been significant institutional investors around the world. However, many insurance contracts made during the years of the bubble economy, are now close to their maturities. Since asset returns in the 1990s have been so low, excess returns are mostly negative and now many Japanese life insurance companies are in a serious trouble. This is also the reason Nikkei data asked about the value of life insurance at its maturity. Hence, the importance of life insurance in the Nikkei data is overly exaggerated. Since the numbers of "personal pension plus life insurance" are similar in aggregate data and the Bank of Japan survey, they are more reliable for the value of life insurance. So In Table 3, I also report the values of financial wealth excluding life insurance (Panel B) and corrected for life insurance values (Panel C).

Another item that requires explanation is trust funds. Trust funds in these tables include assets managed by trust banks and bonds issued by three long-term credit

banks. Since two of the long-term credit banks disappeared in the late 1990s and the last one was also merged in 2002, the supply of this type of asset ceased to exist. This explains clear declining trend in trust funds.

Overall, evidence in Table 1 though 3 clearly suggests that equity share in Japanese households financial wealth had increased in the second half of the 1980s, peaked in around 1990, and then kept declining throughout the 1990s. A similar pattern is observed about the population of households participating in the stock market. Table 4 looks at stock market participation by Japanese households, along with ownership of real estates[4]. Again, it peaked in 1990 and declined throughout the 1990s. This is in clear contrast with U.S. and European countries in which stock market participation shows a clear increasing trend in the last decade (Guiso, Haliassos, and Jappelli, 2002). The share of mutual funds has also decreased throughout the 1990s. Once again, compared with increasing popularity of mutual funds in the U.S. in the 1990s, this might seem surprising. However, to those who are familiar with the Japanese financial markets, it is a well-known fact that Japanese mutual fund business has been suffering from very poor performance and sloppy management (Cai, Chan, and Yamada, 1997).

[Insert Table 4 here]

Small shares of equity in households wealth around 1990 are also surprising. At the peak of the bubble economy, the capitalization of the Japanese stock market exceeded that of the U.S. for one time. However, nowhere in the data we investigating here we can trace such a prosperity in household wealth. The share of equity in wealth certainly increased and peaked at around 1990, but neither the increase before the peak nor the subsequent decline are large enough to be consistent with the size of stock market's swing from the late 1980s to the early 1990s. The most promising explanation for this fact is that, as discussed in French and Poterba (1999), a large fraction of Japanese companies' stocks have been held by other firms, in the form

[4]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%.

of cross-holding. However, more detailed investigation is needed to provide a full explanation of such a small impact of stock prices on household wealth.

3 Financial Portfolio Choice over the Life Cycle by Japanese households

In this section, we look at the age-related pattern of stockholding by Japanese households. First, I briefly discuss what theory might predict about the age-related pattern about portfolio shares and empirical findings about other countries.

The classical (Samuelson-Merton) life-cycle portfolio theory suggests that there will be no age effects and the share invested in stocks should be constant over the life-cycle. Consumers are "myopic" and replicate the static portfolio allocation independently of their investment horizon. This result follows from various assumptions: preferences are CRRA; either constant investment opportunities or log utility has to be assumed; there is only financial wealth and no non-tradable human capital.

On the other hand, popular recommendations from financial planners are in sharp contrast to theoretical predictions. Long-term investors, the young households with long-horizon, should take riskier investment positions and invest in stocks to take advantage of equity premium. Their equity share should decline with age so that age-portfolio profile is downward-sloping.

Amerkis and Zeldes (2001) summarized empirical findings about U.S. data as follows:

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

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

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

So the age-related pattern is explained mostly by the decision to own or not to own stocks at all. These patterns contradict both the classical "myopic" portfolio theory and the financial planners advises. However, they seem to be a global phenomena — the same pattern is observed for European countries, as reported in Guiso, Haliassos, and Jappelli (2001).

What about Japan? It turns out Japanese data also goes along with the global trend. The ownership of equity is hump-shaped and share in stock among stock holders is flat over the life-cycle. Thus, the life-cycle pattern of stock share mostly comes from market participation. Figure 2 shows the variation of equity shares in financial assets over the life cycle. Both panels present the same features. 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 between the age effect, the cohort effect, and the year effect[5]. 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 the 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.

[Insert Figure 2 here]

In the last panel of Figure 2, the age-related pattern of equity shares for 1999 using different definitions of "financial wealth" is shown. As we noted in the previous section, Nikkei Radar data have been asking households about the amount of insurances in the survey. The inclusion of 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 2. Basically, the inclusion of insurance did not change the age-related pattern of equity shares in financial wealth

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

and real estate holdings in total wealth. So we adopt a narrower definition of financial wealth without insurance in the following.

Figure 3 shows the proportion of population that owns stocks and it varies with age just like equity shares. On the other hand, in Figure 4, 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 3 and Figure 4 about here]

While Japanese and U.S. households seem to behave very similarly, Japanese equity shares and stock market participation do not decrease even after retirement age. This is clearly different from the U.S. case in which equity share peaks in the late forties to fifties in terms of household age. However, it is also well-known fact that Japanese households do not stop saving even after retirement. Unfortunately, Nikkei data has very few observations of households over age 65. Detailed investigation of elders portfolio choice has to be left for future research.

4 Financial Portfolio Choice and Owner-occupied Housing

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 Japanese households and 3.2 for 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 decision to hold or not to hold real estate, especially owner-occupied houses.

4.1 Background of Japanese Housing and Land Price Problem

Before getting into the analysis, first, I explain the background of the Japanese land price/housing problem in more detail. 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[6].

The biggest structural problem preventing Japanese households from renting houses is the shortage of quality rented housing. A general consensus is that Japanese land and housing laws (Shakuchi 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 is almost the same in Japan, France, and Germany, the average size of rented houses in Japan is only two-thirds of those in Europe[7]. This means that the supply of large size houses, especially those for families with children, is extremely limited in Japan.

The 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 raising 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 share of their assets in the form of owner-occupied housing and to take risky positions in their portfolios. Therefore, the willingness of

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

[7]Yamazaki (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.

households to take risky positions in the financial market is intimately related to their positions in the housing market.

Another important issue is the 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 standpoint of saving taxes, 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 the early 1990s. So there is a strong tax incentive for Japanese households to hold real estate and take out housing loans, since the latter is tax deductible at market value if one is to carry out a bequest. Also, for residential real estate, there are huge tax deductions in general. Since there is a fairly solid consensus on strong bequest motives among Japanese[8], 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.

4.2 Age, Equity Share, and Owner-occupied Housing

When the ownership of real estate is taken into account, the following trends in the relationship between home ownership and age are observed for Japanese households:

(i) *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.*

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

(iii) *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.*

(i)-(iii) 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

[8]See Horioka and Watanabe (1997).

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 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.

(iv) *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.*

(v) *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 can 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 the demand for risky financial assets is strongly affected by the decision to hold owner-occupied housing or not. Households that decide to purchase their own houses have to accumulate financial wealth to prepare large down payments. If the 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 fact 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, the demand for risky financial assets, such as equities, might have been suppressed by the heavy burden of housing loans borne by Japanese households.

In Figure 5, the exercise in Figure 2 to 4 is repeated for the real estate share in total wealth. In Figure 5 (1), 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.

[Figure 5 about here]

I found exactly the same pattern regarding the proportion of population owning real estate in Figure 5 (2). In Figure 5 (3), 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. This is not surprising since most households 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 decreases with age for home-owners. However, an important assumption in interpreting Figure 5, three

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 used net worth rather than gross wealth of households, the slope of the age-related pattern would be flatter in Figure 5 (1). On the other hand, the ratio of real estate to the net worth of households should decline more sharply than in Figure 5 (3).

Figures 6 through Figure 9 investigate the difference between equity shares of real estate owners and of those who do not own any real estate. Figure 6, Figure 7, and Figure 8 deal with equity shares in financial and total wealth of homeowners. Figure 6 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 in the full sample, the lines in these figures are jagged. Figure 7 plots the proportion of stockholders among real estate owners. It increases with age, just as in the full sample case in Figure 3. But, the proportion of stockholders is higher among homeowners than in the full sample.

[Figure 6 and Figure 7 about here]

In Figure 8, equity shares in financial wealth and in total wealth among households that 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. So the age-related pattern of equity shares in financial assets (S/FW) is 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 8 about here]

Figure 9 describes the portfolio allocation of non-homeowners. Note that, for non-owners, financial wealth equals total wealth by definition. According to Figure 9 (1), equity consists of only about 5% and no clear age-related pattern is observed. Figure 9 (2) and (3) show 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 9 suggests that the observed age-related pattern in stock shares in financial wealth is largely affected by 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 assets 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 9 about here]

Table 5 is looking at the same problem we have discussed 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 produces four groups of households and they are shown in two by two matrices. Panel (A) of Table 5 shows the transition of this matrix over the life cycle using the cross-section data of 1999. The difference between the Age 30-32 group and the Age 39-41 group — the smaller matrix to the right of original matrices — suggests that there is a significant population shift from the "no stock - no land" group (a 25.2% decrease) to the "no stock - own land" group (a 19.3% increase) during the age of thirties. This pattern is observed in a less pronounced way for the difference between the Age 39-41 group and the Age 48-50 group, a 12.8% decrease and a 5.3% increase respectively. Instead, the "own stock - own land" group increases by 10.5% during forties of age. Finally, the difference between the Age 48-50 group and the Age 57-59 group exhibits a 4.2% decline of the "no stock - own land" group, while

the "own stock - own land" group continues to increase by 10.8%. Overall, analysis of these matrices suggests that households start from the "no stock - no land" group, move to the "no stock - own land" group first, then move to the "own both stock and land" group.

