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Why US Household Expenditures are Strong

The Pros and Cons of Asset Price-dependent Spending Behavior

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Summary

1. After a decade of expansion, the US economy entered recession in March 2001. What characterizes the latest recession more than anything else is the fact that corporate sector demand, as represented by capital investment, is undergoing a deeper correction than seen in past recessions, while household sector spending (consumption expenditures and housing investment) is unusually strong. Because of this, the recession itself has been extremely shallow.

2. Household expenditures have maintained their strength during the latest recession primarily because of the rapid and large interest rate cuts enacted by the FRB. The impact of monetary easing went far beyond traditional interest rate-sensitive demand items like housing investment and automobile purchases to have a positive effect on household balances as a whole, increasing the value of the assets held by households and decreasing their interest burdens. Two factors were strongly at work in this in comparison to past easy money periods: 1) changes in the structure of the household balance sheet (rising percentages of interest rate-sensitive assets like stocks and homes, and increased borrowings), and 2) enhanced consumer financial services (better means of borrowing using homes as security, and easier refinancing of fixed interest mortgages).

3. Verifications of the impact on households of monetary easing during the recession produced three conclusions: 1) demand increased for interest rate-sensitive goods such as homes and automobiles for which loans are traditionally relied on, and did so to keep pace with the decline in interest rates; 2) household interest burdens declined substantially because of a rapid increase in the refinancing of existing mortgages; and 3) falling interest rates combined with other factors to boost housing prices, which had a positive impact on consumer spending. Of these three conclusions the third route resulted in an overall decline in the assets owned by households because more cautious corporate earnings forecasts caused share prices to drop in spite of lower interest rates. However, due to the differences in the size of price fluctuations and the ownership of stocks and housing assets, there also tended to be differences in the degree of the wealth effect. In point of fact, the results from our consumption function estimate indicate that during the recession the positive wealth effect from the increase in housing assets was larger than the negative wealth effect from the decline in stock assets, and this likely had a positive effect overall.

4. Having examined the increasing impact of interest rates and asset prices (particularly share prices and housing prices) on household expenditures, we go on to examine the "problems" of "low savings rates" and "excessive debt" that are often considered to be structural issues for US households. In particular, we examine the question of "low savings rates" and the downward bias in statistics due to the treatment of capital gains, an issue that has come to the fore of late. When corrections are made for this bias, it can be seen that the increase in owned assets due to past asset price rises decreases the need for new savings from current income, and this is linked to the decline in the savings rate. In other words, the decline in the savings rate and the increase in household debt themselves are the products of consumption and savings behaviors on the part of households responding to changes in the financial environment and do not necessarily contain, in themselves, factors for instability. At the same time, however, the other side of this trend is the increasing dependence of the household sector on the financial environment in general, and asset prices, in particular.

5. The high dependence of the household sector on the financial environment contains several risks for future household expenditures: 1) the risk of downward pressure on consumption due to the overall wealth effect should stock price weakness be prolonged and eventually generate a negative wealth effect that is larger than the positive wealth effect from housing; 2) the risk that future housing prices will turn downward if there are bubble-like elements behind the housing price rises seen so far; and 3) the risk that household expenditures along with their balance sheets will rapidly deteriorate should interest rates rise and the mechanism examined in this paper work in reverse to exert a strong negative impact on household expenditures. It therefore behooves us to consider what would happen if these risks were realized. What changes would be seen in external balances and fiscal balances as a result of changes in the US household sector and the resulting movements on the capital markets? What impact would this correction have on the world economy as a whole? Strong household expenditures support both the US economy and the world economy and must therefore be watched carefully in the future.

1. Preface

After a decade of expansion, the US economy entered recession in March 2001.[1] What characterizes the latest recession more than anything else (Figure 1; see end of paper) is that corporate sector demand, as represented by capital investment, is undergoing a deeper correction than seen in past recessions, while household sector spending (consumption expenditures and housing investment) is unusually strong. Because of this, the recession itself has been extremely shallow. In other words, in past recessionary periods, it was common for consumption expenditures, including housing investment, to undergo a large contraction in conjunction with the slowdown in capital investment and other corporate sector demands. In the latest recession, however, household expenditures are strong; indeed, there is very little difference from what they were before the recession. Given that household expenditures account for more than 70% of US GDP, it is this strength that is the major factor in keeping the recession extremely shallow.

The primary task before this paper is to explain why household expenditures have been able to maintain their strength during this recession. The US economy is already in a recovery phase, though there is still large uncertainty about the pace and strength of the recovery. Understanding the reasons why household expenditures, which account for the majority of total demand, have been able to maintain their strength is extremely important to any attempt to forecast the future of the US economy. Our observations about household expenditures will also, from a different perspective, shed light on questions regarding the US investment-saving balance and the sustainability of the US current account deficit. These issues are the "flip side" of strong, expanding household expenditures and are of great interest both inside and outside of the United States.

2. Why household expenditures have maintained their strength during the recession

The basic position of this paper is that household expenditures have maintained their strength during the latest recession primarily because of the rapid and large interest rate cuts enacted by the FRB. The impact of monetary easing went far beyond traditional interest rate-sensitive demand items like housing investment and automobile purchases to have a positive effect on household balances as a whole, increasing the value of the assets held by households and decreasing their interest

[1] This report was originally written in Japanese for the August 2002 Bank of Japan Monthly Bulletin based on data and information available as of the end of June, prior to the regular annual revision of the GDP statistics.

burdens. Two factors were strongly at work in this in comparison to past easy money periods: 1) changes in the structure of the household balance sheet (rising percentages of interest rate-sensitive assets like stocks and homes, and increased borrowings), and 2) enhanced consumer financial services, a structural change that has been going on for some years. This paper examines these issues in more detail.

(1) Characteristics of household expenditures during the latest recession

We look more deeply at the nature of household expenditures in an attempt to uncover the reasons why they have continued to be strong during the latest recession (Table 1). What stand out in particular are the strong spending for automobiles and other durable goods and the strength of housing investment. What both of these items have in common is the fact they are interest rate-sensitive. In the United States, it is common for people to borrow money to purchase automobiles and homes. On average, a slightly under 80% of home purchases and about 90% of automobiles purchases are financed by borrowing (Table 2).[2] Because of this, interest rates, which are the cost of borrowing money, will have a direct and significant impact on the demand for durable goods and housing.

Turning to interest rates during the recession (Table 3), we see an extremely large easing of money beginning in January 2001 and extending over the short term to 11 FRB rate cuts. The target level for short-term interest rates (FF rate) dropped over this time period from 6.50% to 1.75%, and real interest rates when the impact of inflation is removed are at historically low levels. The interest rates charged to households (mortgage interest, automobile loan interest etc.) declined significantly in reflection of this rapid and large easing by the FRB.[3]

Connecting these two facts, it seems certain that aggressive rate cuts provided strong support for household expenditures in general and durable goods (automobiles etc.) purchases and housing investment in particular, and that this was one of the chief factors behind the strength of household expenditures. However, the direct effects of falling loan interest rates are not by themselves sufficient to explain the strength that was simultaneously observed for other household expenditures besides durable goods and housing investment. In addition to the spillover effects from automobiles and homes, lower interest rates are likely to have increased the

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2 It is worth noting that dependence is significantly lower in Japan than in the United States: approximately 60% dependency on loans for home purchases; for automobile purchases, there are no clear statistics, but estimates are around 70%.

3 Mortgage interest rates declined significantly prior to the FRB easing. This reflects both a discounting of the upcoming easing, and also a decline in inflation expectations and improvements in the fiscal balance.

value of the assets held by households and reduced the interest burdens from their liabilities,[4] and this route as well exerted a strong positive effect on consumption.[5] The effects of the latter were particularly prominent because the rate cuts were larger and more rapid this time than in previous recessions. There were two other factors that also had a positive impact: 1) the changing structure of household balance sheets (rising percentage of interest rate-sensitive assets like stocks and homes, increased borrowings), and 2) the enhancement of consumer financial services. These two structural changes combined to make household expenditures as a whole more interest rate-sensitive and therefore enhanced the positive effects of the rate cuts.[6] In the pages that follow, we discuss these structural changes in detail and attempt to verify them from data illustrating the impact of declining interest rates on household expenditures.

(2) How monetary easing helped expand household expenditures

(a) Household balance sheet structures

Changes in household balance sheets over the past several years have served to increase the interest rate sensitivity of household expenditures as a whole. These changes are discussed below.

The first change to be noted is the increasing weight within the household balance sheet of assets such as stocks and homes that see large price fluctuations depending on interest rate levels. This has in turn strengthened the wealth effect of declining interest rates.[7] In other words, declining interest rates

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4 Declining interest rates make consumption more attractive than savings and have the effect of increasing current consumption (the "substitution effect").

5 Expansionary policies are being enacted on the fiscal side as well as the monetary side. For example, there was a large income tax cut passed in summer of 2001. This is also a factor supporting household expenditures. However, this paper focuses on the impact of lower interest rates on household expenditures taking note of three developments: 1) the fact that the tax cut took effect in July and August and no appreciable boosting of household expenditures was observed at that time; 2) the fact that household expenditures accelerated substantially after the September terrorist attack and the subsequent large rate cuts by the FRB; and 3) the fact that expenditures were particularly strong for interest rate-sensitive items.

6 Turning back to the relationship between interest rates and household expenditures in traditional economic theory, whether falling interest rates will produce greater expenditures depends on the relative strength and weakness of the "substitution effect" versus the "income effect." Within this framework, the household balance sheet structure (describe in detail below) and the enhancements in consumer financial services have combined to create a situation in which the income effect has relatively little downwards impact on current expenditures and the substitution effect is more easily manifest.

7 The wealth effect produced by falling interest rates is understood in the following form: "Falling interest rates produce rising prices for future goods vis-a-vis current goods, and so the value of future income as measured in current goods increases, increasing lifetime income." This is a concept that does not appear in the framework of the most simple two-term model of "substitution effect and income effect" which distributes current income between current and future

have the effect of boosting spending because of the rising market valuation of assets. On the asset side of the household balance sheet (Figure 4 (1)), the percentage of total assets accounted for by the combination of market value-based real estate (primarily housing) and stocks was less than 44% at the end of 1990 but had risen to approximately 50% by the end of 1995 and approximately 54% by the end of 2001. The main factors in this increase were an expansion of household stock investment and the large rises in stock prices throughout the late nineties which resulted in an increase in stock assets. Note, however, that real estate continued to account for approximately 30% throughout the nineties and continue to be a major asset for households.

There has traditionally been a clear, positive correlation in the United States between share prices and housing prices on the one hand and consumer spending on the other (often referred to as the "wealth effect;" Table 5). With the increasing weight of stocks and housing within household assets, the wealth effect of lower interest rates would appear to have become even stronger.

The second change to be noted is the decrease in the weight of the interest-bearing assets such as bank deposits within household assets. This, combined with the increase in borrowings on the liability side, increases the potential for falling interest rates to improve the net household interest balance. As described before, the weight of stocks and housing has increased on the asset side of the household balance sheet, while the weight of interest-bearing assets, the rates of return of which are directly prescribed by interest rate levels, have dwindled to extremely low levels (Figure 4(2)). Meanwhile, on the liabilities side the debt balance, primarily mortgages, is exhibiting a rising trend (Figure 6). The result for the household balance sheet as a whole has been to create net liabilities when comparing the levels of interest-bearing assets and liabilities (for which interest receipts and payments will vary directly according to interest rate levels). Obviously, it is impossible to generalize about the extent or lag with which the interest rates on these interest-bearing assets and liabilities will follow fluctuations on the short-term money markets, which are directly influenced by monetary policy. However, on the whole, falling interest rates have more potential than in the past to improve the household interest balance.

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consumption, but it does not contradict this framework either. In this paper, we focus on the increase in asset prices caused by falling interest rates, but obviously factors other than falling interest rates will also cause asset prices to rise, for example, more bullish expectations.

(b) Enhanced financial services to the household sector [8]

As described in the section above, a new structure has emerged for US households in which the wealth effect has taken on new importance and falling interest rates more easily lead to higher spending. However, enhancements in the financial services made available to households were also a chief factor in allowing the positive effects of falling interest rates to smoothly translate into household behavior.

More specifically, it is important to note that US households have more and better means of borrowing money at lower interest rates by using their home as collateral than they have enjoyed in the past. For example, let's consider a homeowner who wishes to enjoy the benefits of falling interest rates and rising housing prices. Unlike stocks, it is difficult to sell part of a house and realize capital gains. In most cases, one requires a borrowing opportunity in order to turn the increase in the value of the housing asset towards expenditures. Falling interest rates may also make consumption more attractive than savings (the "substitution effect"). In this case as well, one requires a borrowing opportunity in order to consume in excess of the income and assets actually obtained.[9]

On this point, the United States has developed several means of using homes as collateral on which to borrow. For example, the "home equity loans" is secured with the net asset value of the home (the market value of the home minus the remaining balance on the mortgage loan). Another technique is "cash out refinancing," in which an existing mortgages is refinanced at a higher value that takes account of the appreciation of housing prices since the original loan was entered into--in other words, the price increase is used to increase cash on hand. (For further details, see Box 1 "Borrowings Secured with Home Equity"). These borrowings are secured with housing assets, so the credit risk premium is kept low,[10] while income tax law allows interest payments to be deducted,[11] so

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8 While we do not go into detail on this subject in this paper, it is common to focus on the existence of government-sponsored enterprises (GSEs) in discussions of housing finance in the United States. GSEs do not make mortgage loans directly, but play an important role in the securitization of mortgage loans and indirectly contribute to the expansion of the funds supplied to the housing finance market.

9 The substitution effect and wealth effect that occur when interest rates fall make it rational for households to increase their current expenditures, but it may be difficult in practice to increase expenditures because it is difficult to borrow money (households cannot spend beyond their current income). In economic theory, this circumstance is described by saying, "The household is under liquidity constraints." Using this terminology, we can summarize the current discussion by saying, "The enhancement in household financial services, primarily in home-secured loans, has substantially alleviated the liquidity constraints to which households in the US are subject."

10 For example, comparing coupon rates on loans for the household sector based on information obtained on the Internet in early June 2002, we find that credit cards (revolving) carried a rate of

the real interest burden is significantly lower than an ordinary unsecured consumer loans. This has resulted in widespread use of these borrowing techniques.

Another significant factor is the extreme ease and low cost at which existing loans can be refinanced at lower interest rates during an easy money period. Most of the mortgages that account for the majority of household liabilities are 30 year fixed interest loans (Figure 7(1)), so while monetary easing will lower the interest for new mortgages, the lower rates do not automatically apply to existing mortgages. However, US homeowners are able to refinance their mortgages for extremely low transaction costs when the interest rates on new mortgages are declining,[12] and this structure enables falling interest rates to smoothly translate into lower interest expenses. Intense competition between lending financial institutions[13] has created a pronounced downtrend for transaction cost, which have recently fallen to as little as 0.4% of the loan value (Figure 7(2)).

3. Verification of the impact of monetary easing on household expenditures during the latest recession

In Part 2 we examined the structural changes taking place in the household sector and saw that extremely aggressive monetary easing resulted in extraordinarily strong household expenditures unprecedented in previous recessions. In this part, we verify these assertions from three perspectives: 1) the increase in demand for interest rate-sensitive goods such as homes and automobiles for which Americans have traditionally depended on borrowings, 2) the decline in interest burdens, and 3) the positive effect on consumer spending as a whole of higher asset prices, and particularly higher housing prices.

(1) Increase in interest rate-sensitive demand

One direct effect of monetary easing has been the strong demand for highly interest rate-sensitive housing. In point of fact, ever since the FRB switched to an

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13.65% and consumer loans 11.72%, while mortgages were 6.29% and home equity loans ($10,000 borrowed) were only 4.77% - 7.58%. Interest rates are therefore substantially lower for borrowings secured with homes.

11 Interest payments on ordinary consumer loans cannot be deducted from taxable income.

12 We must note the possibility that there is a surcharge in place when the borrowing interest rate is set to allow the borrower to retain an opportunity to refinance in the future (this surcharge would function as a kind of option premium).

13 Recently, television commercials and Internet advertisements by financial institutions have aggressively solicited refinancing, which provides further evidence of intensifying competition.

accommodative stance in 2001, mortgage interest rates have continued to fall and, in response to this, housing starts have remained solid (Figure 8 (1)). Demand has also increased for durable goods related to housing investment, for example, furniture and home appliances, albeit with a slight lag (Figure 8 (2)).

Automobiles are considered to be just as interest rate-sensitive as housing, and falling auto loan interest rates have produced extremely solid demand (Figure 9). Of particular note is the fact that even though there was a significant deterioration in consumer confidence after the September terrorist attack in 2001, massive time-limited sales promotions rolled out by the major automakers (i.e. "zero interest campaigns.") produced a sharp increase in automobile sales volumes, which went on to reach a historical peak.[14] While the "zero interest campaigns" were initiated as corporate strategies by some of the automakers in response to sharp drops in automobile sales right after the terrorist attack, one should also note that they were only possible because interest rates were at historically low levels already, and they can therefore be seen within the context of monetary easing and its effects, at least to a certain degree.

(2) Falling interest payments

Also important is the fact that falling interest rates significantly reduced household interest payment burdens. Lower interest payments translate into higher real disposable household income and have the effect of directly increasing spending.

For credit card loans and other variable interest liabilities, falling interest rates automatically lead to lower interest burdens. For mortgage loans, which constitute the largest portion of household liabilities, the US households uses primarily fixed interest rates, so lower official rates do not directly produce lower interest burdens, but as noted above, the refinancing process enables households to enjoy the benefits of lower interest rates. The FRB enacted large rate cuts after the September terrorist attack, which produced further reductions in mortgage rates and, in the months that

[14] When the automobile sales volume function is calculated using auto loan interest rates, income, and consumer confidence etc. as explanatory variables (Figure 10), a large reduction in interest rates can be seen to substantially boost automobile sales. Many were worried about a large backwards swing of the pendulum and a drop-off in sales in 2002 after the sales promotion campaigns concluded, and while there has indeed been some swing backwards, sales levels are still above those prior to the terrorist attack. What this indicates is not that there has not been a backlash, but that the surge in automobile sales, which have large economic spillover effects, has served to trigger a more forward-looking income cycle for the economy as a whole. In point of fact, the real GDP growth rate for the 4th quarter 2001 (seasonally adjusted annual rate) shows that automobile purchases alone, among consumer spending, added 2.5%. Household income and other fundamentals had themselves improved, and this may have hidden the backlash. The functions described above do indeed show that the adverse impact from the conclusion of the sales promotions in 2002 has been offset by improvements in income and consumer sentiment.

followed, an unprecedented surge in the number of refinancing applications (Figure 11 (1)).

Even though outstanding household liabilities (primarily mortgage balances) are rising, this ability to take advantage of falling interest rates has resulted in a rapid and significant decline in household interest payments from their peak in the July-September 2000 quarter. It also resulted in a significant decline in the debt-service burden, measured by debt payments as a percentage of disposable income (Figure 11 (2) and (3)).

(3) Wealth effect (especially, stocks and housing assets)

Sharp rate cuts by the FRB serve to boost, or at least support, household net asset values. Stocks and home assets account for a large proportion of household assets, and their prices bear out this trend. For example, housing prices experienced higher growth rates throughout the expansionary phase, and continued to grow strongly during the recession thanks to sharp rate cuts (Table 12 (1)). Our calculation of a housing price function using income and interest rates as explanatory variables indicates that the sharp reduction in interest rates combined with other factors[15] to boost housing prices (Figure 13). As a result, the total market value of real estate held by households underwent an incredible 20% rise between the end of 1999 and the end of 2001. Meanwhile, monetary easing also helped to support share prices,[16] but the economic downturn produced gloomier corporate earnings forecasts,[17] so on the whole, share prices peaked in the spring of 2000 and declined afterwards(Figure 12 (2)).

What impact have asset price trends had on household expenditures? When total assets are considered, one sees a large decline in the market value of stocks,[18] which has caused total asset values to continue to decline (Table 14) and can therefore hardly be considered to have had a positive effect on spending. On the other hand, the different nature between stocks and housing assets (described below) makes it highly likely that there are in fact different degrees to which the wealth effect is manifest for the two, and the positive wealth effect from higher housing assets likely

15 Factors other than interest rates (income, demographic factors) have also contributed significantly to housing price rises. For further discussion of demographic factors, see Section 4. (2).

16 Share prices staged a large rebound between the September terrorist attack and the beginning of 2002. Assuming that there were few other stories on which to buy directly after the terrorist attack, it is likely that the large rate cuts had a substantial positive effect.

17 Additionally, it is possible that risk premiums for exogenous risks (such as terrorist attacks) and accounting scandals have also played a part in the share price drop.

18 The market value of stocks held directly and indirectly by households rose to approximately $17.4 trillion at the end of 1999 but declined to approximately $13.0 trillion at the end of 2001 due to subsequent share price weakness, a loss of close to 26% in two years.

outweighed the negative wealth effect from declining stock prices and financial assets (the “negative wealth effect”) to result in an overall positive effect on household expenditures. As will be discussed later, this assertion can be checked statistically by separating housing assets and financial assets and examining the impact that each of these assets has on consumption expenditures.

The first point to note is that the degree of price change is smaller for housing than for stocks, so households are more apt to see the increase in asset values that comes from rising housing prices as an increase in lifetime income. They are therefore more apt to adopt a more positive stance toward spending. Increases in asset prices (and this is not just limited to housing) tend to be seen as an increase in the "wealth" held by the household and therefore increases the household spending level. How permanent the higher asset values are considered to be depends to a large extent on the degree of past fluctuations, and will naturally result in different degrees of positivity in the household spending stance. We used a fluctuation coefficient to compare the size of housing and stock price fluctuations (Figure 15), and while we cannot entirely discount the possibility that technical issues in the creation of statistics had an impact, it does appear that housing is substantially smaller. When this seems to indicate is that a rise in housing prices will more easily lead to a more positive spending stance.

The next factor to note is the fact that home ownership is more evenly distributed across income brackets. Recent (1998) household surveys allow comparisons of the income levels of households owning stocks and homes (Figure 16 (1)). Just under 70% of all US households owned their own home, and even in the lowest income categories, over 30% owned their own home, according to the surveys. The benefits from rising house prices therefore tend to be distributed evenly across all income levels. By contrast, just under 50% of all households own stocks, which is significantly lower than homes. There is also a strong concentration of ownership towards high income households, and the impact of share price fluctuations tends to be weighted towards higher income households. Research by FRB economists finds that the net increase in assets from the stock market boom of the late nineties was enjoyed primarily by higher income households (Figure 16 (2)). Obviously, it is impossible to reach macro-level generalizations on the impact of these ownership differences on household expenditures, but given the lower propensity to consume among higher income households, it is likely that, at the macro level, the impact of rising house prices would be more easily seen and would in general exhibit a positive wealth effect.

We must emphasize that both of the points made above are hypothetical, or at best good guesses. There is still a need to statistically verify the impact that the wealth effect had during the recession. We therefore calculated a consumption function that used financial assets (primarily stocks) and housing as separate explanatory variables in addition to income and consumer confidence[19] (Figure 17). We then found: 1) that changes in housing assets tend to have a larger short-term impact on household expenditures than stocks and other financial assets,[20] and 2) that during the latest recession the positive impact from an increase in housing assets was sufficient to cover the negative impact from a decrease in stocks and other financial assets.

4. Points to consider in any forecast of future household expenditures

(1) Re-examination of the "structural problems" in the US *household sector*

The discussion to this point has demonstrated that strong household expenditures during the latest recession can be seen as a positive development in that they were a factor in keeping the recession shallow. On the other hand, while strong household expenditures have been seen since the late nineties, there is a substantial decline in the savings rate and an increase in debt burdens. There is therefore a deep-seated view that strong household expenditures are actually a structural problem for the US household sector.[21] In fact, during the latest recession, many expressed their concern over the potential for a sudden and sharp rise in what were close to zero savings rates to trigger a slowdown in consumption expenditures.

We must reexamine the structural problems in the household sector in order to understand the risks surrounding future household expenditures. To jump straight to the conclusion, the declining savings rate and the increase in household debt are the result of household consumption and savings behavior that reflects the changes that have taken place in the household financial environment over the last few years, and one cannot necessarily conclude that factors for future instability are inherent in this.

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19 As previously discussed, there are significant biases in asset ownership between different income groups, and from the perspective of rigorously analyzing the impact of asset prices on household spending behavior, it would be desirable to utilize data for individual household units. However, given the difficulties involved in obtaining such data, we use data for the household sector as a whole in this verification.

20 The results from the calculations show that for housing there is a short term (one or two quarter) boost in consumption, but no such short-term effect could be confirmed for stocks and other financial assets(The parameters for financial assets do not recognize statistical significance at standard 5% significance levels). The wealth effect that occurs as the result of price fluctuations for stocks and other financial assets has a strong tendency to impact actual consumption expenditures in a more gradual form, causing a long-term change in equilibrium values for consumption expenditures rather than any short-term changes.

21 "Structural problems" for our purposes means only "latent factors for macroeconomics instability."

If anything, the structural problems in the household sector should be redefined as "an increasing dependence on the financial environment, and particularly on asset prices." This is the basic position that this paper takes.

(a) The "problem" of low savings rates

The household savings rate is published as part of the GDP statistics compiled by the US Department of Commerce (Figure 18). The savings rate was at approximately 8% until about 1990, but entered a clear downtrend around 1992, and the declines have accelerated since 1998 with a consistent rise in consumption in excess of income growth. The result of this was an average annual savings rate of 1.0% in 2000, extremely close to zero. There have been slight rises observed in subsequent years. The savings rate was 1.2% in 2001 and 2.0% between January and April 2002, but these levels are still extremely low. These statistically low savings rates are the basis from which many argue that US households spend, rather than save, almost all of the income they earn and conclude that this is a problem.

More recently, however, policy makers and private-sector economists have begun to point out technical isuues with the official savings rate statistics which, they argue, may actually understate the savings perceived by households.[22] The main issue they raise is with the treatment of capital gains due to rising asset prices. We go into some detail on the issues involved below, using the savings rate formula to identify the locus of the problems.

The official savings rate is calculated with the following formula:

$$\text{Savings rate} = \frac{\text{Amount saved}}{\text{Disposable income}} = \frac{\text{Disposable income} - \text{Expenditures}}{\text{Disposable income}} = \frac{(\text{Income - tax payments}) - \text{Expenditures}}{(\text{Income - tax payments})}$$

The first major point to be explained in this formula is that "income" does not include capital gains earned from the sale of stocks or other assets. However, "taxes" do include the taxes paid on these capital gains.

Keeping this in mind, let us consider from a general standpoint what occurs when asset prices rise and capital gains are realized. First, by definition, capital gains are not included in income. However, the taxes on capital gains are included in taxes in the formula, so both the denominator and the numerator will

[22] Chairman Greenspan of the FRB commented in testimony given to the Committee on Financial Services, U.S. House of Representatives on February 28th, 2001 that the household savings rate published by the Department of Commerce was extremely low, but he did not believe that ordinary households shared that awareness.

decrease by the amount of taxation. Obviously, the amount in the numerator is smaller, so this will reduce the savings rate, which is calculated as a proportion. In addition, it is natural to assume that the wealth effect will, to some extent, boost expenditures, so the savings rate is further reduced. Obviously, the increase in assets has added depth to the household's stores for the future, and that is why spending can increase. Therefore, this statistical movement in the savings rate--which by definition is correct--could result in a substantial misreading if superficially interpreted.

Turning to US households in the late nineties, the unprecedented stock market boom brought large capital gains which, because of the factors and circumstances described above, can be assumed to have significantly reduced the savings rate. Actually, by adding capital gains from asset sales to the GDP-based disposable income,[23] it is possible to calculate a "revised savings rate" (Figure 19) that is almost unchanged throughout the nineties.

In other words, the decline in the statistical savings rate is likely to be the result of household consumption and savings behavior that adjusts current and future consumption patterns according to increases in assets. There is no factor for future instability inherent in this itself.[24] If anything, the problem is that household expenditures have substantially increased their dependence on assets that generally have wide price fluctuations.

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[23] If households consider asset price rises sustainable and view them as increases in lifetime income, then even if the capital gains are not realized, it is fully possible that they will increase current expenditures. In this sense, it is not necessarily appropriate to limit the corrections to realized capital gains. However, it is also difficult to know exactly what portion of unrealized capital gains households consider to be permanent, so for purposes of convenience, we limit corrections to realized capital gains. In light of the fact that pension funds are carrying large unrealized profits, it is possible that the revised savings rates found in this paper still contain a "downward bias."

[24] One could argue that even the revised savings rate calculated in this paper is low from a standard or international perspective, certainly from a Japanese perspective. This paper does not concern itself with whether the savings rate is high or low in comparison to other countries. It merely wishes to point out that it may not be appropriate to point to what is an ostensibly low household savings rate and conclude that the household sector has "gone overboard." In other words, the reasons that normally motivate households to save are: 1) provisions for future payments such as children's education or retirement; 2) provisions for emergencies; and 3) provisions for children's inheritances. When households are in different circumstances in different countries, the savings rate that results from rational decisions made by these households will also be different. For example, countries that have strong public pension systems reduce the uncertainties of retirement and therefore may have lower household savings rates in comparison to countries with less favorable pension systems. People who live in countries with better insurance and financial services are able to raise funds more cheaply and dynamically than those in less advanced countries, and will naturally require less in the way of emergency savings. In addition, countries that continue to see improvements in fiscal balances (expanding surpluses or contracting deficits) will have less anxieties over future tax hikes and may therefore see a decline in savings to provide for tax burdens in comparison with countries where such improvements are not seen (the "Barro-Ricardo equivalence theorem").

(b) The problem of "over-indebtedness"

Along with the low savings rate, the other household structural problem most commonly pointed to is the historically high debt burden. The clearest indication of this comes from the household debt-service burdens statistics that are published quarterly by the FRB. One can see (Figure 20 (1)) that debt started to increase in the mid-nineties and is closing in on the highest levels ever seen since the statistics began being kept (in the first quarter of 1980).

But here again we must emphasize that there is not necessarily any factor for instability in the size of the statistical debt burden itself.

First, the major factor in the increase in debt was the consistent rise in the home ownership rate throughout the late nineties (Figure 20 (2)). In other words, it was an increase in housing assets rather than an increase in consumption for which nothing remains at the time of repayment. Breaking down the increase in household loan burdens into mortgages (home loans) and consumer loans (Figure 20 (3)), one finds that mortgage loans account for virtually all of the increased debt burden. Therefore, the current statistically high debt burden must be seen in the context of asset creation in the form of home acquisition. Both the asset and liability sides of the balance sheet are expanding, and this is a point that should not be forgotten. As already described, the prices of the housing assets that secure loans are being maintained at the current point in time, so the size of the debt itself is not necessarily a problem.

Another statistical issue is the fact that, by definition, it is not reflected by a corresponding decline in the rent payment burden because of the rise in the home ownership rate. For example, let's assume that a household spending $500 a month on rent buys a home and pays that same $500 a month for its mortgage. If income is unchanged during this time, the essential burden on the household will basically be unchanged. However, the statistics do not take account of the elimination of the rent burden. They only reflect the generation of a mortgage interest payment burden in conjunction with the house purchase, and therefore show the debt burden as rising. If one calculates tentatively a more broadly defined housing-related debt burden that takes account of changes in rent payment burdens (Figure 21), the debt burden clearly does not rise as much as the official statistics would suggest.

In light of this, it would be hasty to conclude that the statistical debt burden level is itself a problem. Rather, the problem is that the housing that generated the debt is subject to unforeseeable price fluctuations after purchase due to

interest rate and supply and demand trends, even if these fluctuations are not as pronounced as those experienced by stocks and other marketable financial assets.

(2) The main risks for household expenditures in the future

The structural problems that have traditionally been identified for the US household sector can be redefined as "the increasing dependence of household expenditures on the financial environment, and particularly on asset prices." This indicates that the main risk for future household expenditures is that the positive role played by assets during the latest recession will be reversed by future financial conditions so that the high degree of dependence of household sector on the financial environment will result in increased vulnerability in household expenditures.[25]

From this perspective, one point of concern is the weakness of stock prices. Much of the recent share price weakness is due to downward revisions in the medium and long-term growth prospects for corporate earnings prompted by the collapse of the "IT bubble" in the spring of 2000. To this has recently been added a rising risk premium prompted by corporate accounting scandals (Figure 22). If current government and business efforts to address the latter are to be successful, the risk premium can be expected to decline, which will then increase share prices, but the medium and long-term corporate earnings prospects are unlikely to improve to the point that they are able to produce substantial share price gains. If the share price weakness is prolonged and the "negative wealth effect" strengthens, then there is an undeniable potential for the overall wealth effect to push consumption down even if housing prices retain their current strength.

Meanwhile, we should also note that demographic factors have been working in favor of housing prices. Both the US population and the number of households have been growing in recent years, in part thanks to a constant flow of immigrants. Added to this is the fact that the "postwar baby boom generation" (born between 1946-1964) is now in the age groups (35-54) in which home ownership is rising greatly

[25] Others also point out the risk of a large stock correction for housing and durable goods (automobiles etc.) which have exhibited such strength in the latest recession. For housing, this paper would argue, as it did in the discussion of prices, that demographic factors have created structural rises in the ownership rate that will alleviate stock correction pressures. For automobiles, we also note several factors that may alleviate stock correction pressures. For example, 1) immigration and other factors have caused an increase in the licensed driver growth rate (demographic factor) and 2) since the mid-nineties, consumer preferences have shifted to sports utility vehicles (SUVs), which have shorter usable lives and this has shortened the average usable life of automobiles (which will in turn increase the frequency of renewals). (For details see Box 2 "Automobile Stock Cycles in the United States.") Therefore, this paper does not consider stock correction pressures as a clear risk to household expenditures.

(Figure 23). If it is correct to assume that these structural "pluses" have combined with more cyclical factors like falling mortgage rates and increasing income, then it is not appropriate to conclude that a large "bubble" has formed. Housing inventories indicate that there is no problem in the supply and demand balance in the current housing markets, and the economic sentiment among home builders remains positive to this date(Figure 24), so at least over the short term there is little fear of a large drop in housing prices.

However, in the function discussed above (Figure 13), there are aspects that cannot be fully explained by interest rate and income factors. One might assume that the demographic factors just described account for a large portion of this, but that does not completely eliminate the potential for bubble-like elements to be at work, so it is impossible to tell whether housing prices will maintain a steady growth tenor in the future. If reduced expectations were to bring about a change in housing prices--this has much in common with the discussion of share prices above--asset owners would intensify their efforts to sell their assets at the highest possible price, which would undermine the supply and demand balance, spurring further reductions in expectations and drops in asset prices, and plunging households into a "downward spiral."

Future interest rate rises are also a cause for concern. In Parts 2 and 3 we examined the mechanism by which falling interest rates had a positive effect on household expenditures. If this mechanism works in reverse, there would be a negative impact on household expenditures because: 1) interest rate-sensitive demand would decline; 2) household interest burdens would increase;[26] and 3) the "negative wealth effect" would come into play. Assuming the structural changes in household balance sheet described above, it is likely that the negative effect would be significantly larger than in past rising interest scenarios. Obviously, if the rise in interest rates is commensurate to the degree of economic recovery, it would be backed by stronger corporate earnings and household income, and it could therefore be argued that the negative wealth effect and higher interest burdens from rising interest rates would not have a substantial impact on household expenditures. However, when money is tightened in response to latent inflationary risk, interest rates can often be hiked at a faster pace than that of economic recovery itself. In addition, one cannot fully deny

[26] Given the fact that most household liabilities take the form of fixed interest rate mortgages, rising interest rates do not immediately result in rising interest burdens for households. However, burdens will increase for floating-rate liabilities, and even for fixed-rate liabilities there will be an increase in burdens from new contracts. There is therefore some cause for concern that the reduction in interest payments that supported consumption expenditures during the latest recession may eventually be eliminated.

the potential for a large and unforeseen correction in asset prices during a tight money period that comes after a period of historically low interest rates such as has been experienced. We must therefore note the potential for a tight money period to cause a rapid slowdown in household expenditures, a fall in asset prices, a rise in liability burdens and a rapid and general deterioration in household balance sheets.

The general view is that the US economy will continue to experience a modest recovery, but this view assumes that household expenditures will maintain their strength. A prolonged stock market correction, falling housing prices, a sharp rise in long-term interest rates, or a significant deterioration in the financial environment could render households unable to maintain the "low savings rate/high debt" behavior that was a rational choice in a more favorable financial environment, and this would risk triggering an even larger correction in the form of a sharp decline in the propensity to consume and a sharp rise in the savings rate. It therefore behooves us to consider what would happen if these risks were realized. What changes would be seen in external balances and fiscal balances as a result of changes in the US household sector and the resulting movements on the capital markets? What impact would this correction have on the world economy as a whole? Strong household expenditures support both the US economy and the world economy and must therefore be watched carefully in the future.