Panels (B) and (C) of Table 5 are looking at the same problem using the cohort data, tracking the Age 30-32 cohort and the 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. The only difference from the cross-section data is that the increase of the "own both" group is relatively limited for the older cohort. From 1987 to 1999, there was only a 4.6% increase in the "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 5 about here]

4.3 Econometric Analysis

To confirm the observations in the previous subsection, I ran regressions for stock market participation and equity share in financial wealth. The results are reported in Table 6. Explanatory variables include age, income, wealth, and their squared terms, plus dummy variables for sex, marriage status, employment/job status (*unemployed*, *self-employed*, *agriculture*) and owner-occupied housing (*house*). I used the two-stage Heckman procedure, which is to use probit for stock market participation in the first stage and include the correction term for sample selection in the regression for equity shares in the second stage. Hence the first stage equation include the variables that are supposed to affect participation. Here, they are a couple of regional dummies (*Tokyo* and *Ibaraki*), credit card holding, and internet access at home.

[Table 6 about here]

In columns (1) and (2) of Table 6, where financial wealth is used as a wealth variable, age, income, and financial wealth are all affecting to stock market participation significantly. College education also has a positive impact on stock ownership. These parameter estimates are very similar whether or not the homeownership dummy is included. The regression for equity shares is rather disappointing. Nothing but homeownership is significant. The wealth variable is total wealth in Table 6 (3) and is net worth in Table 6 (4). Since total wealth and net worth include the value of real estates owned by households, homeownership dummy is insignificant to explain stock market participation. However, owner-occupied housing is still significant in share equations and parameter estimates are even higher than in (1) and (2) of Table 6. However, given the same wealth level, homeownership significantly increases equity shares in financial wealth by more than seven percent.

4.4 Discussion

The empirical findings in section 3 and section 4 can be 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 of age 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 purchased their homes.

What do these empirical findings suggest about theory? It is not difficult to think that we can construct a model with a combination of large indivisible investment opportunity and loan market imperfection and will be able to explain some of the features described in this section. For example, Hayashi, Ito, and Slemrod (1988)

presented such a model to explain some aspects of high Japanese private saving rate. Using simulation, they showed that large down payments and heavy housing loans will increase saving at younger stage of the life-cycle.

Recent paper by Faig and Shum (2002) is more directly related to the issues discussed in this paper. In their model, the households facing borrowing restrictions also face investment opportunities (a house) that needs money at various stages (the down payment, the purchase, maintenance, mortgage etc.) and is costly to liquidate. Borrowing restrictions and project illiquidity generate a demand for self-financing and liquid assets. Since younger households are more likely to invest in those illiquid assets, this can account for the hump-shape in stock holding. Faig and Shum test their model with the U.S. SCF (Survey of Consumer Finances) data and find that the portfolio share of liquid assets is higher for households with a high value of illiquid investment (housing or private business). However, the remaining problem is that Faig and Shum's story is about the share invested in stocks, not about ownership. Provided the risk premium is positive, all household will hold stock in their model.

It seems very obvious that housing tenure decision heavily affects financial portfolio decision[9]. It also seems that a model with a large indivisible investment opportunity and capital market imperfection will provide a sensible explanation for what is happening. However, existing models are still unsatisfactory, in particular, in explaining the fact that market participation is mostly responsible in generating age-related variation in stock shares. Perhaps a model with some form of transaction costs is required to explain the age-related pattern of household stock market participation.

5 Conclusions

This paper provided a general survey of household portfolios in Japan and analysis in age-related variation of portfolio shares paying particular attention to its relationship with real estate holdings. It is shown that both stock market participation by Japanese households and the share of equities in their financial wealth have followed a declining trend in the last decade. This is in sharp contrast to U.S. and European countries in

[9]See Flavin and Yamashita (2002) and Yamashita (2002) for empirical evidence in U.S. data.

which increasing trends in household stock holdings are observed. It is also surprising that large fluctuation in Japanese stock prices had such a tiny impact on the financial wealth of the Japanese households.

About the age-related variation in stock holdings and stock shares, Japanese evidence clearly suggests that owner-occupied housing plays a very important role in their determination. Homeownership has a significantly positive effect on stock market participation and stock shares in financial wealth. 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 the 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, regulations and tax policies related to the housing market might have a big impact on equity demand by individual investors.

We are still lacking in a formal theoretical model that provides a satisfactory description of stock market participation and portfolio choice over the life-cycle. 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 2002) 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 market, 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.

6 Appendix: Nikkei Radar data

In this appendix, I summarize how the data set for graphical and econometric analysis in the text was constructed from original Nikkei Radar data. 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[10]. Even after we formed the age groups 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 containing 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 from 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 that 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 an 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.

The number of the observations used for econometric analysis in Table 6 is smaller than used for graphical inspection, since many households did no responded to the items that are used as explanatory variables.

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

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Table 1
Composition of Household Financial Wealth:
National Survey Data

Wealth level (in 1999 value) and shares of assets in total financial wealth.

	1981	1984	1987	1990	1993	1996	1999
(a) Wealth level (ten-thousand yen)							
Average financial assets per household	685.7	786.3	1008.8	1219.9	1294.8	1356.5	1479.1
Median financial assets per household	445.3	468.6	605.7	717.2	747.0	805.6	939.7
Average net financial worth per household	471.9	526.3	711.1	904.9	861.4	845.8	968.6
(b) Asset shares (in percentage)							
Deposits	67.0	64.8	55.5	49.3	53.1	58.0	60.1
Time Deposits	38.7	35.4	36.8	26.8	37.2	45.4	44.5
Employees account (Zaikei saving)	3.0	3.3	3.2	2.8	2.9	3.0	2.9
Trust Funds	5.7	6.8	5.6	5.5	6.4	4.2	2.6
Life Insurance	15.6	15.3	17.5	19.4	19.8	20.2	20.1
Personal Pension	1.9	1.5	1.8	2.7	3.5	4.6	4.8
Bonds	2.9	2.9	3.7	2.8	2.5	2.1	1.5
Equity	6.1	6.8	8.9	10.6	9.5	7.6	7.2
Mutual Funds	0.8	1.2	3.0	2.8	2.4	2.1	1.0
Other Financial Assets	3.2	0.7	4.0	6.9	2.8	1.2	2.7

Table 2
Composition of Household Financial Wealth: Aggregate data

Aggregate wealth level (in 1999 value) and aggregate shares of assets in total financial wealth.

	1991	1993	1996	1999	2000
(a) Wealth level (trillion yen)					
Financial asset holdings by household sector	1079.9	1144.1	1299.4	1459.6	1497.5
Net financial worth of household sector	797.4	841.7	971.38	1119.0	1151.4
(b) Asset shares (in percentage)					
Cash	1.7	1.7	1.9	2.2	2.4
Deposits	47.0	47.7	49.1	49.9	50.6
Trust Funds	5.8	5.7	4.3	2.5	2.0
Mutual Funds	2.7	2.4	2.2	2.2	2.4
Equity	11.9	10.9	9.3	10.8	8.5
Life Insurance/Pension	22.3	24.9	26.2	27.2	28.3
Bonds	2.4	2.4	2.3	1.7	1.9
Others	6.2	4.3	4.7	3.5	3.9

Table 3
Composition of Household Financial Wealth: Nikkei survey data

Note: In the survey question, Nikkei data asked about the value of life insurance at its maturity, instead of current market value. As a result, life insurance values in Nikkei data reported in Panel (A) are apparently overvalued compared with ones reported in Table 1 and 2. For this reason, I calculated wealth level and asset shares in a couple of additional ways. In Panel B, life insurance is simply excluded from financial wealth. In panel C, I made an adjustment so that life insurance shares in financial wealth matches to those reported in Table 1 and Table 2. Specifically, I assumed the life insurance share is 17.5% in 1987, 20% for 1990, 1992, 1996, and 1999, and then made adjustment at the individual household level.

Panel A: Including life insurance

	1987	1990	1993	1996	1999
(a) Wealth level (ten-thousand yen)					
Average financial assets per household	1443.1	2061.4	2023.6	1832.8	1811.5
Average total assets per household	6333.6	8013.0	5781.8	4834.3	4518.4
(b) Asset shares (in percentage)					
Deposits	42.3	39.7	41.4	49.8	56.6
Time Deposits	28.8	23.4	21.7	24.1	28.1
Employees account (*Zaikei* saving)	6.5	5.3	5.4	5.7	5.3
Trust Funds	4.0	4.9	3.9	3.1	2.3
Life Insurance	41.3	43.4	46.1	40.5	32.1
Bonds	5.0	2.7	3.3	2.0	2.2
Equity	6.1	6.4	4.6	4.0	5.9
Mutual Funds	1.0	1.1	0.7	0.7	0.6
Other Financial Assets	0.3	2.1	-	-	0.4

Table 3 (continued)

Panel B: No life insurance

	1987	1990	1993	1996	1999
(a) Wealth level (ten-thousand yen)					
Average financial assets per household	799.0	1187.5	1121.3	1013.4	1154.1
Average total assets per household	5689.5	7139.1	4977.2	4015.0	4518.4
(b) Asset shares (in percentage)					
Deposits	77.5	73.9	79.5	85.0	76.1
Time Deposits	45.3	23.4	39.2	40.4	41.0
Employees account (*Zaikei* saving)	10.2	10.3	10.4	9.8	7.9
Trust Funds	5.9	4.9	6.2	4.5	3.3
Life Insurance	-	-	-	-	-
Bonds	6.8	4.2	5.3	3.1	3.2
Equity	7.8	6.1	7.7	6.3	8.1
Mutual Funds	1.2	1.1	1.1	1.1	0.8
Other Financial Assets	0.5	3.2	-	-	0.5

Panel C: Corrected for life insurance value

	1987	1990	1993	1996	1999
(a) Wealth level (ten-thousand yen)					
Average financial assets per household	967.8	1484.4	1366.1	1266.8	1442.6
Average total assets per household	5878.7	7436.0	5124.3	4268.4	4806.9
(b) Asset shares (in percentage)					
Deposits	68.5	60.2	63.6	68.7	67.0
Time Deposits	37.4	33.4	29.4	33.0	32.8
Employees account (*Zaikei* saving)	8.4	8.2	5.2	7.9	6.4
Trust Funds	4.9	6.3	6.9	3.5	2.6
Bonds	5.7	3.3	3.4	3.5	2.4
Equity	6.5	7.3	5.3	5.0	6.5
Mutual Funds	1.0	1.4	0.8	0.9	0.6
Other Financial Assets	0.4	2.8	-	-	0.4

Table 4

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	-(*)	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

Note: Author's calculation from Nikkei data. (∗)There is no distinction in types of real estates in 1987.