Box 1: Borrowings Secured with Home Equity

The paper notes that the US has developed many techniques for using housing to secure low-interest loans, and observes that this made substantial contributions to weakening the liquidity constraints on households.[1]

There are two main kinds of borrowings secured with housing assets: 1) "cash out refinancing," in which an existing mortgages is refinanced at a higher value that takes account of the appreciation of housing prices since the original loan was entered into--in other words, the price increase is used to increase cash on hand; and 2) "home equity loans" which are secured with the net asset value of the home (the market value of the home minus the remaining balance on the mortgage loan).

(1) Cashing out when refinancing existing mortgage loans

In the United States it is possible to enjoy the benefits from price rises after the original loan by adding them to the outstanding principal--in other words, by increasing cash on hand. This is called "cash out refinancing." The table below provides an example that explains how this works.

Example of cash out refinancing

	Before refinancing	After refinancing	
Appraised value of owned home (A)	$200,000		
Balance remaining on mortgage (B)	$90,000		$100,000
		Of which, net refinanced portion	$90,000
		Of which, cashed out portion	$10,000
Net asset value = (A) – (B)	$110,000	$100,000	
Mortgage interest	8%	7%	

Mortgage refinancing has been prominent since 2001, and in addition to the simple refinancing to reduce interest burdens, there has also been an increase in "cash out" refinancing that takes advantage of strong housing prices.[2] The Federal Loan Mortgage Corp. (Freddie Mac) publishes a quarterly survey that shows a large

[1] While this form of home financing is relatively unfamiliar in Japan, it is not at all unusual in Europe and North America, and particularly in English-speaking countries. In addition to the US practices discussed in the paper, the UK has a similar scheme referred to as "Mortgage Equity Withdrawal (MEW)" that has become increasingly common in recent years.

[2] Refinancing that intends only to reduce interest burdens ("interest burden reduction" refinancing) does not, in all probability, occur during periods of rising interest rate. However, we must note that "cash out" refinancing may indeed occur when interest rates are rising.

reduction in average loan interest rates due to refinancing since 2001. That may be obvious, but it also shows that the majority of households refinancing a mortgage increased the outstanding balance on the loan by more than 5% (Figure Box 1-1).

Statistical constraints make it difficult to accurately capture in monetary terms the size of the "cash out" during the latest easy money period, but judging from experience one can assume that the impact is not insignificant. For example, a mortgage refinancing survey conducted by the FRB in 1998 and early 1999 found that a little under 40% of the households who refinanced mortgages engaged in some form of cashing out and that the average cash out per refinancing was $18,240 (median value of $10,000). One can therefore calculate the macro-level cash out as roughly $54.5 billion. This is not a small amount in comparison to the increase in consumer loans ($75.0 billion) during the same period (1998). Given the fact that mortgage refinancing applications were higher during the latest period than they were in 1998-1999, the macro-level size of the cash out is in all likelihood higher as well.

(2) Home equity loans

It is also possible to take out a new loan against net home equity (the market value of the home minus remaining mortgage balance) without refinancing an existing loan. These loans are called "home equity loans."

There are two different varieties of home equity loans: 1) the traditional type that provides one loan per contract, 2) a "credit line" type that only sets a credit limit and allows borrowing as necessary within that limit.[3] The table below shows an example of how this works.

Example of home equity loans

	Before	After
Appraised value of owned home (A)	$200,000	
Outstanding mortgage balance (B)	$90,000	$90,000
Home equity loan balance (C)	$0	$10,000
Net asset value = (A) – (B) – (C)	$110,000	$100,000

[3] A study of the interest rates applied indicates that for the former, traditional type, it will most likely be fixed interest as it would be with the first mortgage loan, while for the latter "credit line" type it will probably be floating interest (prime rate-linked). Credit lines use a "revolving" system that makes it easy to increase borrowings when necessary. Convenience is further enhanced by the use of ATM cards to make withdrawals and the ability to write checks against the credit line. (However, in many cases there are also minimum borrowing requirements, so this arrangement is not suited to small payments.)

Since 1995, outstanding home equity loan values have risen almost exactly on par with the increase in the net asset values of housing. Thanks to this strong increase, the outstanding balance at the end of 2001 was approximately triple what was a decade earlier (Figure Box 1-2), and the percentage of total consumer loans accounted for by home equity loans[4] is also rising. Growth has been particularly strong over the past few years for "credit line" loans because of their convenience and flexibility. Each term, households use these loans to liquidate approximately 2-3% of their net assets. The cumulative effect has been to liquidate approximately 10% of the net asset value of household-owned housing. (Figure Box 1-3).

[4] We do not include the "refinancing cash out value" because of statistical constrains, even though it is of a similar nature.

Box 2: Automobile Stock Cycles in the United States

The US auto market has traditionally been seen as a "matured market," and the prolonged high sales levels experienced since the late nineties have been greeted with deep-set caution and warnings that "from the perspective of the medium term stock cycle, considerable correction pressures are accumulating that could at some point result in a pronounced slowdown." Figure Box 2-1 (1) provides a conceptual diagram of the automobile stock cycle. One can see that until the early nineties the US auto market did indeed exhibit the classical signs of "maturation," with declining growth rates for automobile demand and a declining ratio of flow (number of automobiles sold each year) to stock (number of automobiles owned). If we assume that these trends have continued until recently, then there is indeed a considerably large latent stock correction pressure that has built up (downward pressure on the "flow side" sales volume). If this is true, then in addition to the income and interest rate trends discussed in the body of this paper, one must also add a stock correction for automobile sales at some point in the future and the risk of declining demand as a result.

However, if one takes a slightly longer-term view of automobile sales trends, one finds that after the rapid growth in sales volumes in the late nineties to 2000, there was a slight slowdown in 2001 and 2002, but generally high levels have been maintained. This could be interpreted one of two ways: either "large stock correction pressures have not yet resulted in a full-fledged correction" or "stock correction pressures were not as large as originally thought due to some structural change in the automobile market." It is difficult to offer a definitive conclusion as to which of these is the main factor. However, if one examines the individual factors that define the automobile stock cycle--specifically, 1) the depreciation rate, 2) the licensed drivers growth rate, and 3) the ownership rate (number of vehicles owned per licensed driver) growth rate--then there is a strong possibility that structural changes occurred[5] sometime around the mid-nineties that, at the very least, alleviated some of the stock correction pressures or, in other words, increased the medium-term growth potential for automobile demand (Figures Box 2-1 (2) and 2-2).

(1) Depreciation rate

The depreciation rate was in a downtrend up until the early nineties because of improvements in automobile performance. This had the effect of extending the

[5] In terms of the stock cycle diagram, the structural changes are a shift in the axis of the cycle back to the upper right. This is essentially a "rejuvenation" in which the automobile demand growth rate is rising so that the ratio of flow (annual sales volumes) to stock (owned vehicles) increases.

renewal cycle, which had a correspondingly negative impact on the medium-term growth potential for automobile demand.

However, changes in consumer preferences in the late nineties have resulted in a shift in demand away from vehicles with longer years of useful life towards more shorter-lived sports utility vehicles (SUVs) and recreational vehicles. The average depreciation rate has increased by a corresponding amount (so that automobiles are, on average, removed more quickly). The effect of this will be to boost the medium-term growth potential for automobile demand.

(2) Licensed drivers growth rate

Immigration and an increase in the young and middle-aged age groups caused the number of licensed drivers to increase in the late nineties. This will have the effect of boosting the medium-term growth potential for automobile demand

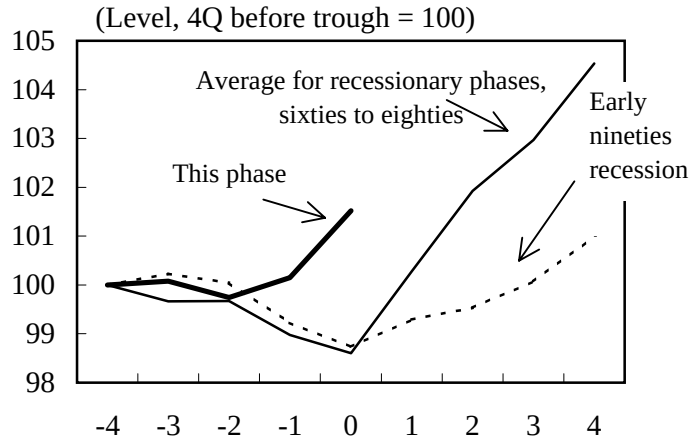
(3) Ownership rate (number of vehicles owned per licensed driver) growth rate

Ownership rates have risen since the late nineties and serve to boost medium-term growth potential for automobile demand.

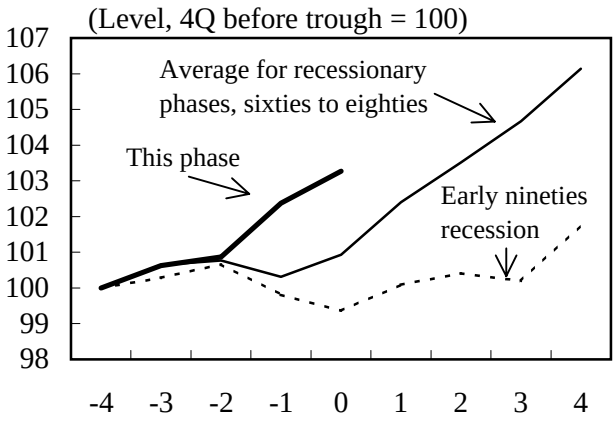
(Figure 1)

Characteristics of the latest recession: Comparison to previous recessions

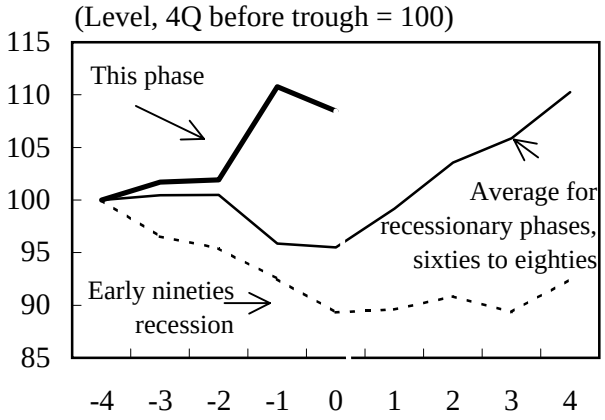
(1) Real GDP



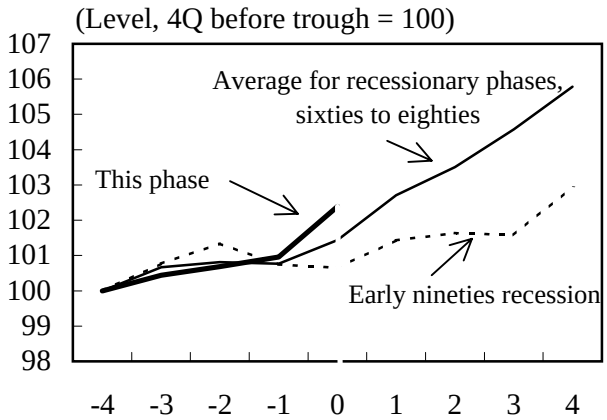
(2) Consumption expenditures



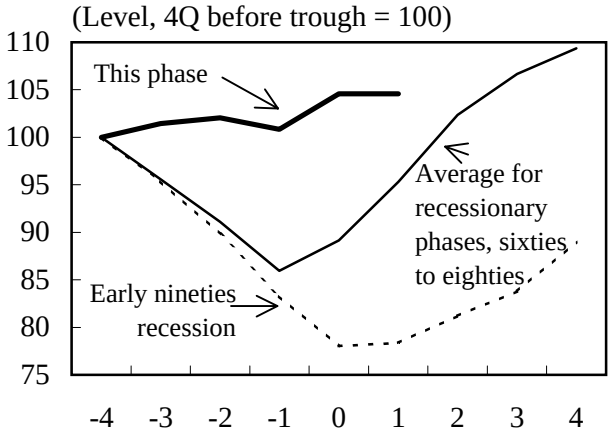
Of which, durable goods



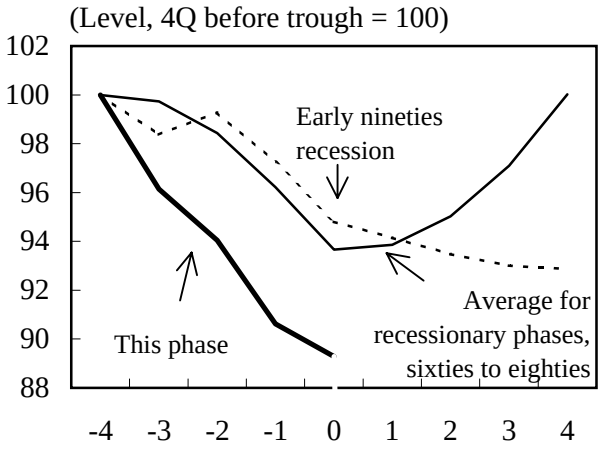
Of which, consumption other than durable goods



(3) Housing investment



(4) Capital investment



Notes: 1 Trough shown by "0." This phase is set as "2002/1Q" because the NBER (National Bureau of Economic Research) had not yet determined a turning point for the next phase.

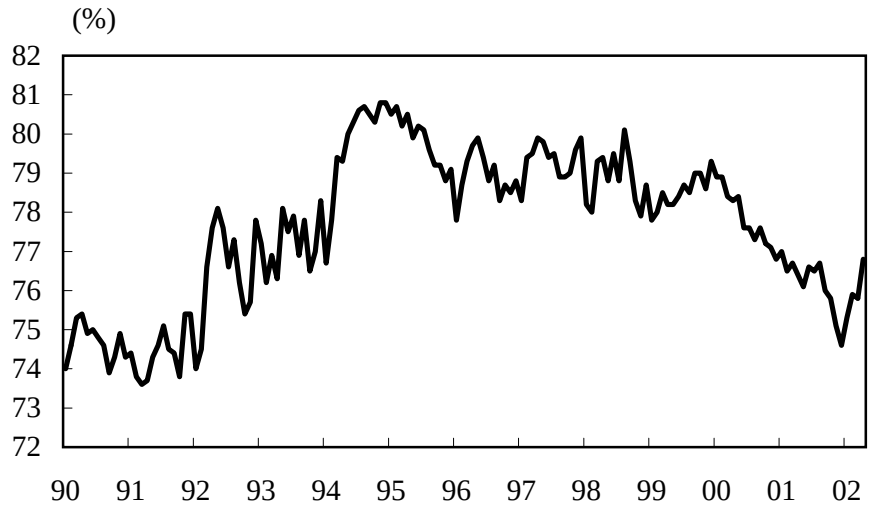
2 The figures take the level 1 year prior to the trough as 100 and follow the levels of demand factors during the recession and initial recovery.

Source: Department of Commerce Bureau of Economic Analysis

(Figure 2)

Dependence on borrowings for housing and automobile purchases

(1) Dependence on borrowings for housing purchases



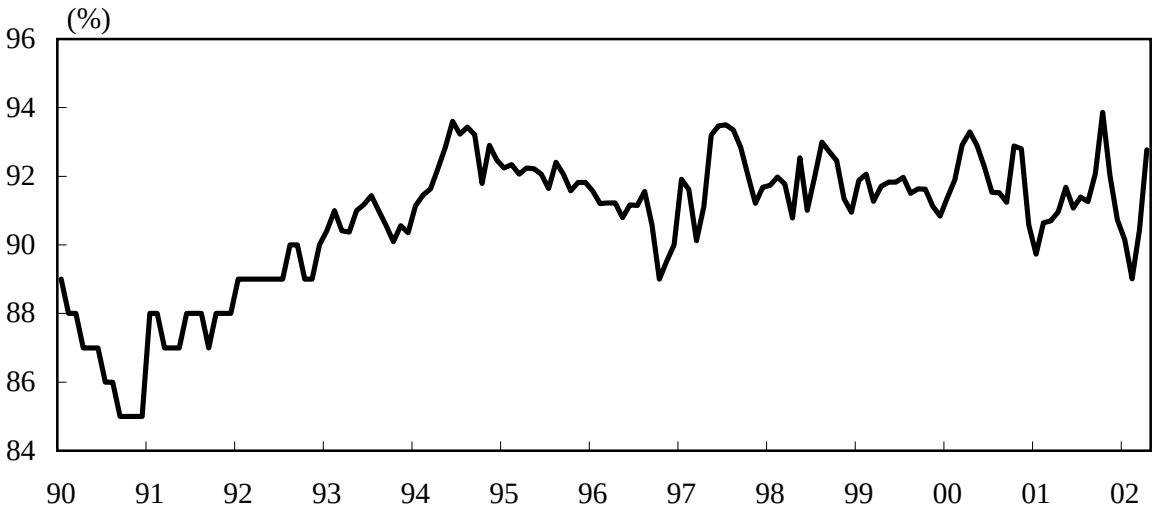
Source: FHLMC (Federal Home Loan Mortgage Corp.)

Reference: Japan

FY	Dependence on outside funding
8	60.9
9	60.5
10	58.7
11	63.6
12	61.9

Source: Ministry of Land, Infrastructure and Transport, "Survey of Private Home Construction Funding"

(2) Dependence on borrowings for automobile purchases



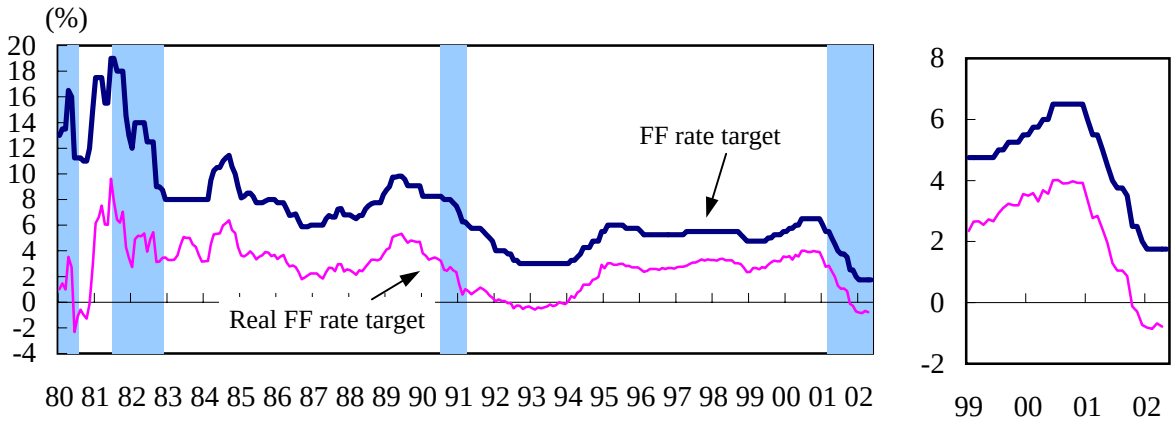
Note: Dependence on borrowings calculated as borrowed funds/purchase price.