Table 5

Ownership of Stocks and Real Estates: Change by Age

(A) Cross-section of 1999

Age 30-32		Own real estate?		
		No	Yes	
Own stocks?	No	73.0%	13.8	[15.8](1)
	Yes	10.2	3.0	[22.7](2)
		[12.2](3)	[17.8](4)	

	No	Yes
No	△25.2	19.3
Yes	△1.3	7.2

Age 39-41		Own real estate?		
		No	Yes	
Own stocks?	No	47.8%	33.1	[40.9]
	Yes	8.9	10.2	[53.3]
		[15.7]	[23.5]	

	No	Yes
No	△12.8	5.3
Yes	△3.0	10.5

Age 48-50		Own real estate?		
		No	Yes	
Own stocks?	No	35.0%	38.4	[52.4]
	Yes	5.9	20.7	[77.8]
		[14.5]	[35.0]	

	No	Yes
No	△8.1	△4.2
Yes	1.5	10.8

Age 57-59		Own real estate?		
		No	Yes	
Own stocks?	No	26.9%	34.2	[56.0]
	Yes	7.4	31.5	[81.0]
		[21.6]	[48.0]	

Note: (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 5

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

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

1987		Own real estate?		
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]	

1990		Own real estate?		
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 real estate?		
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 **1987** to **1993**
[age 30-32 to 36-38]

	No	Yes
No	3.1	△2.0
Yes	△3.6	2.5

1996		Own real estate?		
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 real estate?		
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]	

change from **1993** to **1999**
[age 36-38 to 42-44]

	No	Yes
No	△17.0	15.9
Yes	△1.0	2.1

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 5

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

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

Age 45-47 1987		Own real estate? No	Yes	
Own stocks?	No	25.8%	46.2	[64.2]
	Yes	1.1	26.9	[96.1]
		[4.0]	[36.8]	

Age 48-50 1990		Own real estate? No	Yes	
Own stocks?	No	29.8%	42.9	[59.0]
	Yes	6.0	21.4	[78.3]
		[16.7]	[33.3]	

Age 51-53 1993		Own real estate? No	Yes	
Own stocks?	No	34.2%	35.8	[51.2]
	Yes	4.9	25.2	[83.8]
		[12.5]	[41.3]	

change from **1987** to **1993**
[age 45-47 to 51-53]

	No	Yes
No	8.4	△10.5
Yes	3.8	△1.7

Age 54-56 1996		Own real estate? No	Yes	
Own stocks?	No	25.6%	40.0	[61.0]
	Yes	4.4	30.0	[87.1]
		[14.8]	[42.9]	

Age 57-59 1999		Own real estate? No	Yes	
Own stocks?	No	26.9%	34.2	[56.0]
	Yes	7.4	31.5	[81.0]
		[21.6]	[48.0]	

change from **1993** to **1999**
[age 51-53 to 57-59]

	No	Yes
No	△7.3	△1.6
Yes	2.5	6.3

total change from **1987** to **1999**
[age 45-47 to 57-59]

	No	Yes
No	1.1	△12.0
Yes	6.3	4.6

Table 6

Cross-sectional Regression for participation and the share of equities

Cross-section of 1999 data. Dependent variable is equity share in financial wealth. Total obs: 1,710; Uncensored obs (equity holders): 497

	(1) No house		(2) With house	
	Participation	Share	Participation	Share
age	.0612**	.0064	.0552*	.0061
	[.0252]	[.0092]	[.0254]	[.0089]
age^2/1,000	−.4132	−.0661	−.3680	−.0669
	[.2491]	[.0837]	[.2502]	[.0820]
married	−.1173	−.0544	−.1301	−.0607
	[.1627]	[.0535]	[.1628]	[.0532]
male	−.0615	−.0276	−.0868	−.0351
	[.2028]	[.0684]	[.2031]	[.0681]
income	0.7629**	−.0269	.7275**	−.0368
	[0.2056]	[.08576]	[.2059]	[.0838]
income^2	−0.1616**	.0181	−.1549**	.0207
	[0.0607]	[.0226]	[0.0605]	[.0223]
college	.2172**	.0016	.2215**	.0038
	[.0792]	[.0291]	[.0794]	[.02888]
junior high	−.0986	−.0610	−.1150	−.0732
	[.1467]	[.0523]	[.1475]	[.0524]
no job	.0184	.0405	.0031	.0425
	[.1443]	[.0413]	[.1449]	[.0409]
self-employed	−.0942	.0171	−.0939	.0192
	[.1013]	[.0304]	[.1015]	[.0302]
agriculture	−.4293	.1250	−.4402	.1183
	[.2637]	[.0881]	[.2651]	[.0875]
wealth	.4058**	−.0353	.4021**	−.0352
	[.0396]	[.0243]	[.0397]	[.02393]
wealth^2	−0.0184**	.0012	−.0182**	.0012
	[.0032]	[.0013]	[.0032]	[.0013]
house owner	-	-	.1790*	.0471*
	-	-	[.0769]	[.0257]

Note: Income and wealth are in ten-thousand yen. The wealth variable in (1) and (2) are both financial wealth excluding life insurance.

Table 6 (continued)

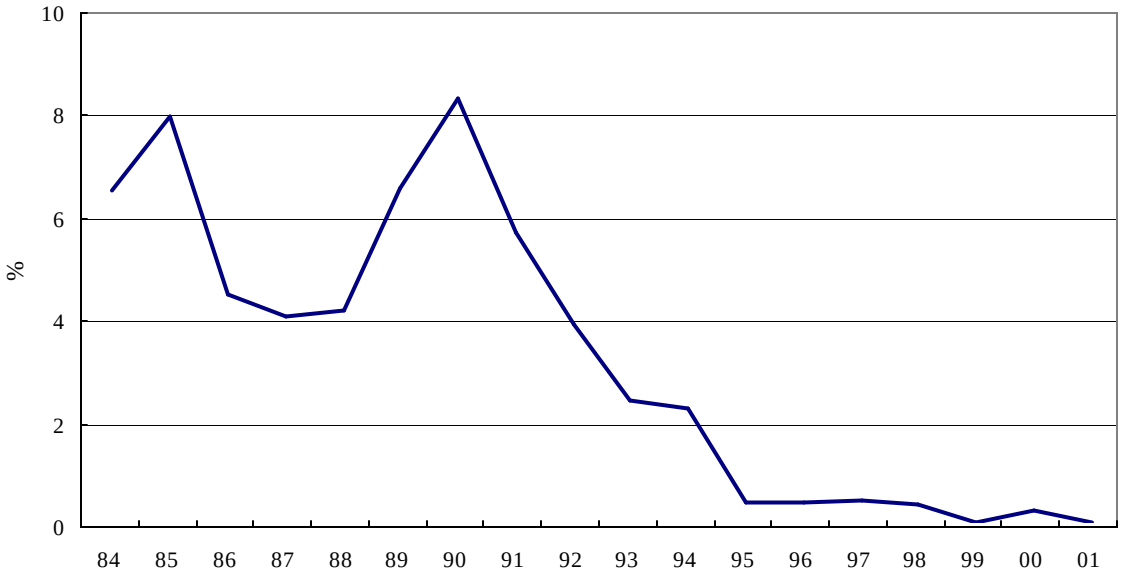
Cross-sectional Regression for participation and the share of equities

	(3) Total wealth		(4) Net worth	
	Participation	Share	Participation	Share
age	.0606**	.0030	.0631**	.0065
	[.0247]	[.0096]	[.0247]	[.0091]
age^2	−.3260	−.0536	−.3531	−.0698
	[.2429]	[.0837]	[.2427]	[.0812]
married	−.1751	−.0507	−.1667	−.0607
	[.1592]	[.0544]	[.1592]	[.0532]
male	−.0936	−.0261	−.1031	−.0357
	[.1985]	[.0696]	[.1976]	[.0679]
income	.8562**	−.0701	.9351**	−.0156
	[.2040]	[0.1017]	[.2037]	[.0939]
income^2	−.1703**	.0286	−.1865**	.0179
	[.0606]	[.0251]	[.0615]	[.0235]
college	.2557**	−.0077	.2653**	.0122
	[.0777]	[.0334]	[.0774]	[.0303]
jhigh	−.3083	−.0427	−.3131*	−.0668
	[.1454]	[.0587]	[.1448]	[.0558]
unemployed	.1343	.0291	.1588	.0336
	[.1387]	[.0431]	[.1381]	[.0424]
self-employed	−.1394	.0420	−.1324	.0308
	[.1008]	[.0335]	[.1001]	[.0312]
agriculture	−.4239	.1530	−.4017	.1247
	[.2643]	[.0911]	[.2623]	[.0856]
wealth	.0635**	−.0101	.0362**	−.0005**
	[.0105]	[.0053]	[.0068]	[.0002]
wealth^2	−.0007**	.0001	-	-
	[.0018]	[.0001]	-	-
house	−.0254	.0780**	−.0597	.07180**
	[.0849]	[.0260]	[.0807]	[.0253]

Note: In (3), the wealth variable is "Total wealth" = "Financial wealth" plus"real estates." In (4), the wealth variable is "Net worth" = "Total wealth" minus "housing and other loans."