Source: FRB

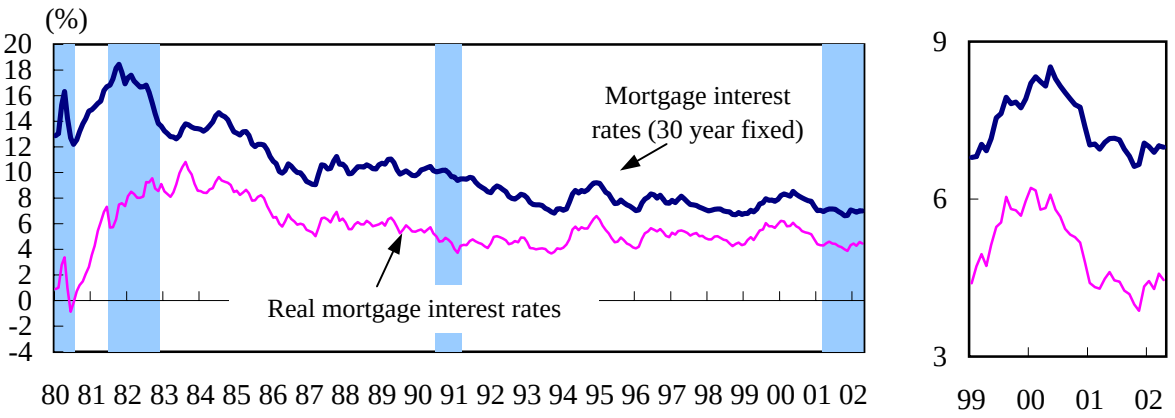
(Figure 3)

Major interest rate movements

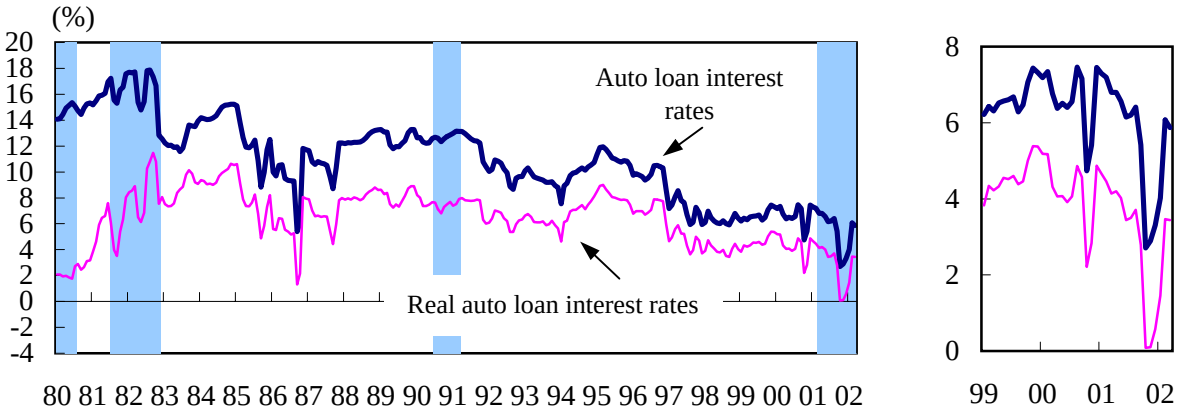
(1) FF rate targets



(2) Mortgage interest rates



(3) Auto loan interest rates



Notes: 1 Real interest rates are nominal interest rates deflated for the CPI core (excluding energy and food).

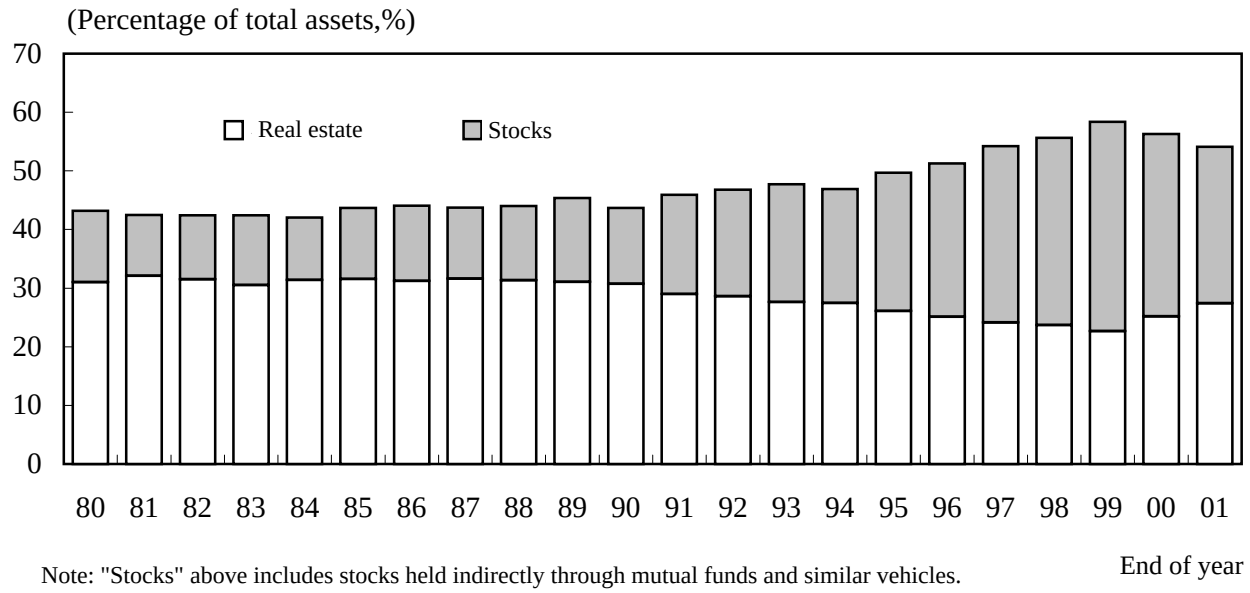
2 Recessionary periods shown by shadows.

Source: FRB

(Figure 4)

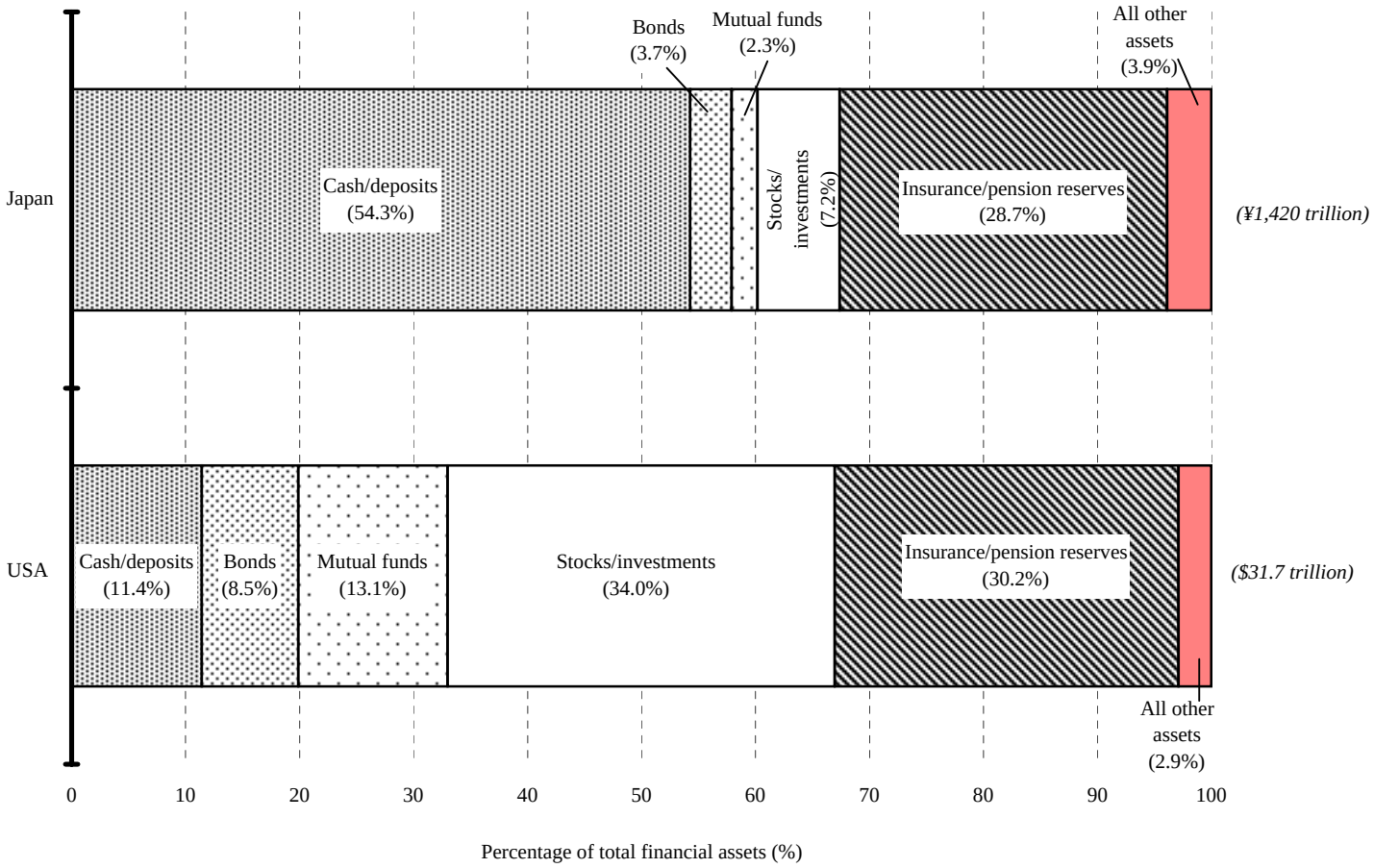
U.S. household balance sheet characteristics (1): Rising weight of stocks and housing etc.

(1) Percentage of total household assets accounted for by housing and stocks



Note: "Stocks" above includes stocks held indirectly through mutual funds and similar vehicles.

(2) U.S.-Japan comparison of household financial assets (end of 2001)

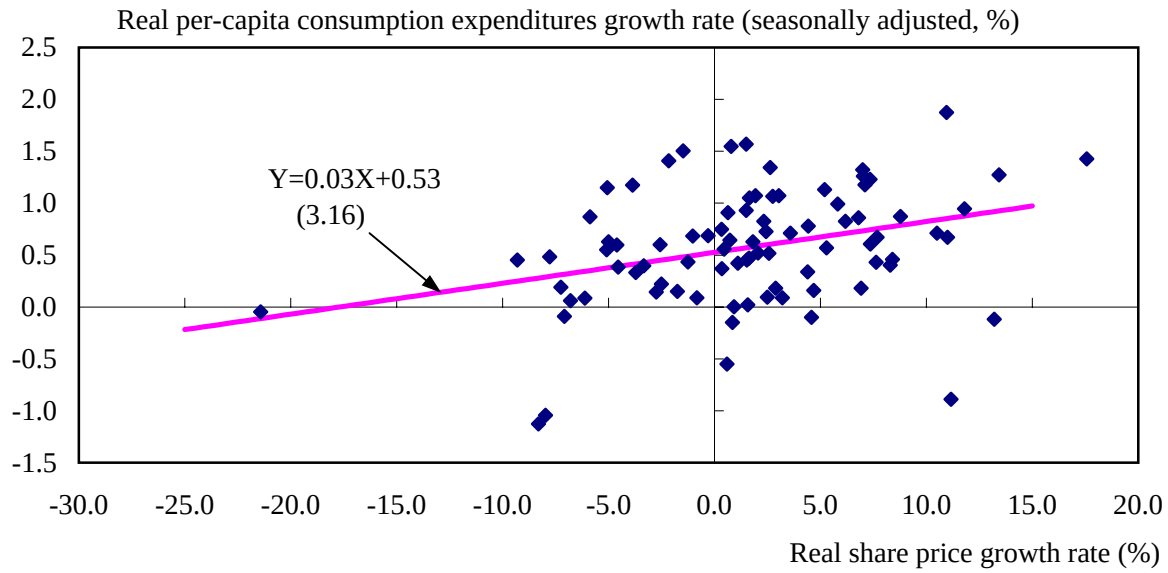


Note: U.S. stock ownership in (2) is direct ownership only.
Source: FRB for USA; BOJ for Japan.

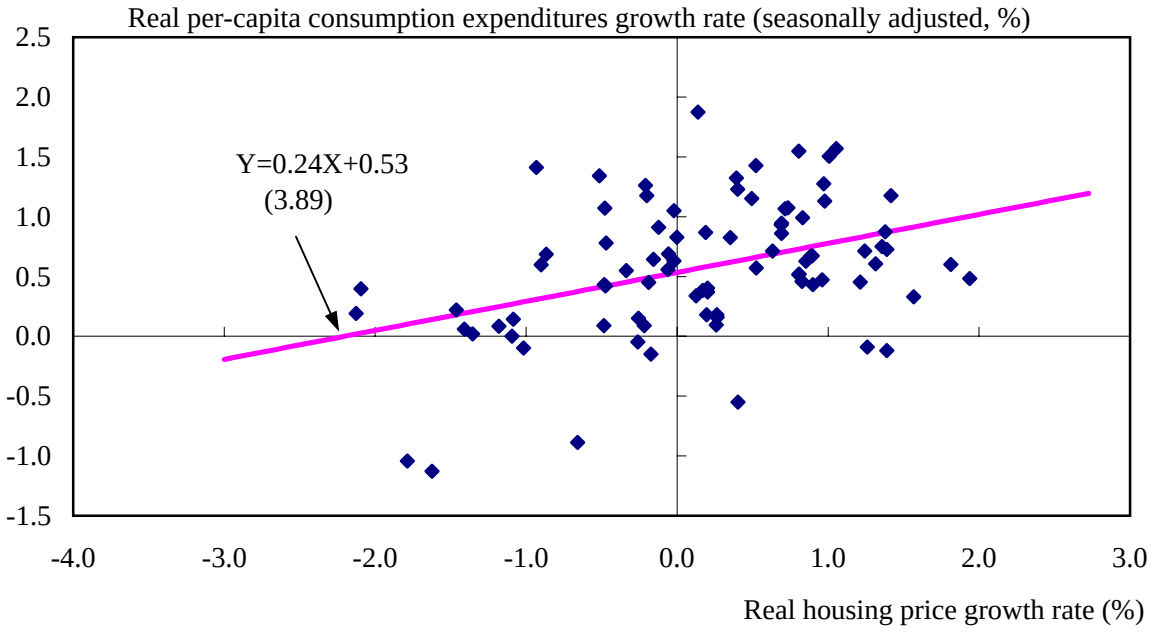
(Figure 5)

Relationship between asset prices and household expenditures

(1) Share price growth rate (Wilshire 5000 Index) and consumption expenditures



(2) Housing prices and consumption expenditures



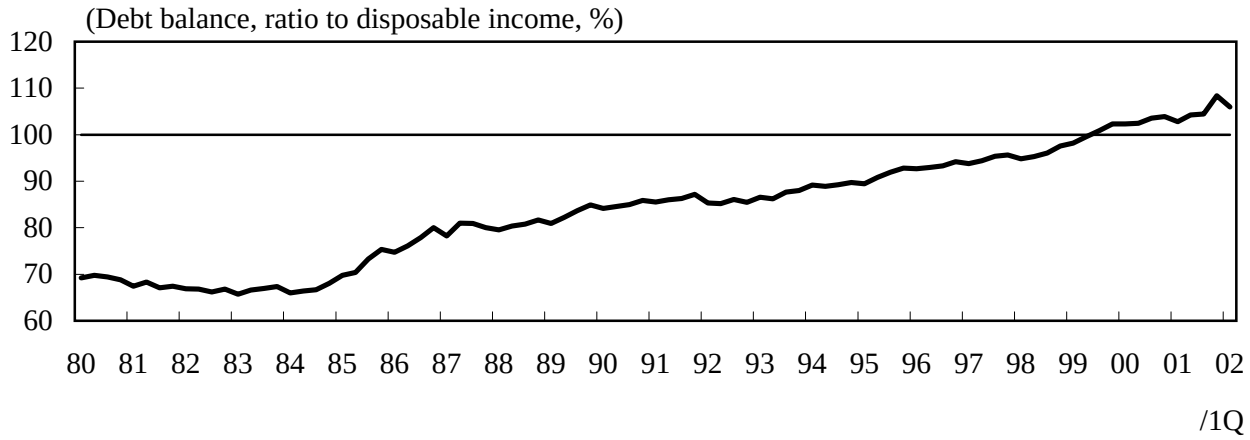
Notes: 1 Period analyzed: 1981/1Q - 2002/1Q.
2 Real share prices and real housing prices are deflated for the CPI core.
3 The parenthetical values in the formulas within the graph are t values.

Source: For share prices, Datastream; for housing prices, Office of Federal Housing Enterprise Oversight; for CPI, Department of Labor; for consumption expenditures and housing investments, Department of Commerce Bureau of Economic Analysis.