Figure 1 (continued)

Short-term interest rate (call rate)



Long-term interest rate (10 year JGB)

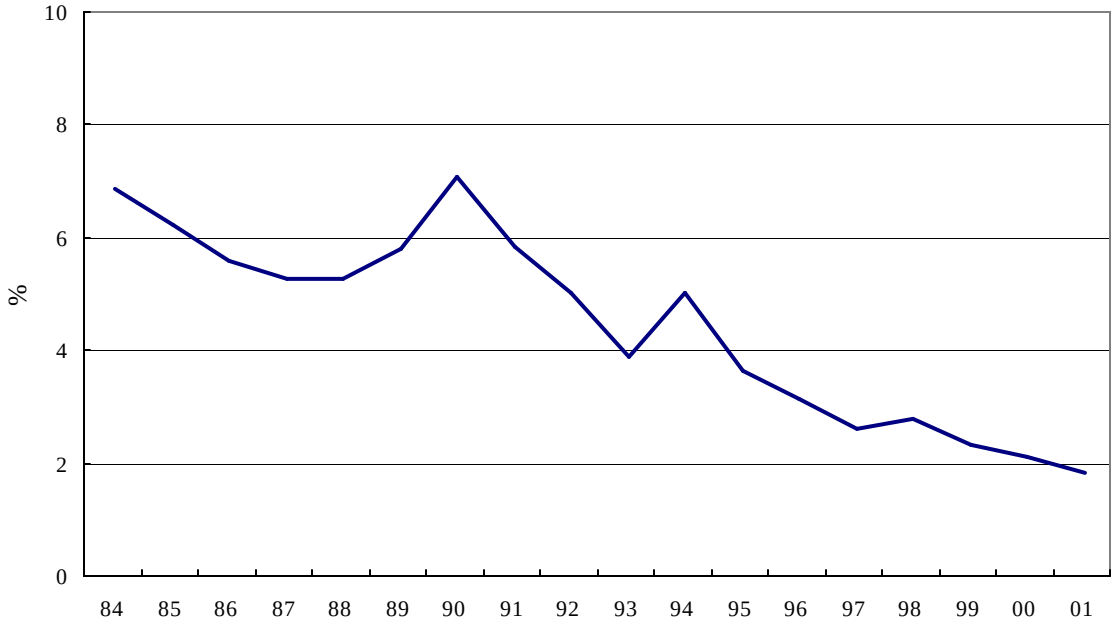
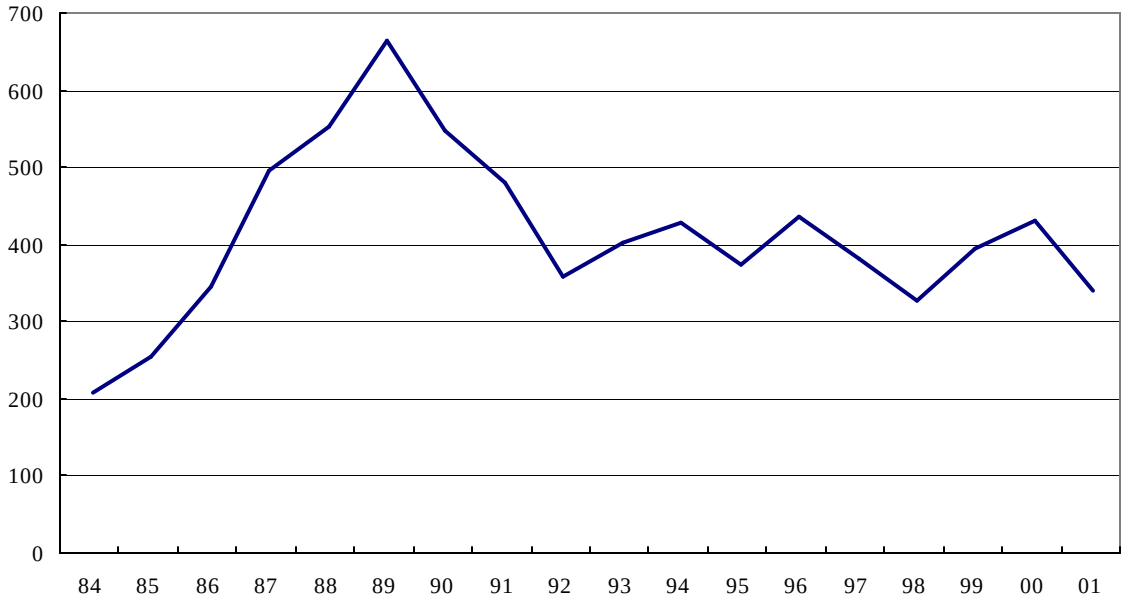


Figure 1 (continued)

Stock prices (JSRI index)



Residential land prices (price index of urban residential areas)

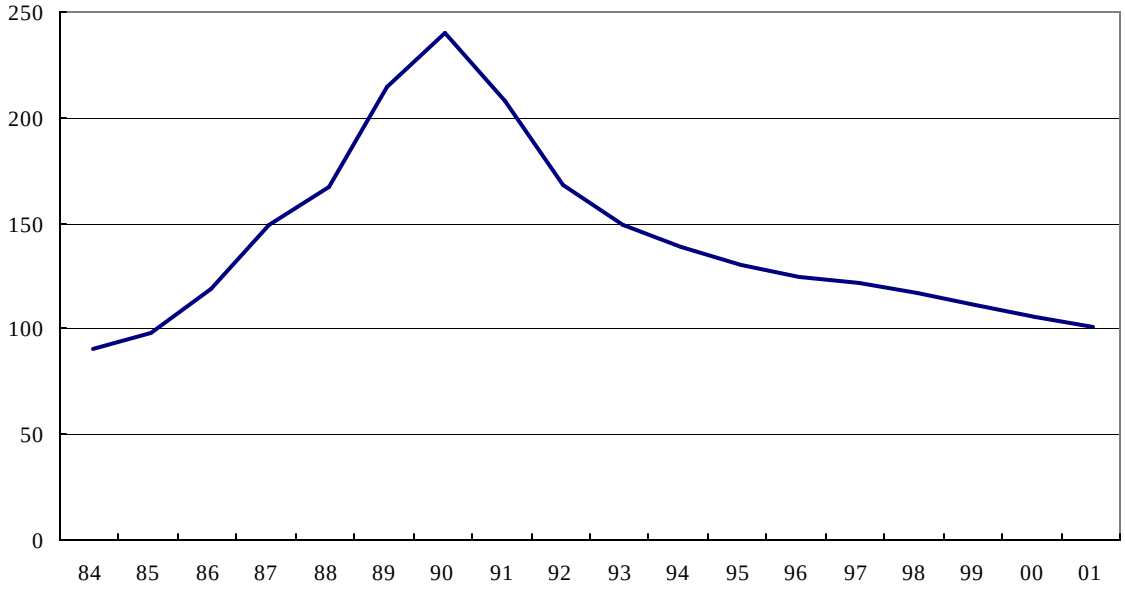
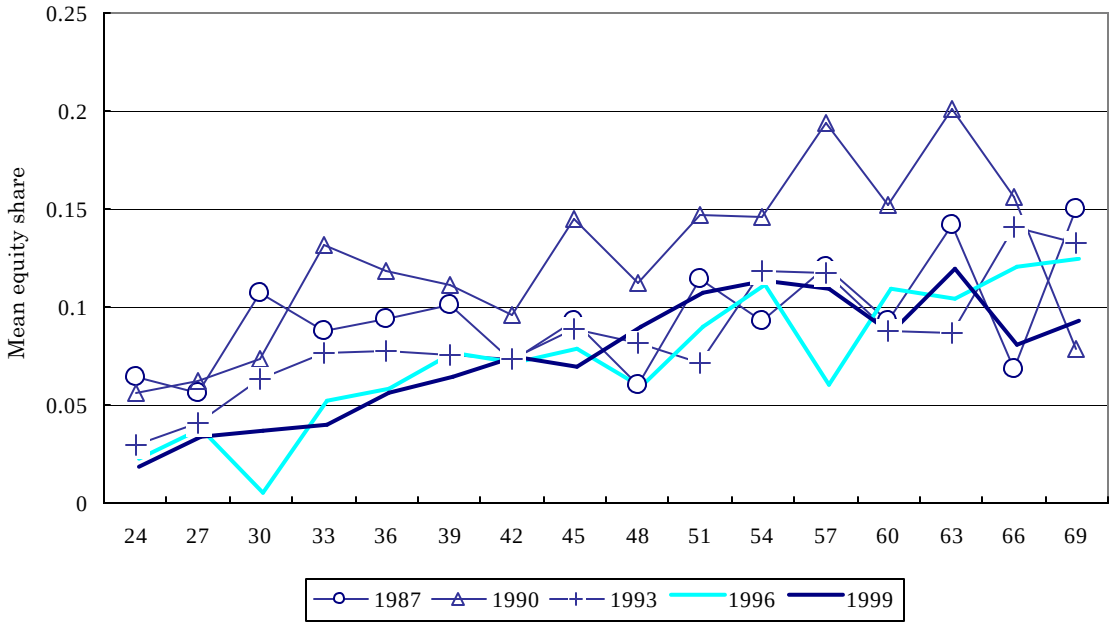