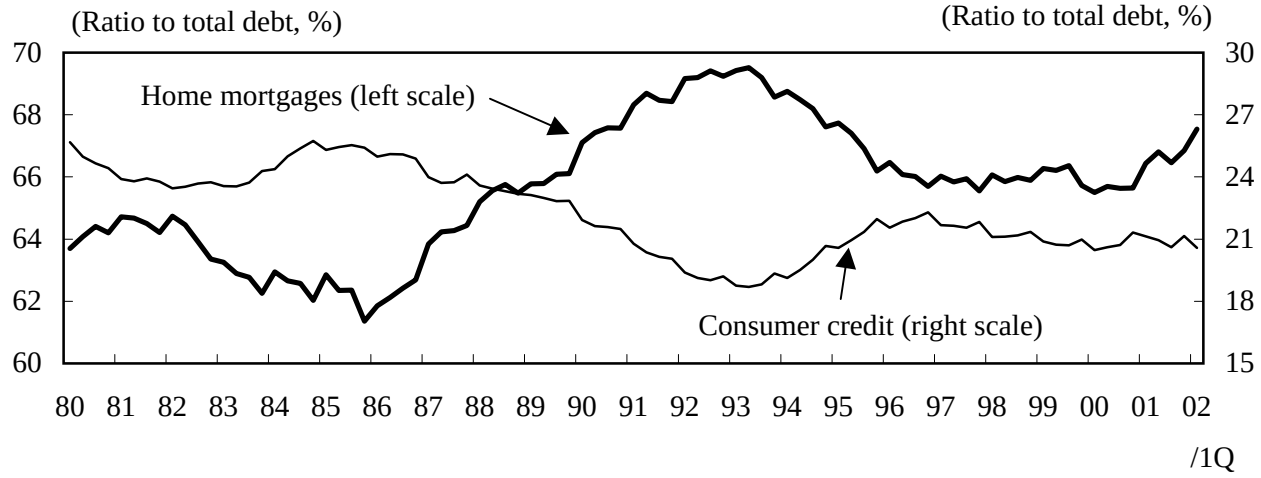
(Figure 6)

U.S. household balance sheet characteristics (2): Rising indebtedness

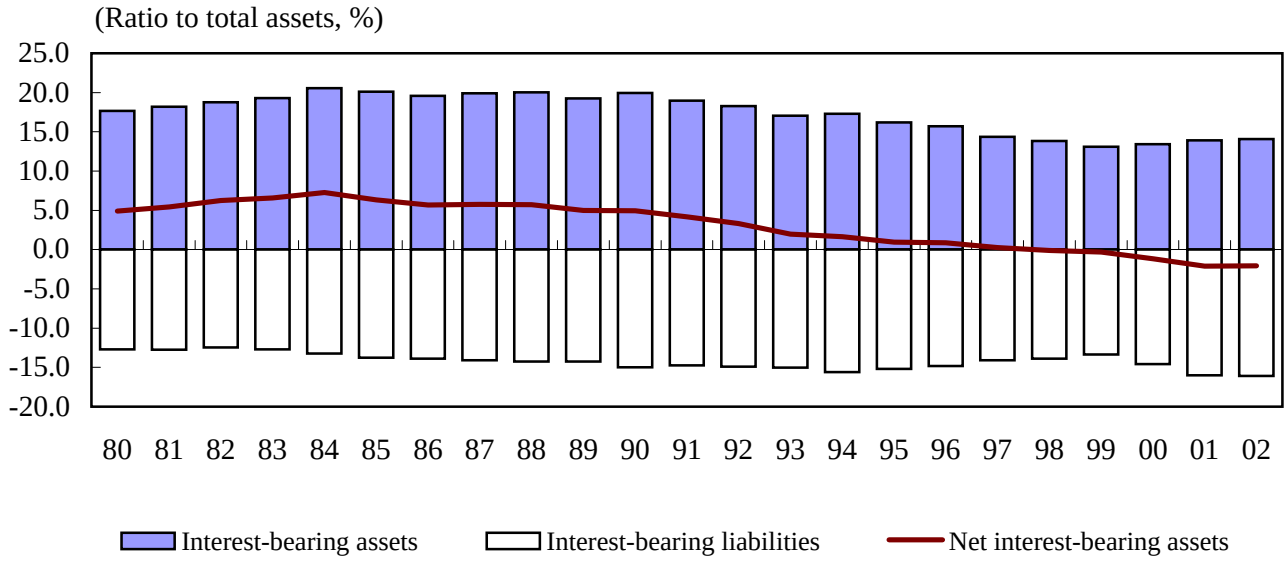
(1) Debt balance (ratio to disposable income)



(2) Break down of debt



(3) Weight of interest-bearing assets and liabilities in household balance sheets

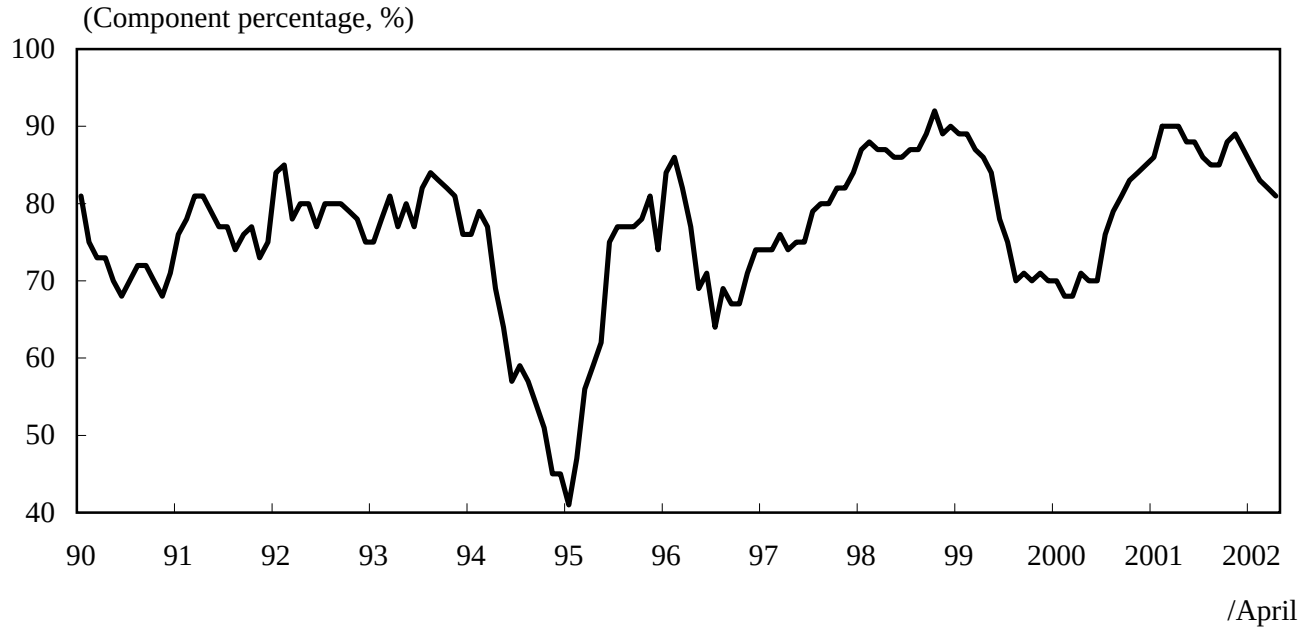


Note: 1Q values used for 2002.
Source: FRB

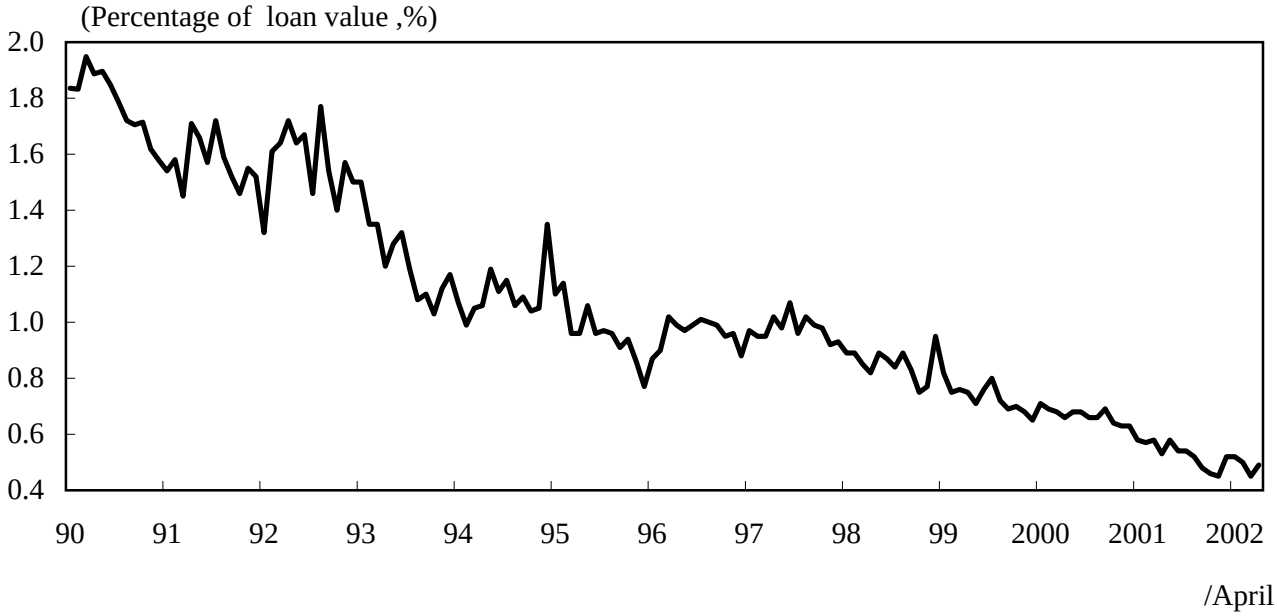
(Figure 7)

Fixed interest mortgage loans and refinancing fees

(1) Percentage of fixed interest loans in new mortgages



(2) Mortgage transaction fees

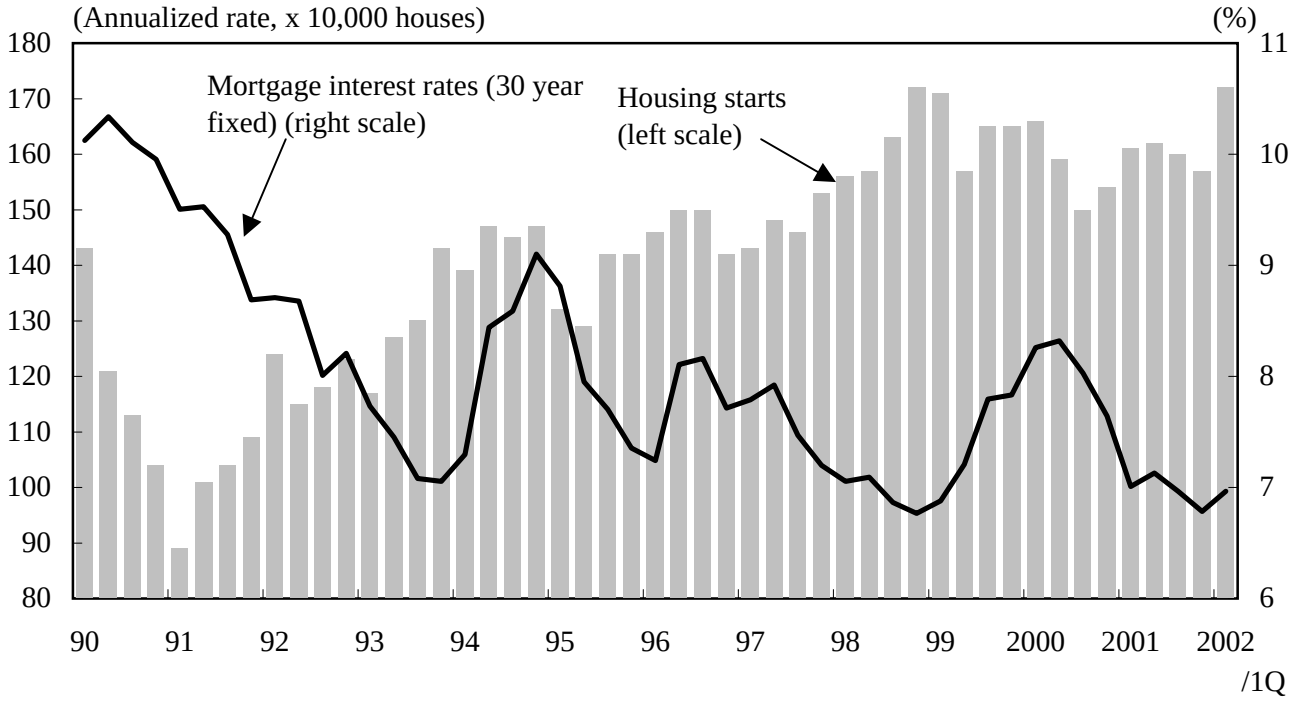


Source: Federal Housing Finance Board

(Figure 8)

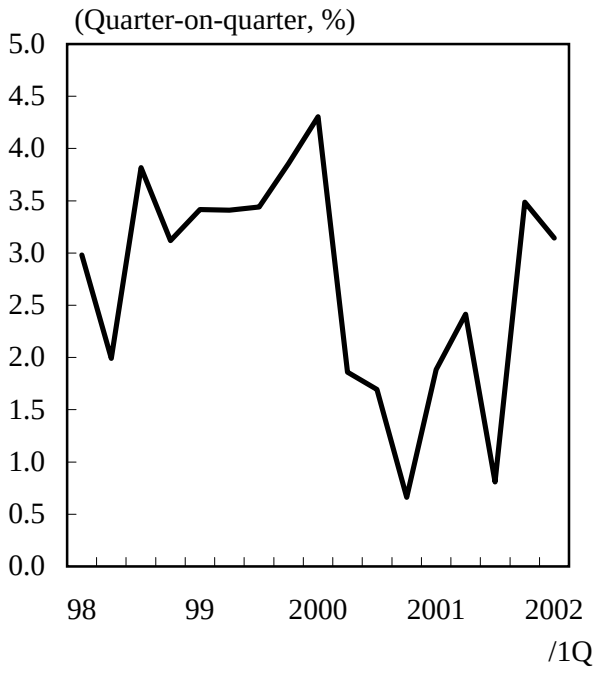
Housing and housing-related durable goods demand trends

(1) Mortgage interest rates and housing starts

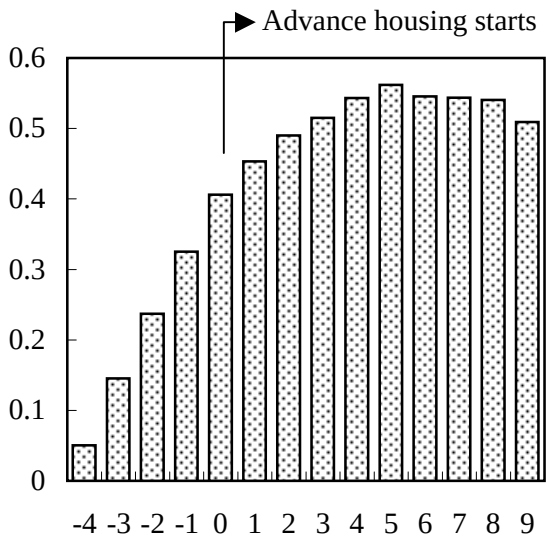


Source: For housing starts, Department of Commerce Census Bureau ; for interest rates, FRB.

(2) Housing-related durable goods consumption (furniture, home appliances etc.)



Time correlation between housing-related durable goods consumption and housing starts



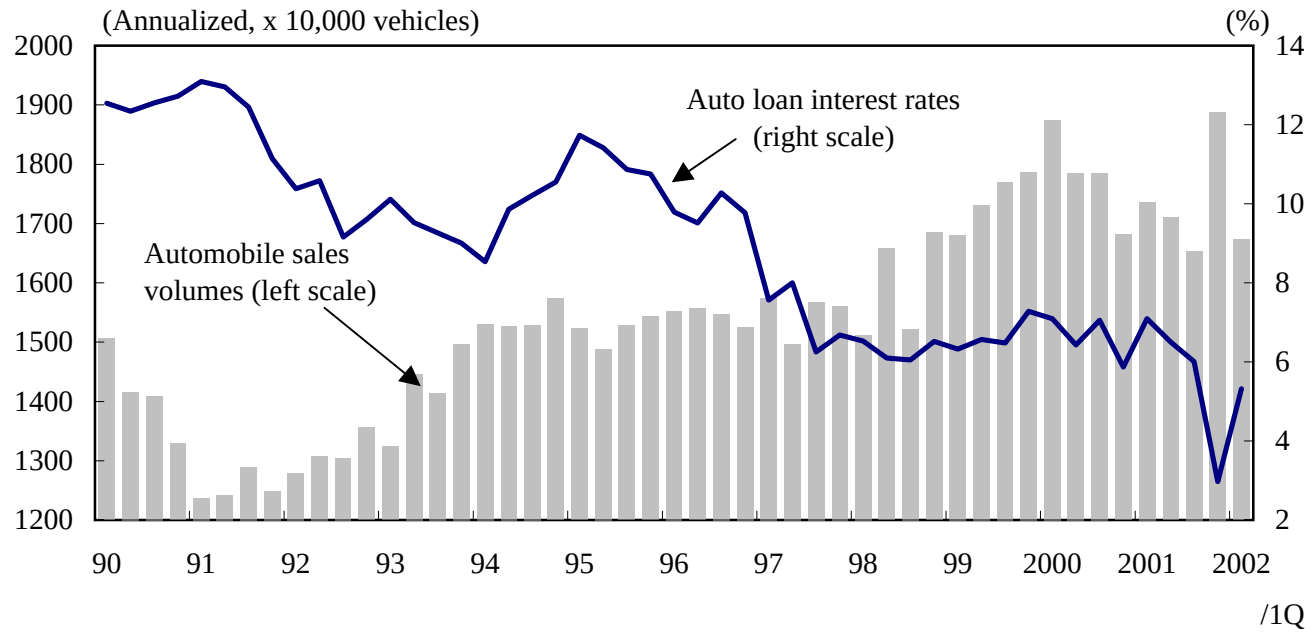
Note: Monthly, year-on-year basis.