Figure 2: Equity Shares in Financial Wealth: 1987-1999

Cross-section View



Cohort View

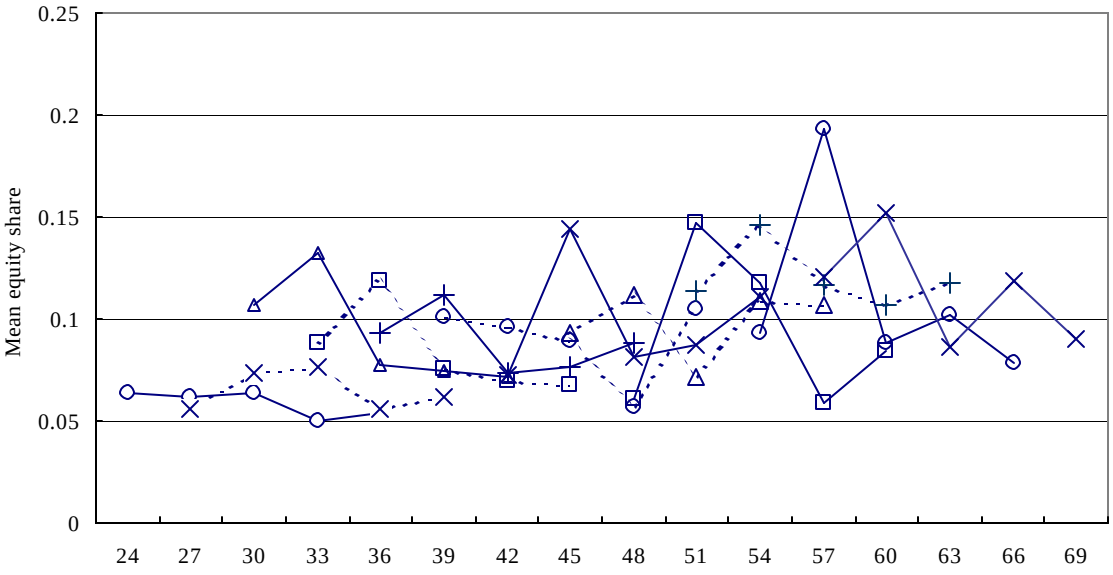


Figure 2 (continued)

Different Definitions of Financial Wealth

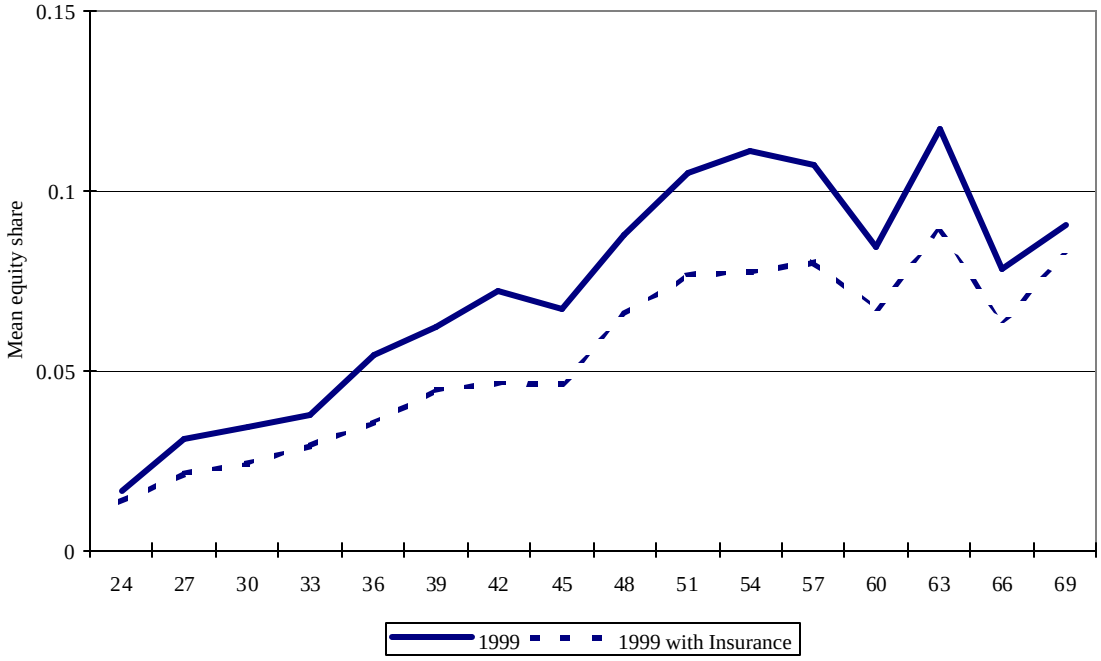
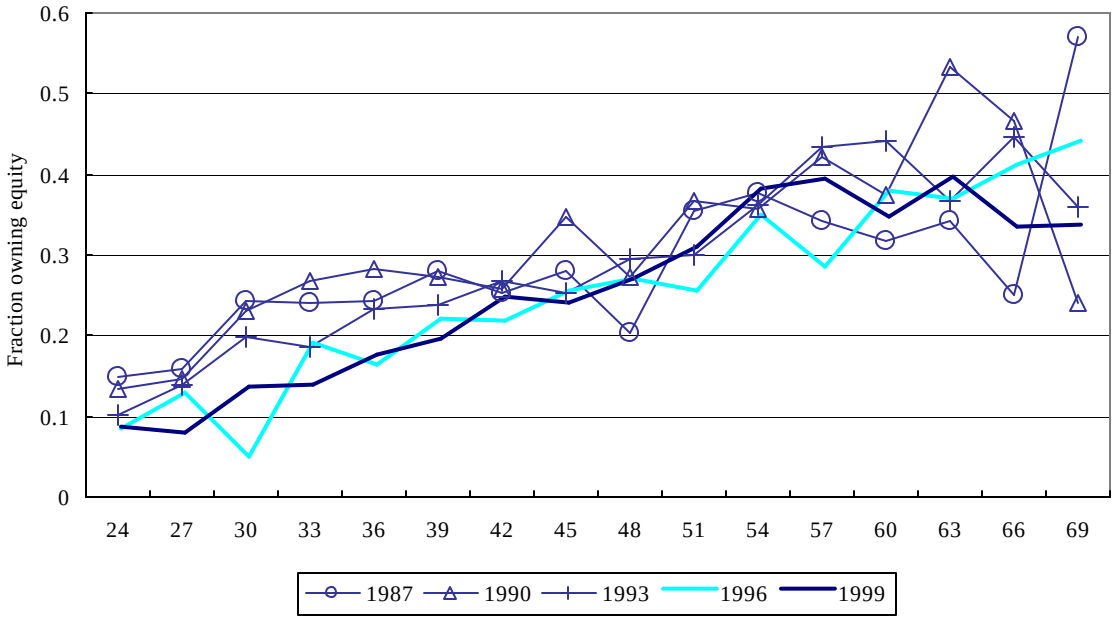


Figure 3: Fraction of Population Owning Equity: 1987-1999

Cross-section View



Cohort View

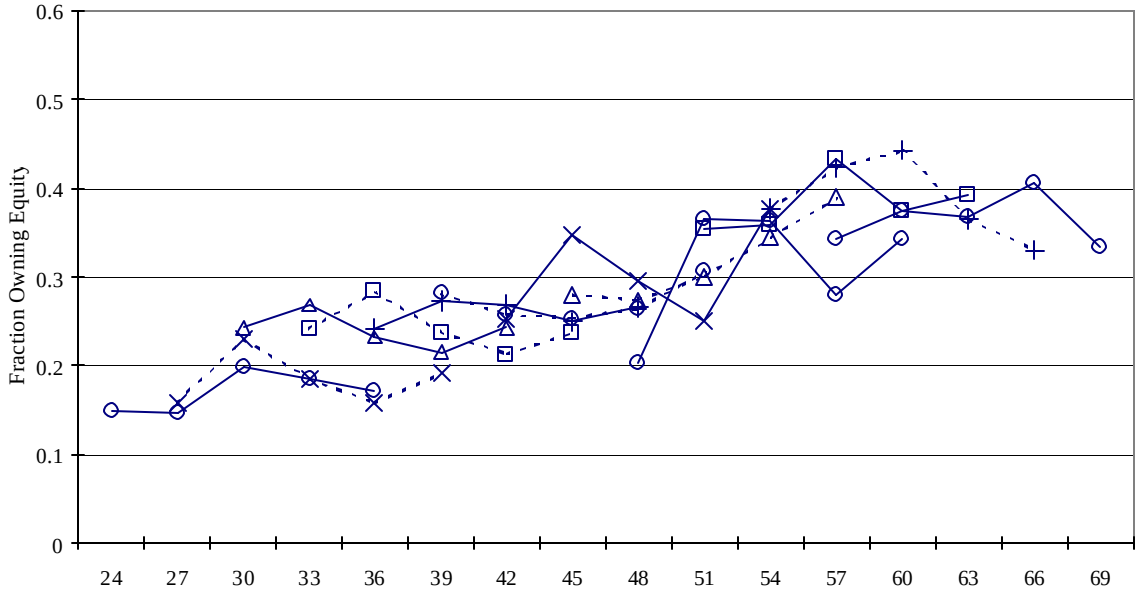
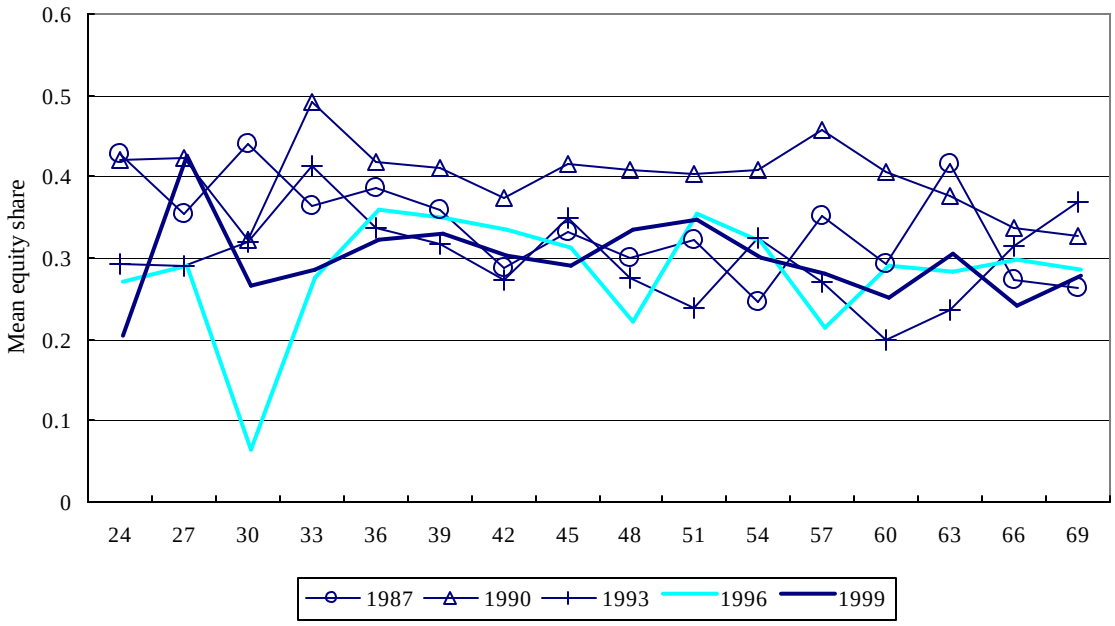


Figure 4: Equity Shares among Equity Owners: 1987-1999

Cross-section View



Cohort View

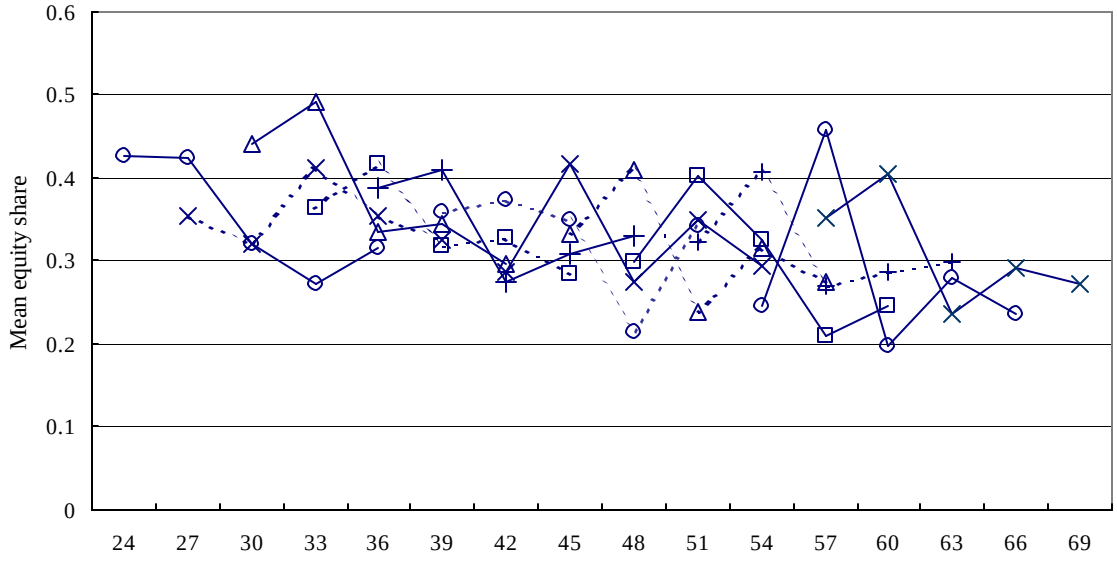
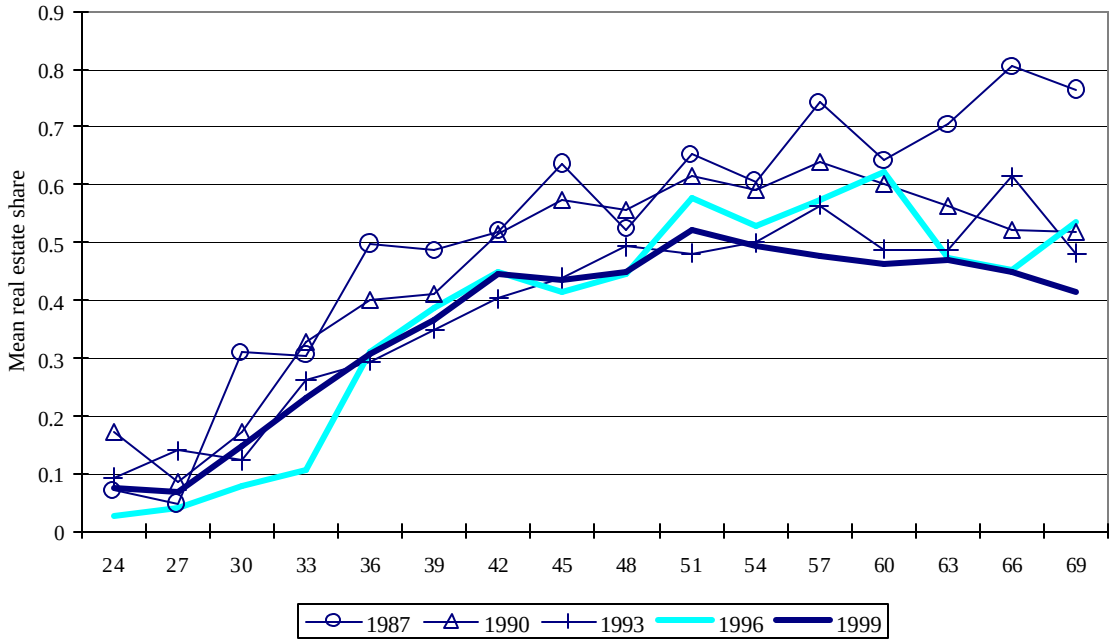


Figure 5: Real Estate Shares in Total Wealth and Ownership: 1987-1999

(1) Real Estate Shares in Total Wealth



(2) Fraction of Population Owning Real Estates

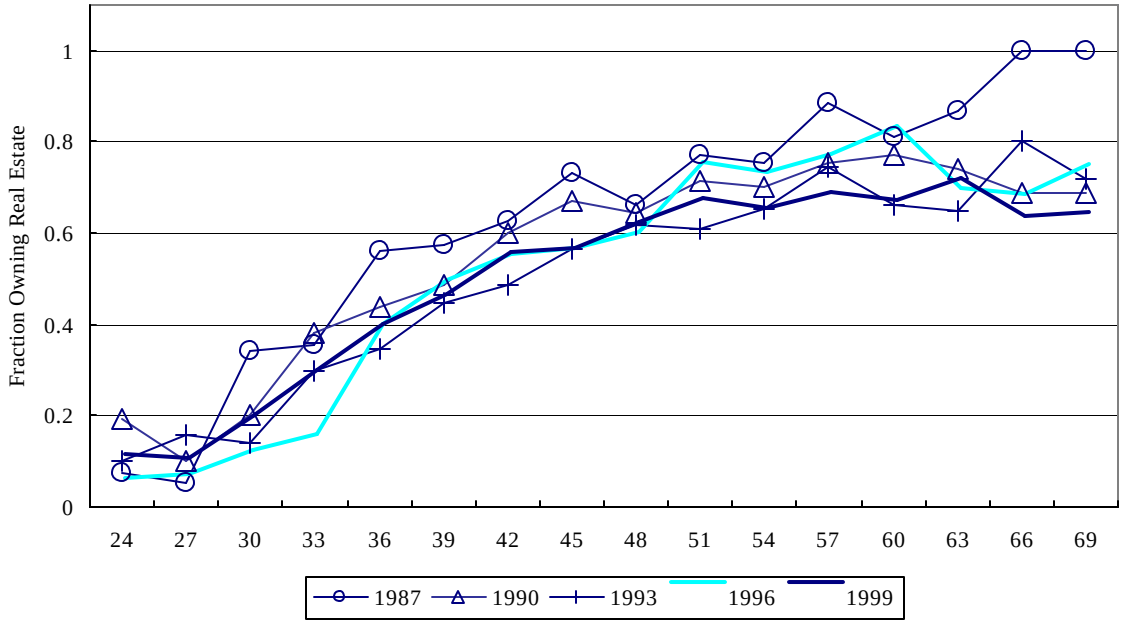


Figure 5 (continued)