Source: Department of Commerce Bureau of Economic Analysis

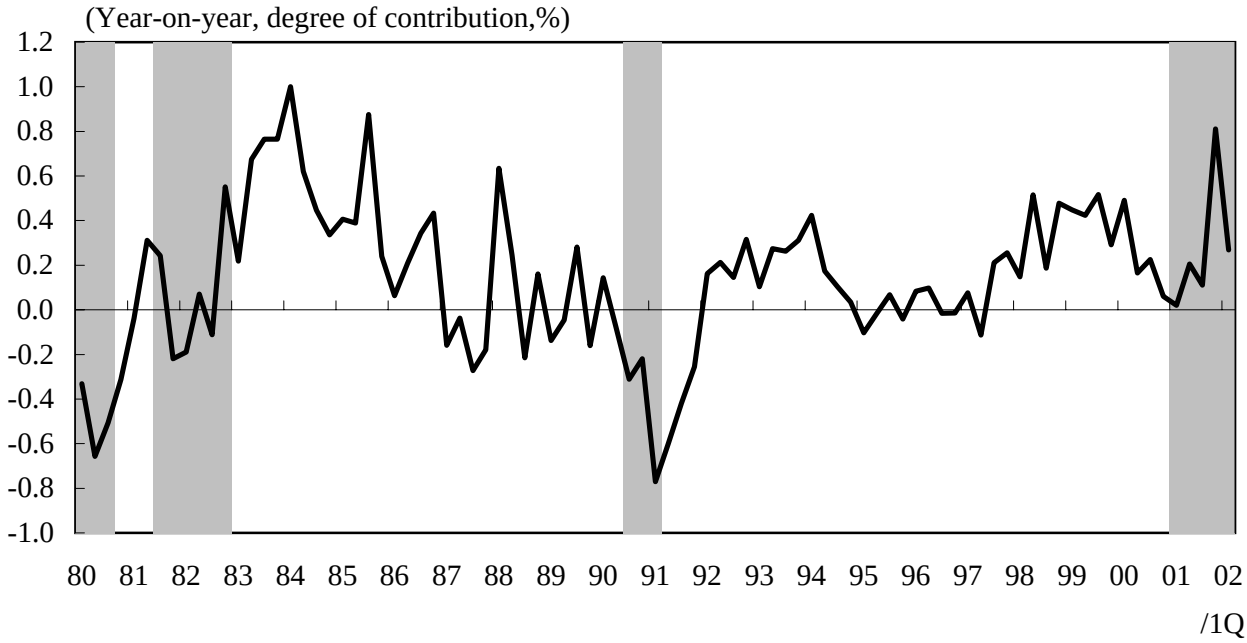
(Figure 9)

Automobile sales

(1) Automobile sales and auto loan interest rates



(2) Contribution of auto sales (consumer spending) to real GDP



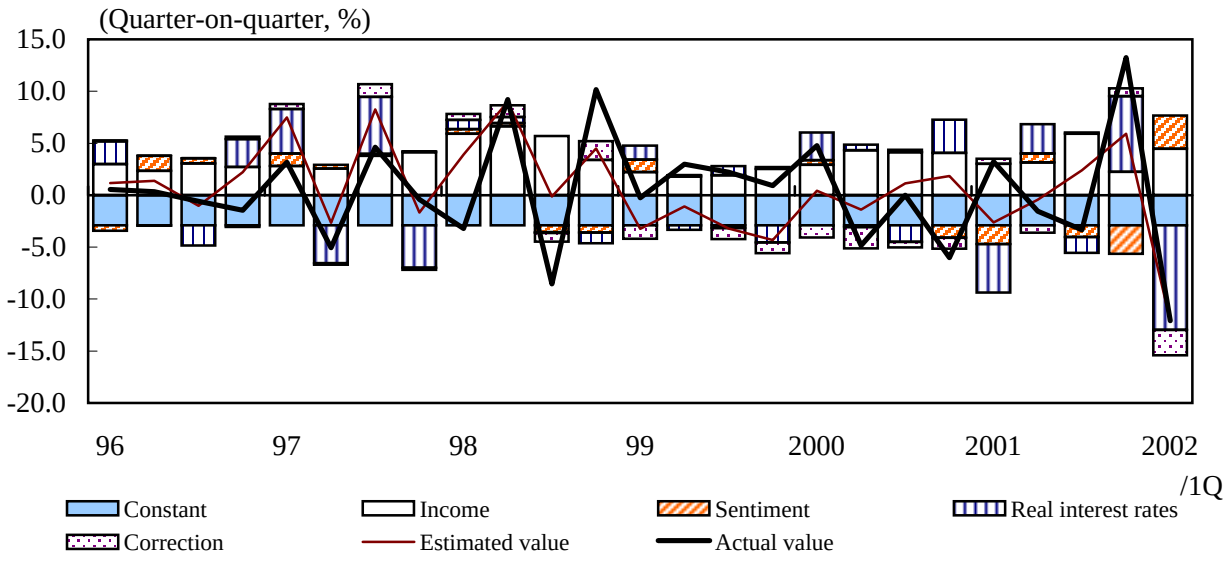
Note: Recessionary periods shown by shadows.

Source: FRB for all interest rates; Department of Commerce for automobile sales volumes.

(Figure 10)

Automobile sales volumes function and factor analysis

(1) Automobile sales volume function (Error Correction Model)

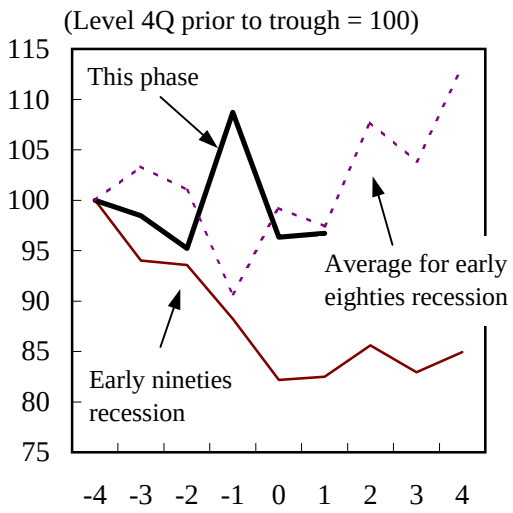


△Automobile Sales volume = -0.041+1.571*△Real disposable income + 2.350*△Real disposable income (-1)
(-3.817) (2.230) (3.478)
+1.794* △Real disposable income (-2) +0.153* △Confidence index -0.024* Real auto loan interest rates
(2.512) (2.921) (-4.814)
-0.209*(Automobile sales volume -0.482 *Real disposable income -3.188) (-1)
(-3.884) (8.126) (6.328)
-0.401*△Automobile sales volume (-1)
(-4.919)

Calculation period: 79/1~2002/1Q, Values in parentheses: t values,
Adj-R^2:0.484,DW:2.085,Durbin's h:-0.665

Notes: 1 Logarithmic values used for automobile sales volumes, income and confidence in the calculation.
2 The calculation of the error correction model satisfies the prior test normally required (results omitted).
3 Lag of the dependent varualble (△ automobile sales volume (-1)) contribution is broken down for each explanatory variable through the 12th term.

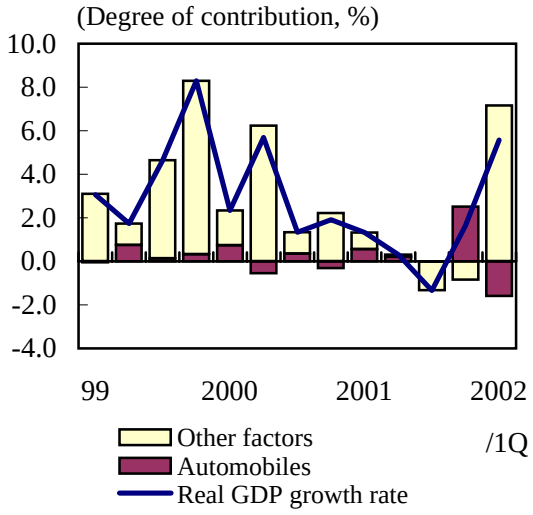
(2) Comparison of automobile sales volumes in different economic phases



Note: Trough shown by "0." This phase is set as "2002/1Q" because the NBER (National Bureau of Economic Research) had not yet determined a turning point for this phase.

Source: Department of Commerce Bureau of Economic Analysis

(3) Contribution of automobile demand to real GDP

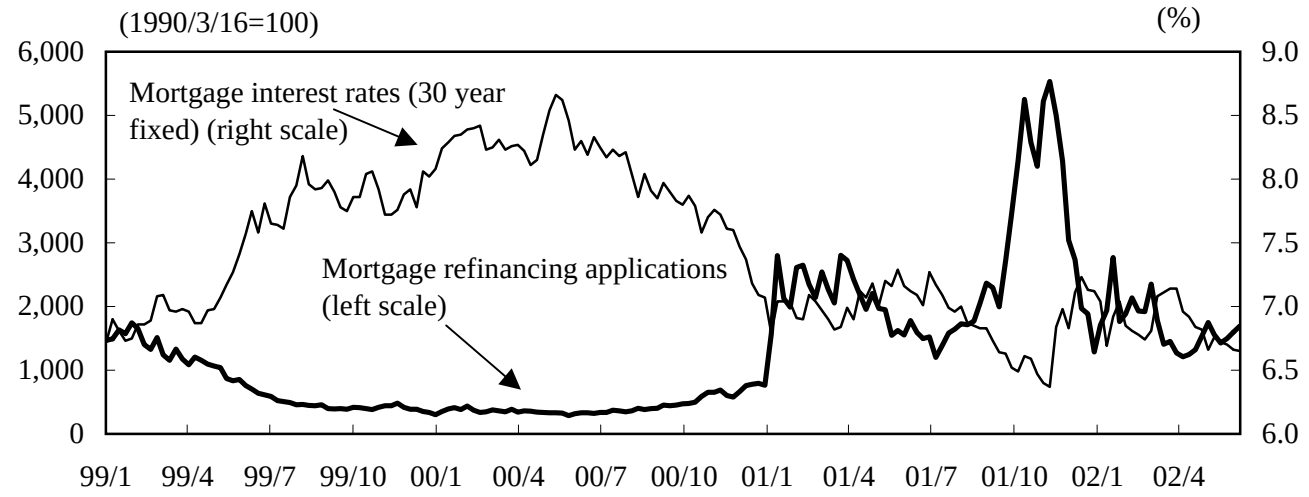


Source: Department of Commerce Bureau of Economic Analysis

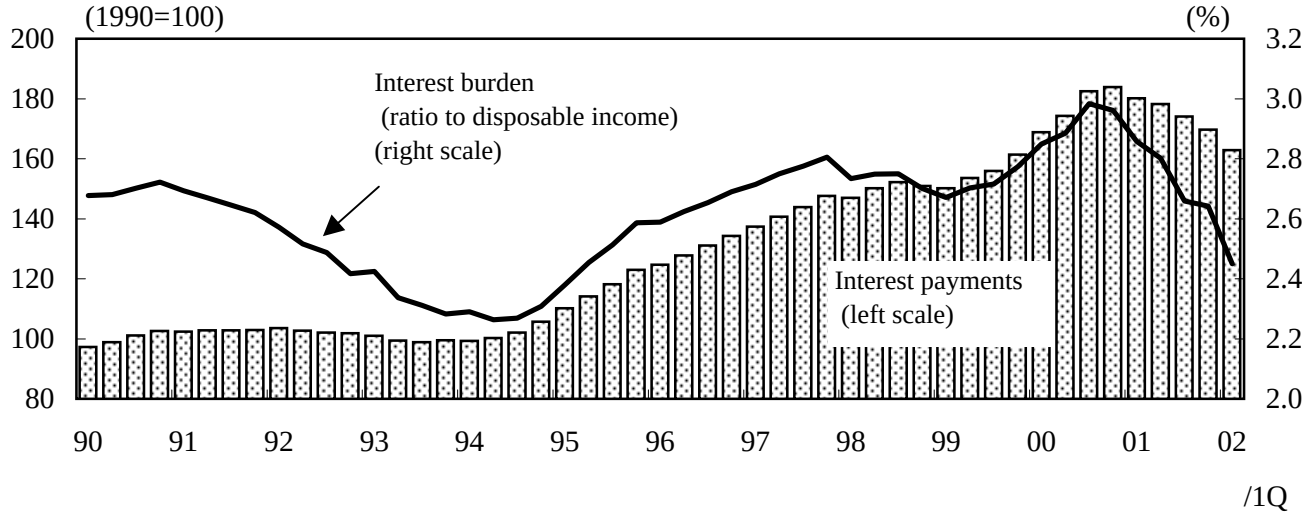
(Figure 11)

Reduction of interest burdens from monetary easing

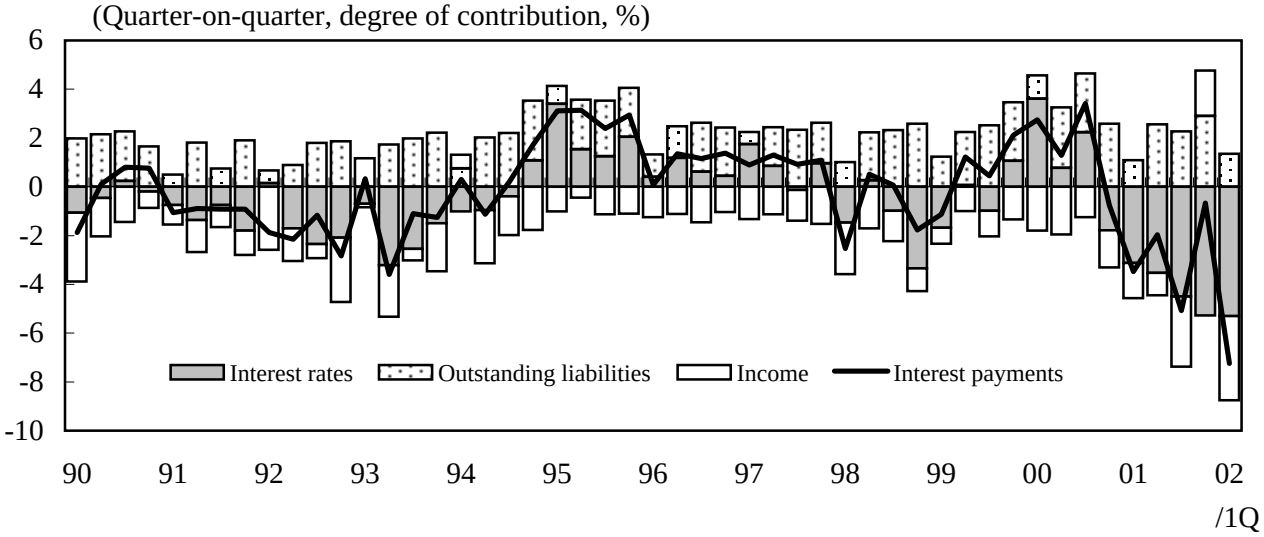
(1) Mortgage refinancing



(2) Household interest burden



(3)Interest payments(ratio to disposable income) factor analysis

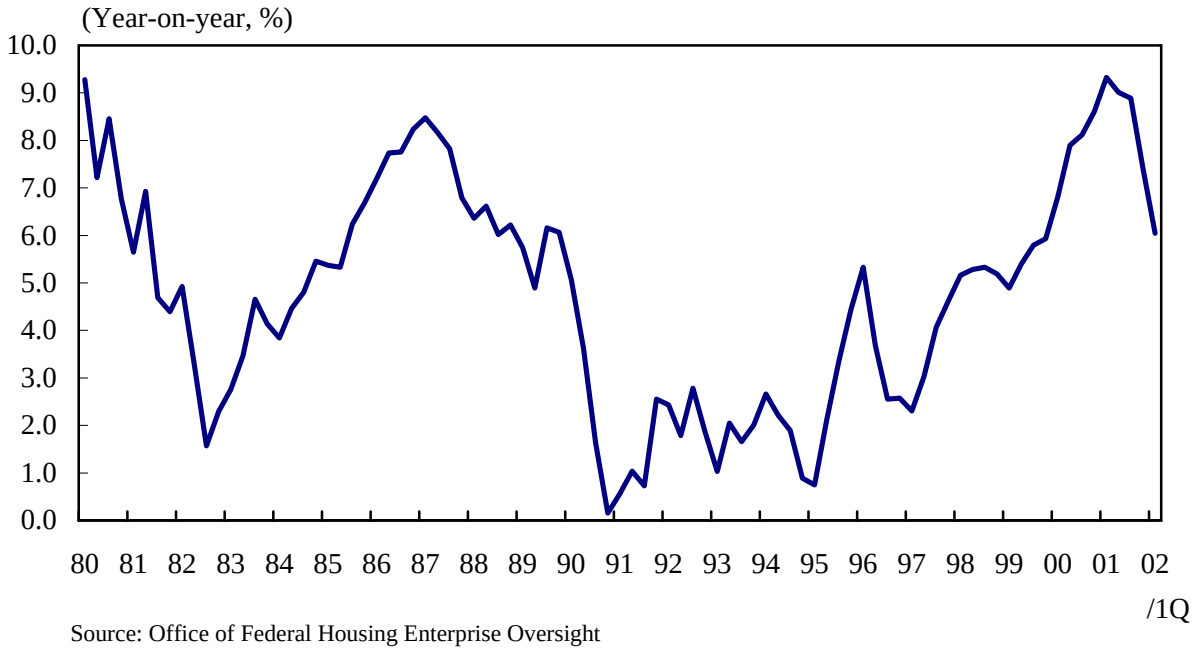


Source : Department of Commerce Bureau of Economic Analysis,FRB

(Figure 12)

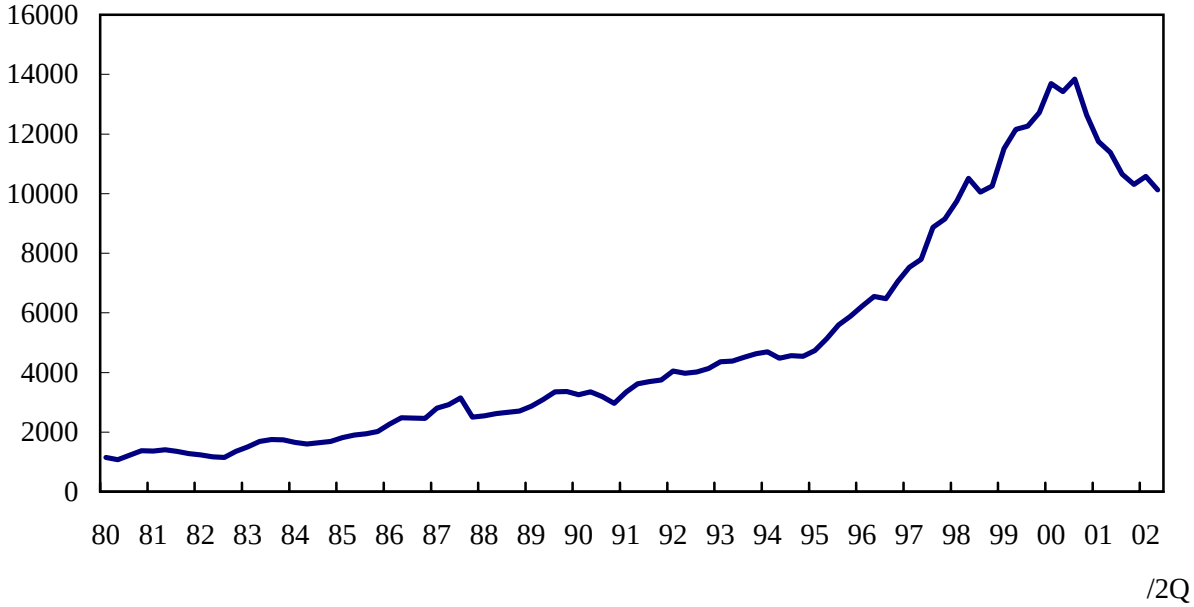
Housing price growth rate and share prices

(1) Housing price growth rate



Source: Office of Federal Housing Enterprise Oversight

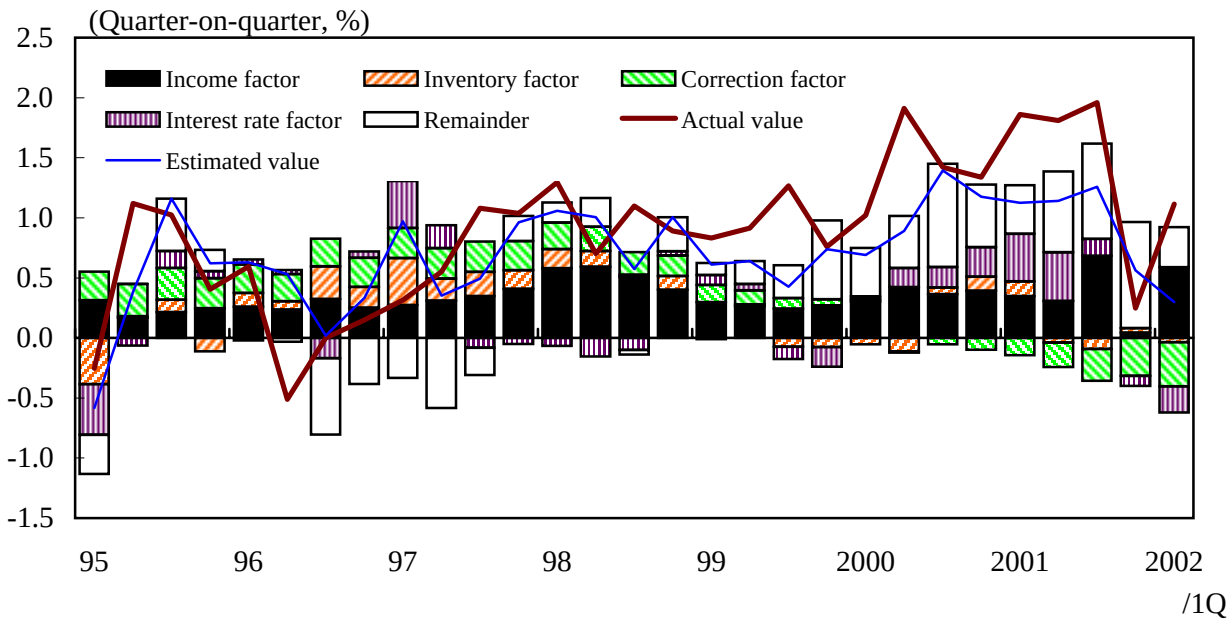
(2) Share prices (Wilshire 5000 Index)



Source: Datastream

Housing price estimations and factor analysis

(1) Factor analysis of housing price fluctuations



(2) Housing price function used in estimate

(1) Long-term equilibrium formula: HOUSEP=C(1)+C(2)DPI+EC

(2) Error correction model: △HOUSEP=c(1)△HOUSEP(-1)+c(2)△DPI+c(3)△RMR+c(4)△RMR(-1)+c(5)△RMR(-2)+c(6)△RMR(-3)+c(7)△RMR(-4)+c(8)△RMR(-5)+c(9)△RMR(-6)+c(10)△RMR(-7)+c(11)△ZAIKO+c(12)EC(-1)

		Coefficient	t value
Long-term equilibrium formula (1)	C(1)	2.531***	18.148
	C(2)	0.430***	15.225
Error correction model (2)	c(1)	0.591***	6.609
	c(2)	0.172**	2.575
	c(3)	-0.002	-1.448
	c(4)	-0.004***	-2.686
	c(5)	-0.002	-1.026
	c(6)	-0.000	-0.080
	c(7)	-0.001	-0.496
	c(8)	-0.001	-1.087
	c(9)	-0.001	-0.919
	c(10)	-0.001	-0.744
	c(11)	-0.003**	-2.079
	c(12)	-0.019	-1.062
	Adjusted R^2		0.449
	S.E.		0.006
	D.W.		2.174
	Durbin's h		-0.969

Notes: 1 Below is an explanation of the variables used in the formula. Logarithmic values are used for consumption, income and housing prices.
HOUSEP: Real housing price,DPI: Real disposable income, RMR: Real mortgage interest rates, ZAIKO: New one-family housing inventory rate,EC: Error correction

2 Calculation period:1982/1Q - 2002/1Q.

3 The "***", "**" and "*" indications to the upper right of the parameters indicate significance levels of 1%, 5% and 10% respectively.

4 The calculation of the error correction model satisfies the prior test normally required (results omitted).

5 The contribution of the lag of the dependent valuable (△ real housing price (-1)) was analyzed for each explanatory variable to the 12th term. The remainder shown here represents the portion that could not be explained from the analyzed values and is different from the calculation error in the function.

(Figure 14)

Household sector balance sheet

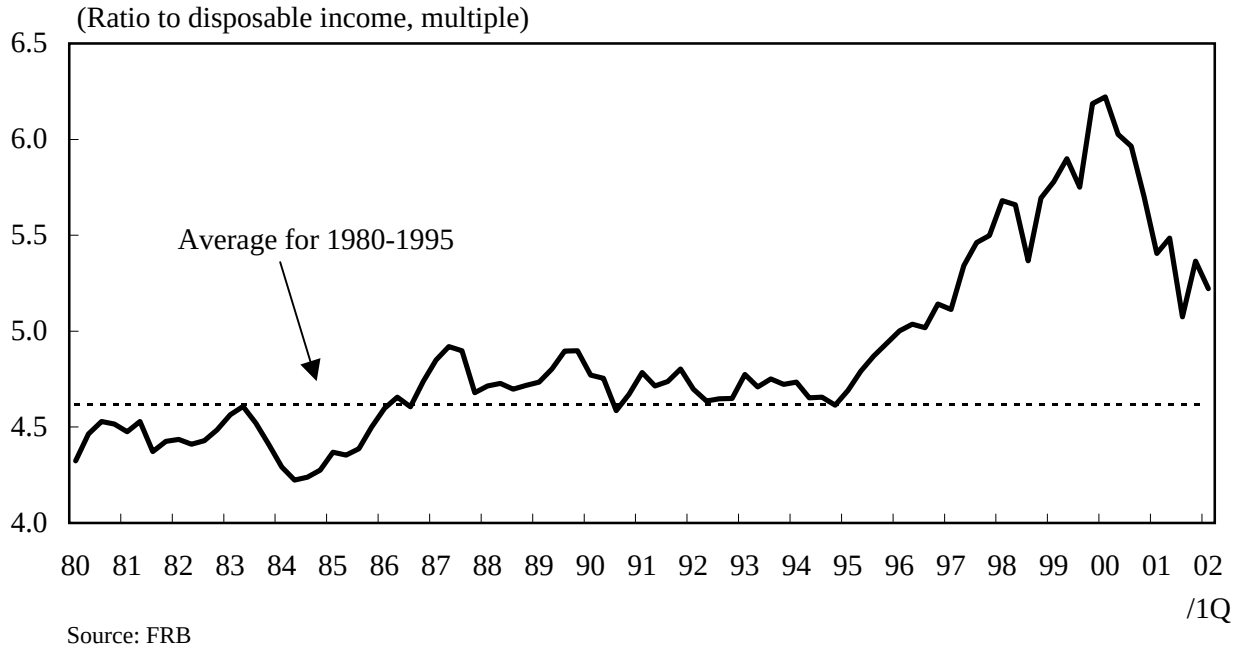
(1) Major items on the household sector balance sheet

($1 trillion) (%)

	End of 1980	End of 1990	End of 1999	End of 2000	End of 2001	Year-on-year
Total assets	11.0	24.1	**48.6**	48.5	47.9	▲ 1.1
Tangible assets	4.4	9.3	13.7	15.1	**16.3**	7.9
Real estate	3.4	7.4	11.1	12.2	**13.2**	8.2
Financial assets	6.6	14.8	**34.8**	33.4	31.7	▲ 5.2
Total stocks	1.3	3.1	**17.4**	15.2	13.0	▲ 14.6
Directly held	0.9	1.8	**9.2**	7.3	5.9	▲ 19.5
Indirectly held	0.5	1.4	**8.2**	7.9	7.1	▲ 10.1
Total liabilities	1.5	3.7	6.9	7.5	**8.1**	7.8
Home mortgage	0.9	2.5	4.5	4.9	**5.4**	9.8
Consumer credit	0.4	0.8	1.4	1.6	**1.7**	6.9
Net worth	9.6	20.4	**41.7**	41.0	39.9	▲ 2.7
Ratio to disposable income	4.5 fold	4.7 fold	6.2 fold	5.7 fold	5.4 fold	n.a.
(Reference)						
Insurance/pension reserves	1.2	3.8	9.8	**9.9**	9.6	▲ 3.4

Notes: 1 Indirect stock ownership refers to ownership through equity mutual funds and pension funds.
2 Figures in bold represent past peaks for the item.

(2) Ratio of household net worth (total assets - total liabilities) to disposable income

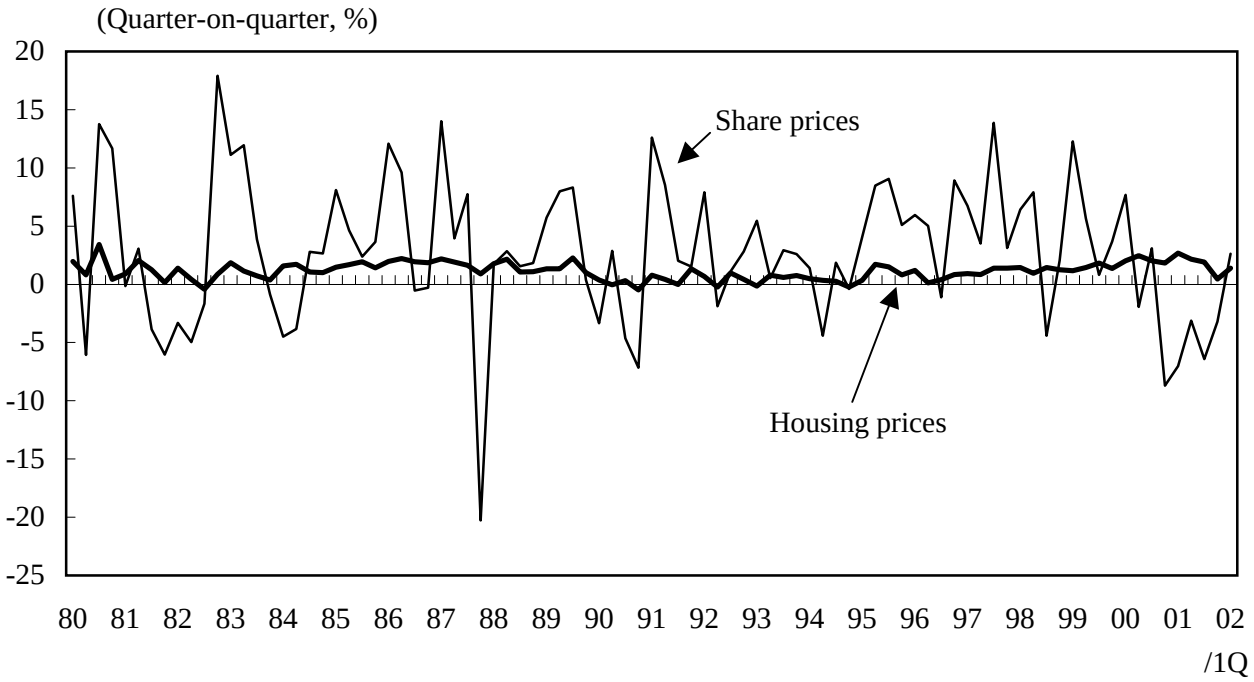


Source: FRB

(Figure 15)

Comparison of the degree of fluctuation in share prices and housing prices

(1) Quarter-on-quarter trends for share prices and housing prices



(2) Fluctuation coefficient for share prices and housing prices (quarterly basis, 1980/1Q - 2002/1Q)

Share prices	2.2%
Housing prices	0.7%

Note: Fluctuation coefficient = Standard deviation / average

Source: For share prices, quarterly average figures for the Wilshire 5000 Index used because of broad coverage; housing prices based on OFHEO (Office of Federal Housing Enterprise Oversight) figures.

(Figure 16)

Asset Holdings broken down by income group

(1) Asset holdings broken down by income group

(Percentage of households holding asset, %)

	Stock (including indirect holdings)		Automobiles		Own home	
	1995	**1998**	1995	1998	**1995**	**1998**
All households	**40.4**	**48.8**	84.1	82.8	**64.7**	**66.2**
Annual income less than $10,000	**5.4**	**7.7**	54.9	51.3	**36.1**	**34.5**
Annual income of $10,000 - $24,999	**22.2**	**24.7**	82.3	78.0	**54.9**	**51.7**
Annual income of $ 25,000 - $ 49,999	**45.4**	**52.7**	91.7	89.6	**67.0**	**68.2**
Annual income of $ 50,000 - $ 99,999	**65.4**	**74.3**	93.4	93.6	**84.5**	**85.0**
Annual income of over $100,000	**81.6**	**91.0**	91.6	88.7	**91.1**	**93.3**

Source: Recent Changes in U.S. Family Finances: Results from the 1998 Survey of Consumer Finances, FRB Bulletin January 2000

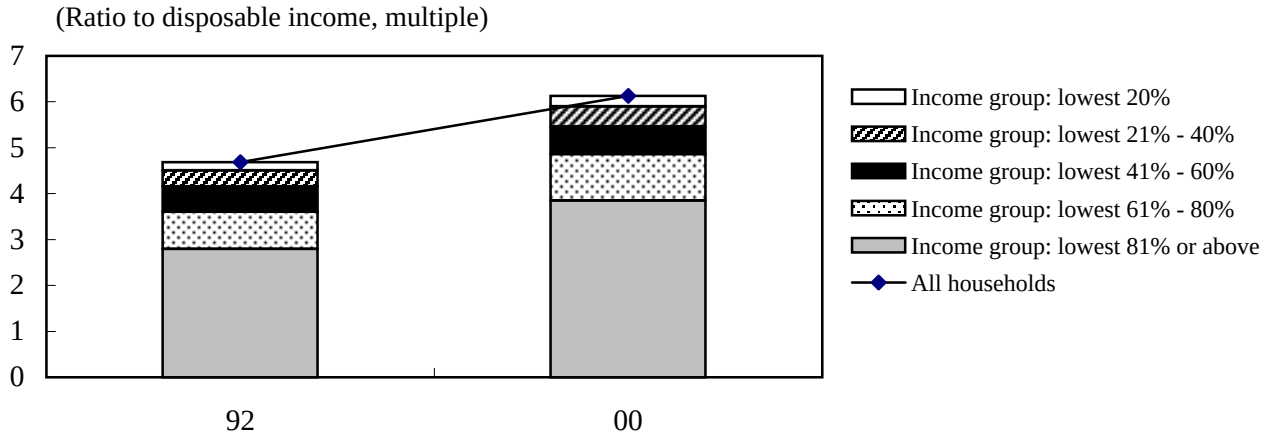
(2) Net asset holdings broken down by income group

(Ratio to disposable income, multiple)

	1992	2000	Difference
All households	4.69	6.13	1.44
Income group: lowest 20%	4.11	5.12	1.01
Income group: 21%-40%	3.28	4.15	0.86
Income group: 41%-60%	3.27	3.65	0.38
Income group: 61%-80%	3.32	4.17	0.85
Income group 81% or above	6.40	8.69	2.30

Source:
Maki, Dean M. and Palumbo, Michael G. (2001) "Disentangling the Wealth Effect: A Cohort Analysis of Household Saving in the 1990s" Federal Reserve Board Finance and Discussion Series working paper no. 2001-21(April)

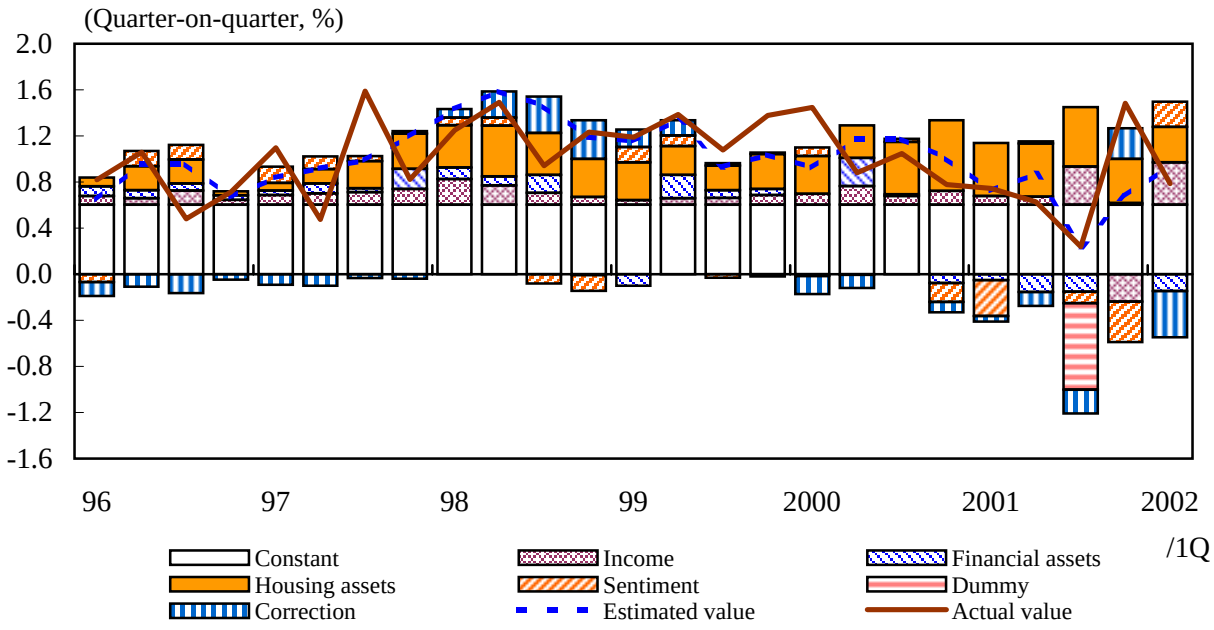
Reference: Contribution to total assets (ratio to disposable income) broken down by income group



(Figure 17)

Wealth effect calculation results

(1) Factor analysis of real consumption expenditures



(2) Consumption function used in estimate

(1) Long-term equilibrium formula: CE=C(1)+C(2)FA+C(3)RA+C(4)DPI+EC

(2) Error correction model: △CE=c(1)+c(2)△FA(-1)+c(3)△FA(-2)+c(4)△RA(-1)+c(5)△RA(-2)+ c(6) △DPI+c(7)△CONFI+c(8)dummy+c(9)EC(-1)

		Coefficient	t value
Long-term equilibrium formula (1)	C(1)	-1.220***	-6.289
	C(2)	0.082***	3.919
	C(3)	0.029*	1.840
	C(4)	1.007***	22.927
Error correction model (2)	c(1)	0.006***	7.947
	c(2)	0.005	0.306
	c(3)	0.023	1.384
	c(4)	0.054	0.747
	c(5)	0.166**	2.261
	c(6)	0.114	1.610
	c(7)	0.0002**	2.346
	c(8)	-0.008	-1.644
	c(9)	-0.162***	-2.781
	Adjusted R^2		0.364
	S.E.		0.004
	D.W.		2.224

Notes: 1 Below is an explanation of the variables used in the formula. Logarithmic values are used for consumption, income and assets.