(3) Real Estate Shares among Real Estate Owners

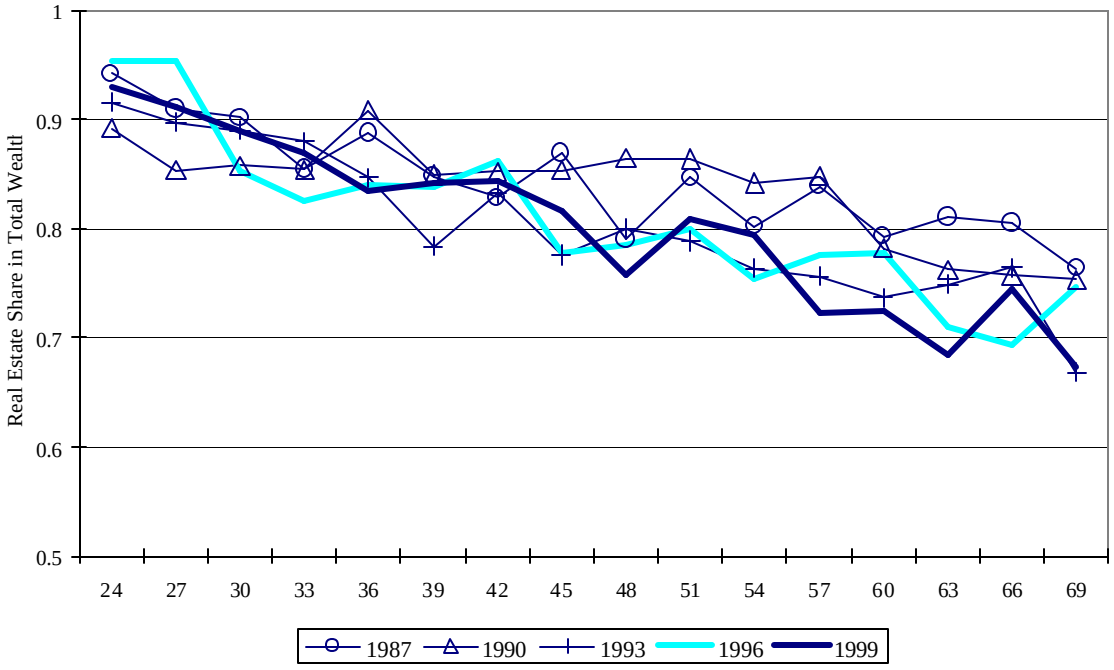
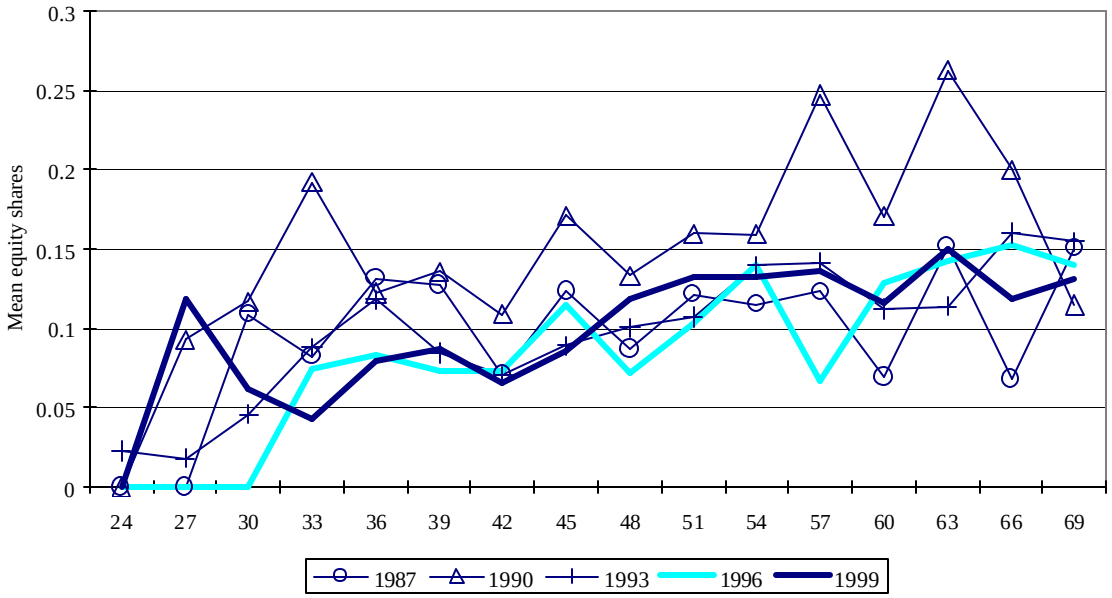


Figure 6: Equity Shares in Real Estate Owners Portfolios

(1) Equity Shares in Financial Wealth



(2) Equity Shares in Total Wealth

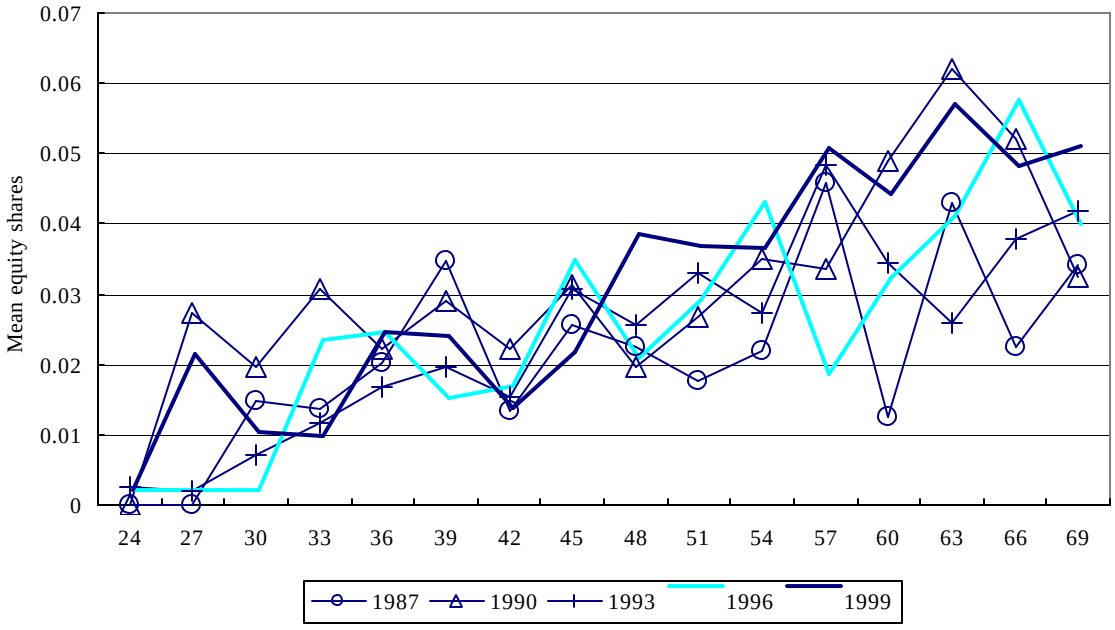


Figure 7: Fraction of Equity Holders among Real Estate Owners

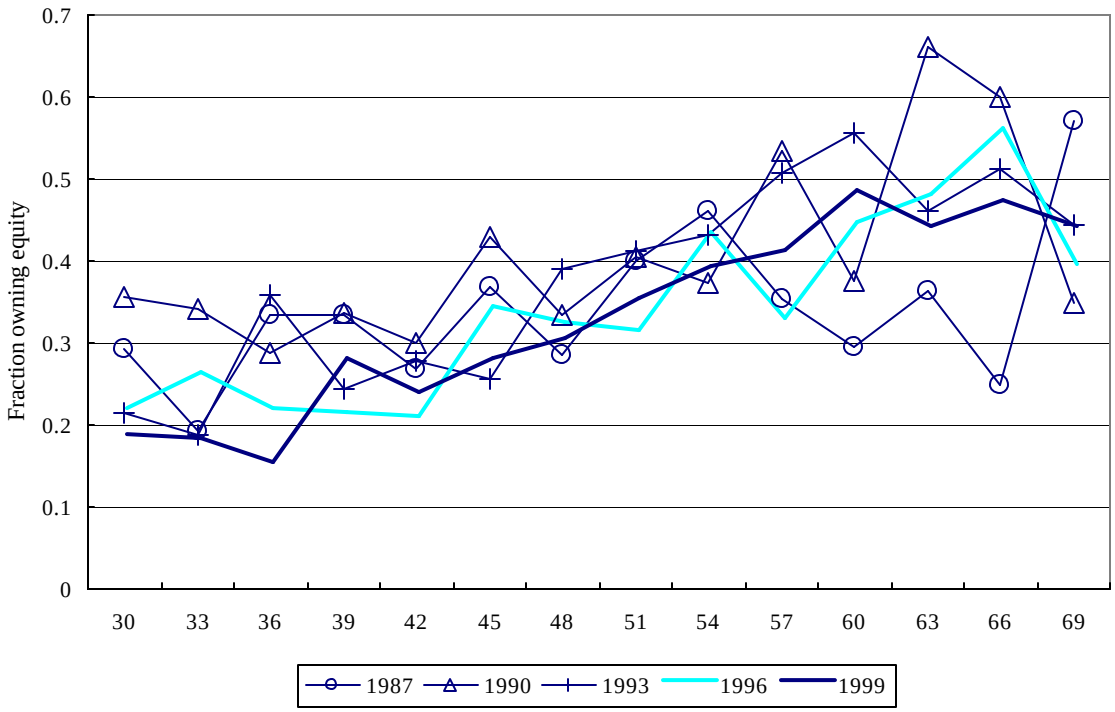
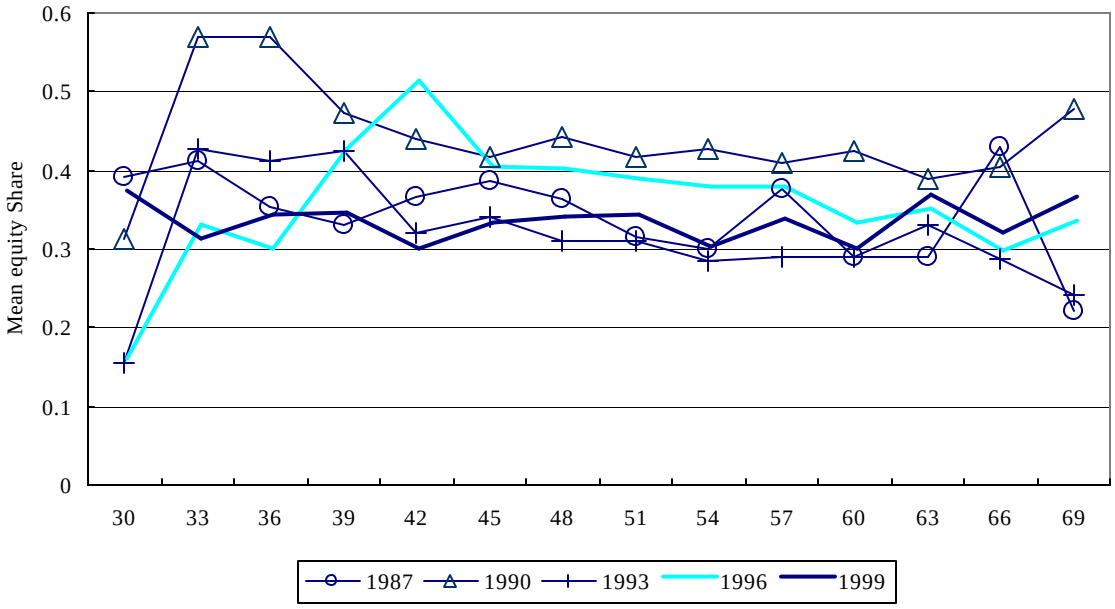


Figure 8: Equity Shares of Households owning both Equity and Real Estate

(1) Equity Shares in Financial Wealth / Owning both Equity and Real Estates



(2) Equity Shares in Total Wealth / Owning both Equity and Real Estates

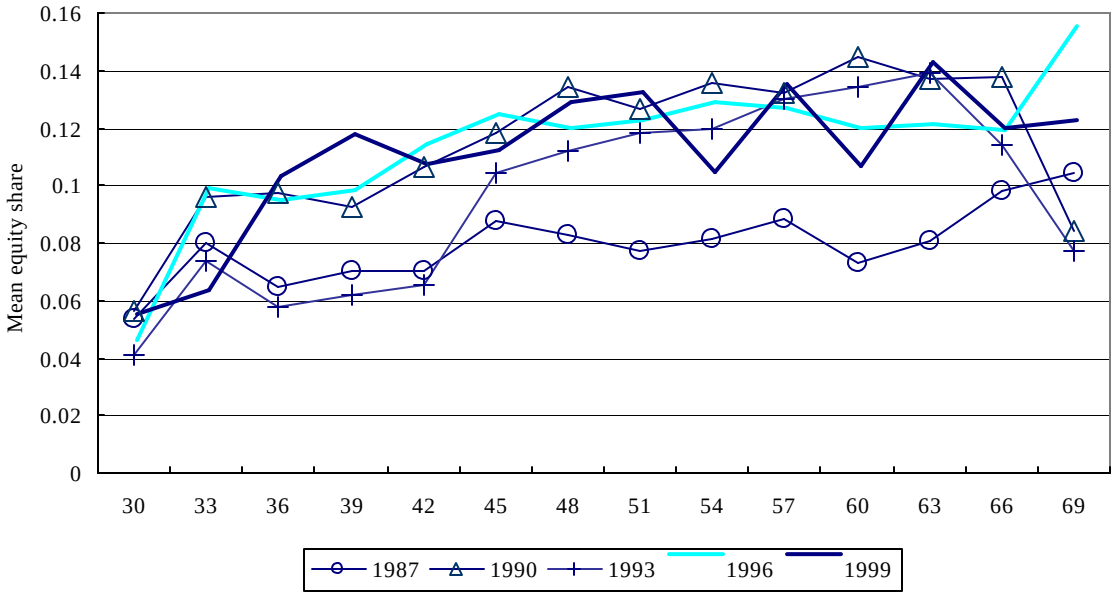
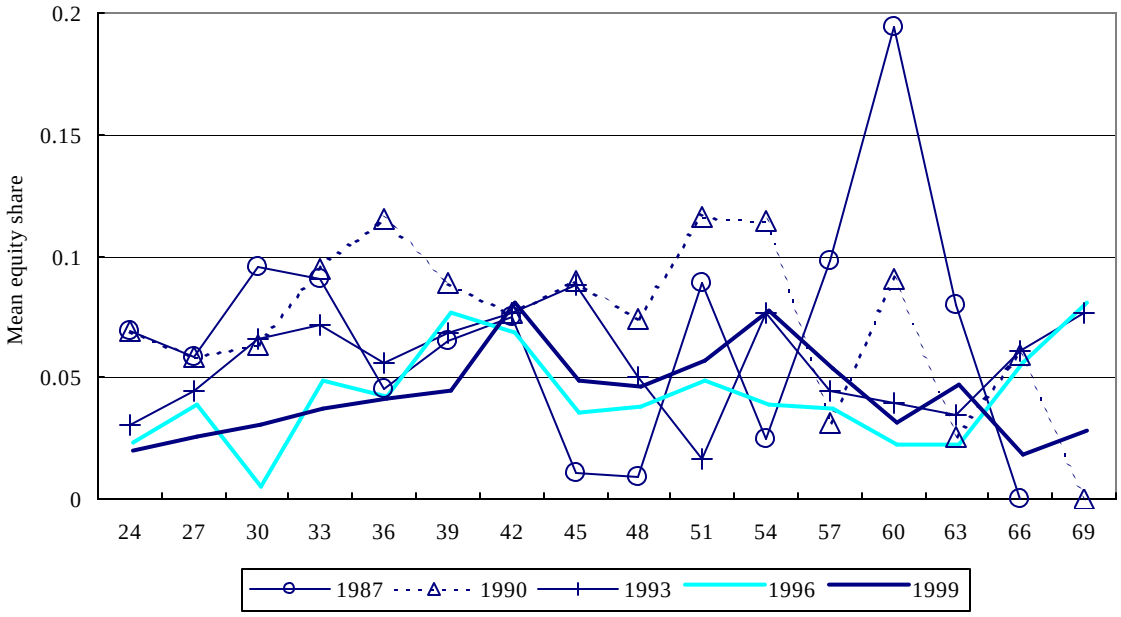


Figure 9: Equity Shares and Ownership of Households Do Not Own Real Estates

(1) Equity Shares in Financial Wealth



(2) Fraction of Population Owning Equity

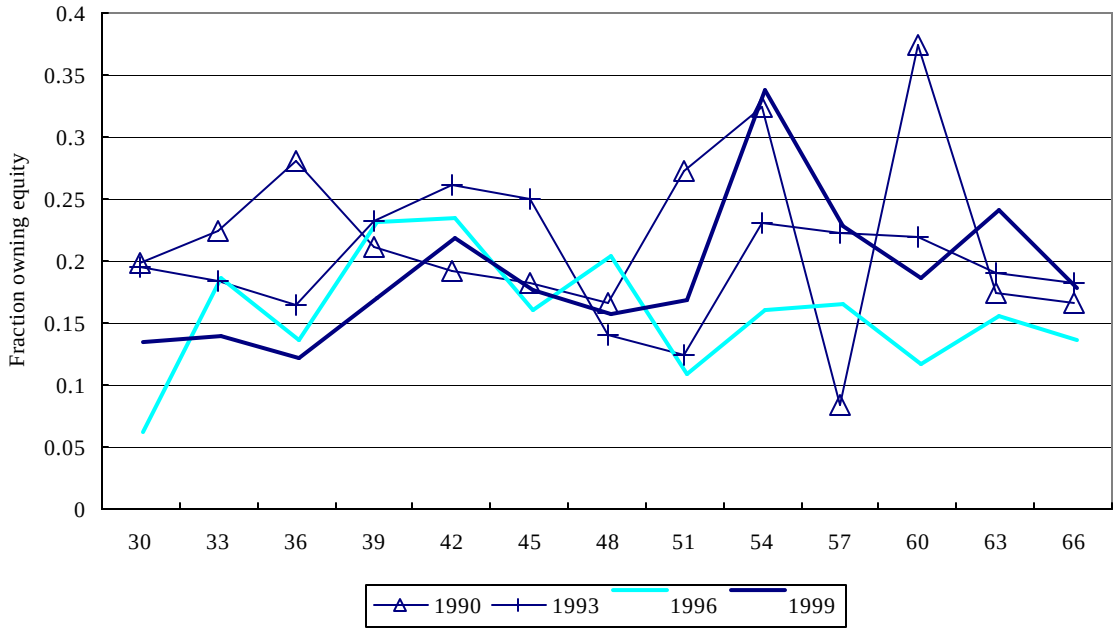


Figure 9 (continued)

(3) Equity Shares among Equity Owners