CE: Real consumption expenditures, FA: Real net financial assets, RA: Real net housing assets, DPI: Real disposable income, CONFI: Consumer confidence, dummy: Terrorist attack dummy, EC: Error correction

2 Calculation period: 1986/1Q - 2002/1Q.

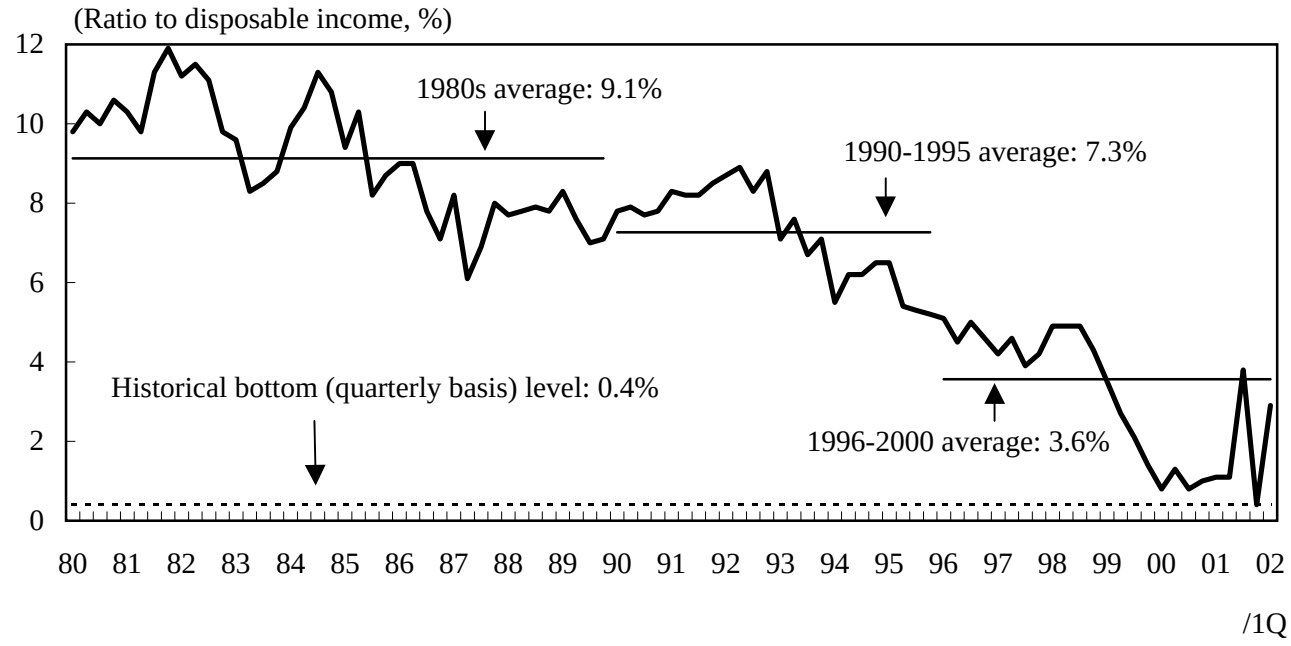
3 The "***", "**" and "*" indications to the upper right of the parameters indicate significance levels of 1%, 5% and 10% respectively.

4 The calculation of the error correction model satisfies the prior test normally required (results omitted).

(Figure 18)

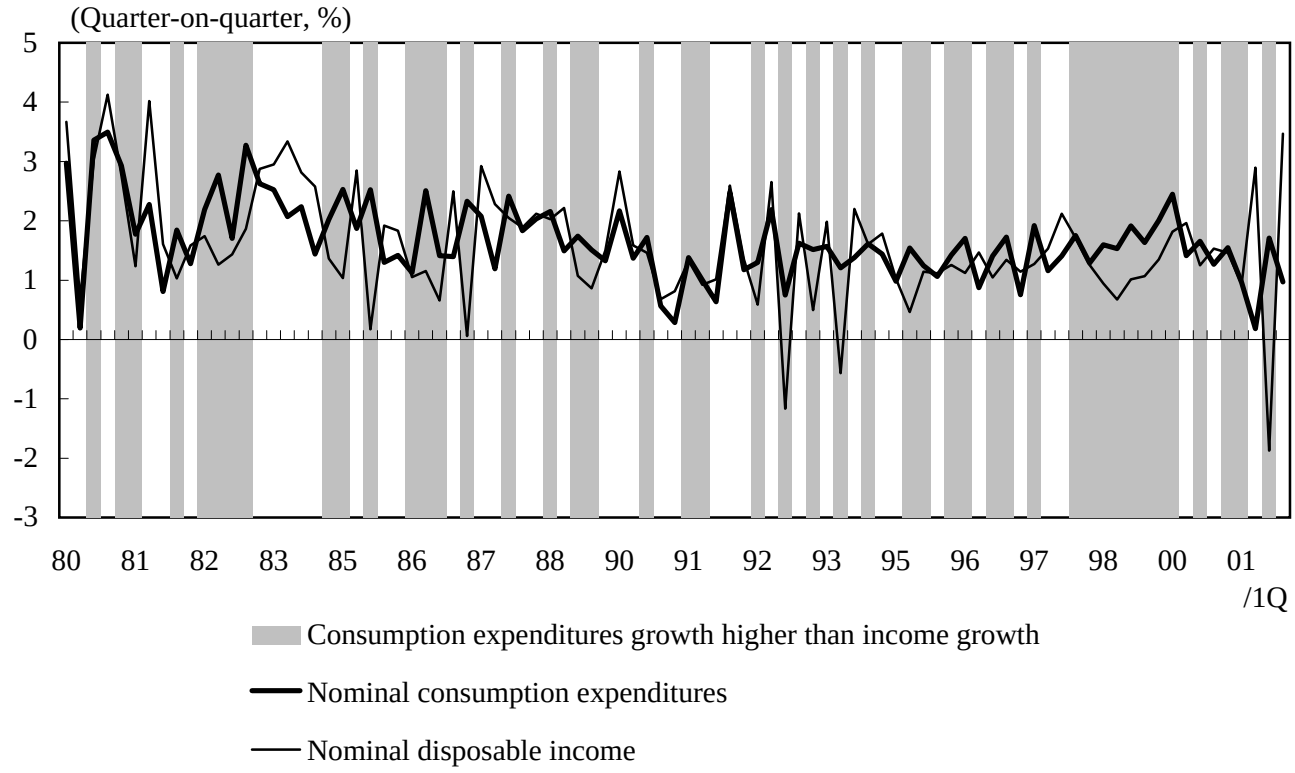
Household savings rate, disposable income and consumption expenditures

(1) Household savings rate (as published by the Department of Commerce)



Source: Department of Commerce Bureau of Economic Analysis

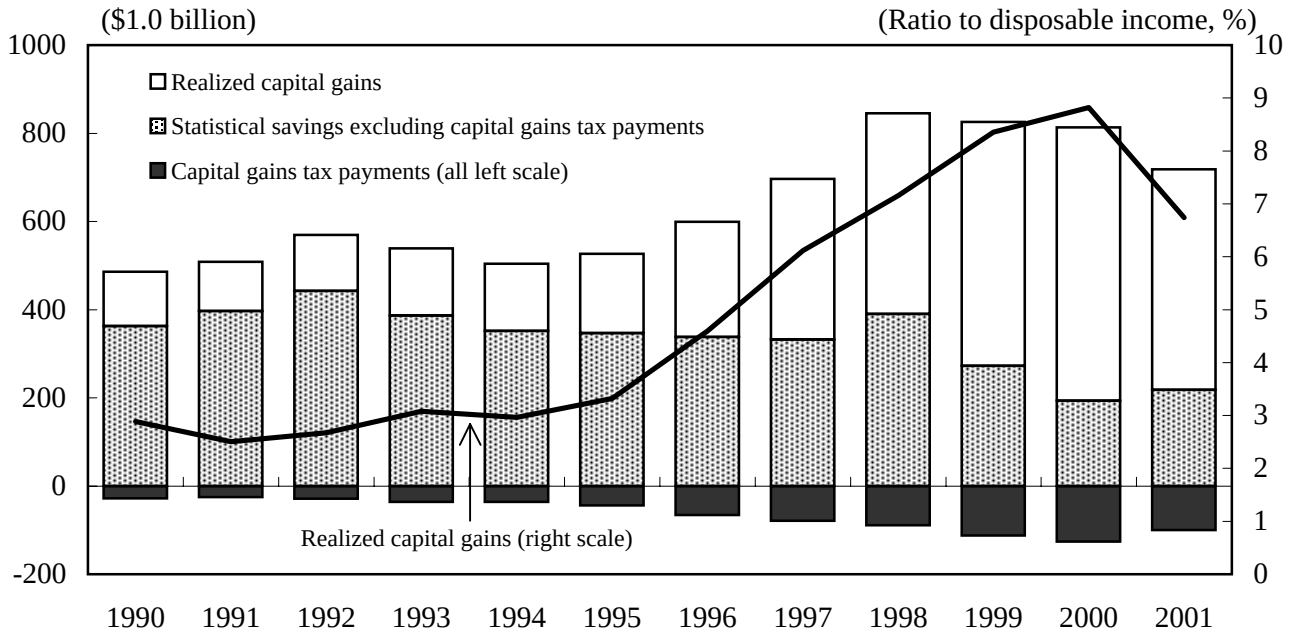
(2) Nominal consumption expenditures and nominal disposable income



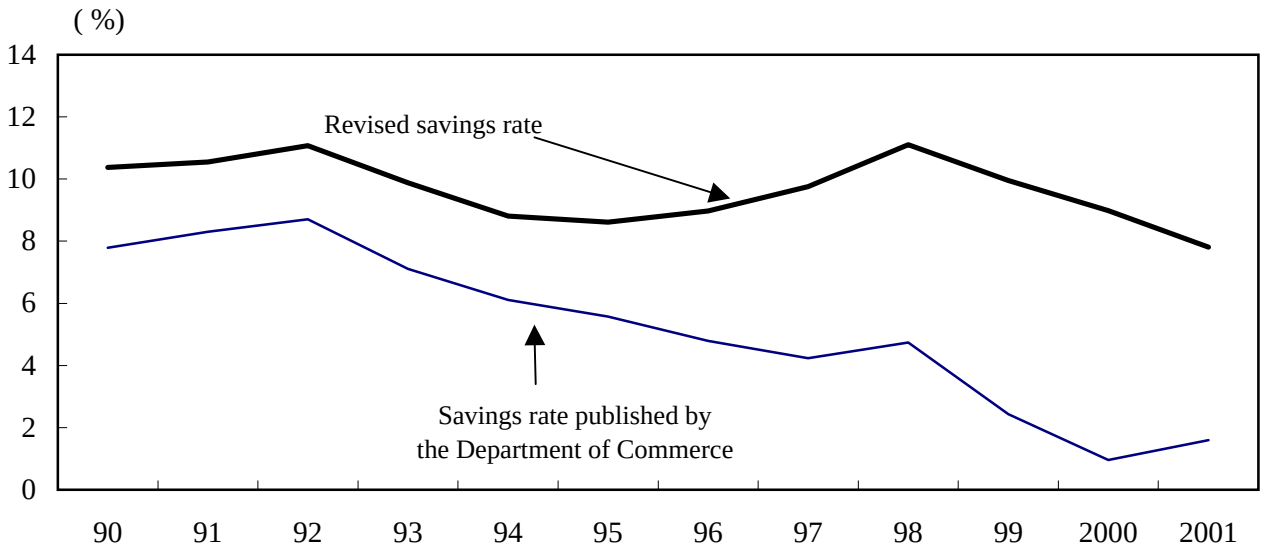
Source: Department of Commerce Bureau of Economic Analysis

Savings rate adjusted for realized capital gains

(1) GDP-based savings and realized capital gains



(2) Revised savings rate after adjustment for realized capital gains



Note: The following formula was used to calculate the "revised savings rate:"

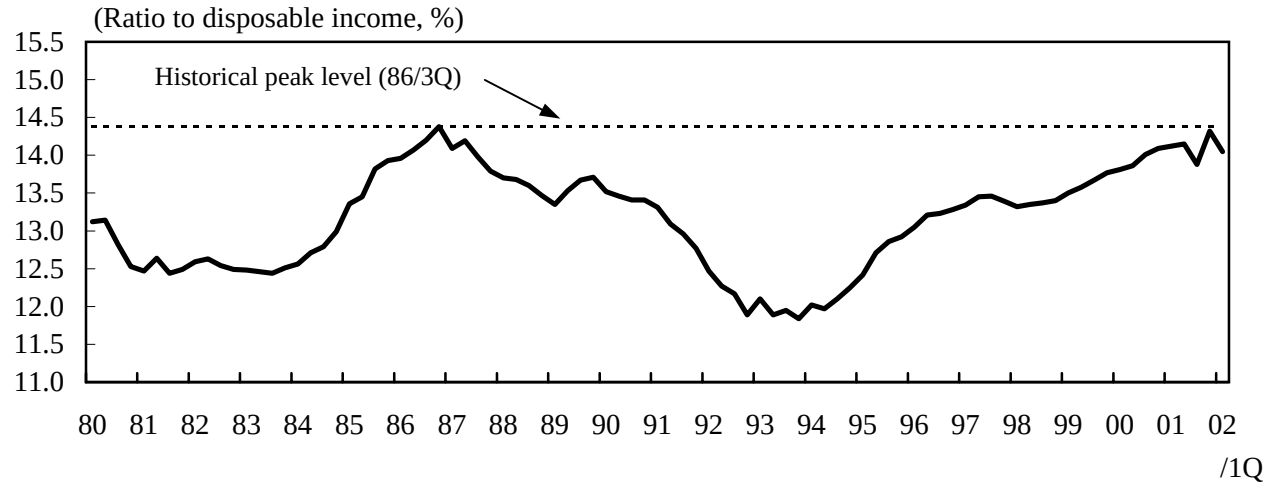
$$\text{Revised savings rate} = \frac{\text{Disposable income + Realized capital gains - Consumption expenditures}}{\text{Disposable income + Realized capital gains}} \times 100$$

Source: The CBO trial values were used for the realized capital gains value in the calculation. Statistical savings and disposable income figures are from the Department of Commerce Bureau of Economic Analysis.

(Figure 20)

Household debt-service burden

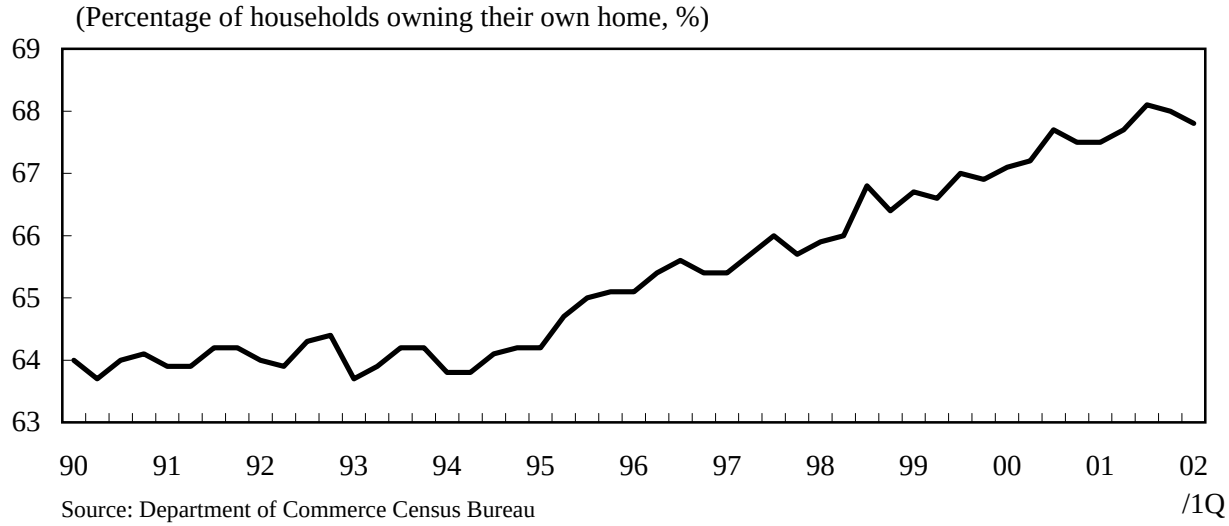
(1) Household debt-service burden



Note: The debt-service burden is the ratio to disposable income of principal and interest payments for: 1) consumer loans and 2) mortgages.

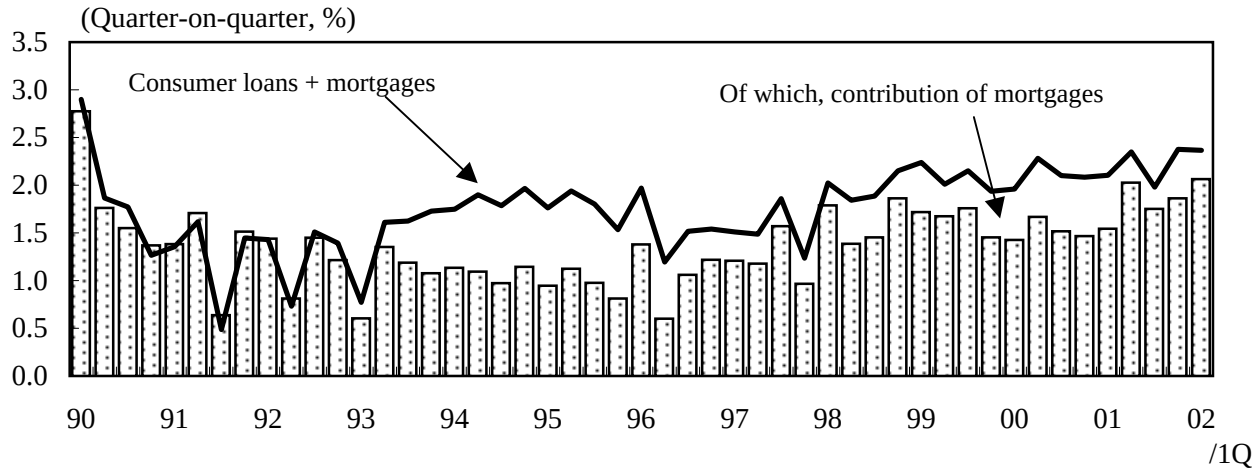
Source: FRB

(2) Home ownership rate



Source: Department of Commerce Census Bureau

(3) Outstanding consumer loans and mortgages



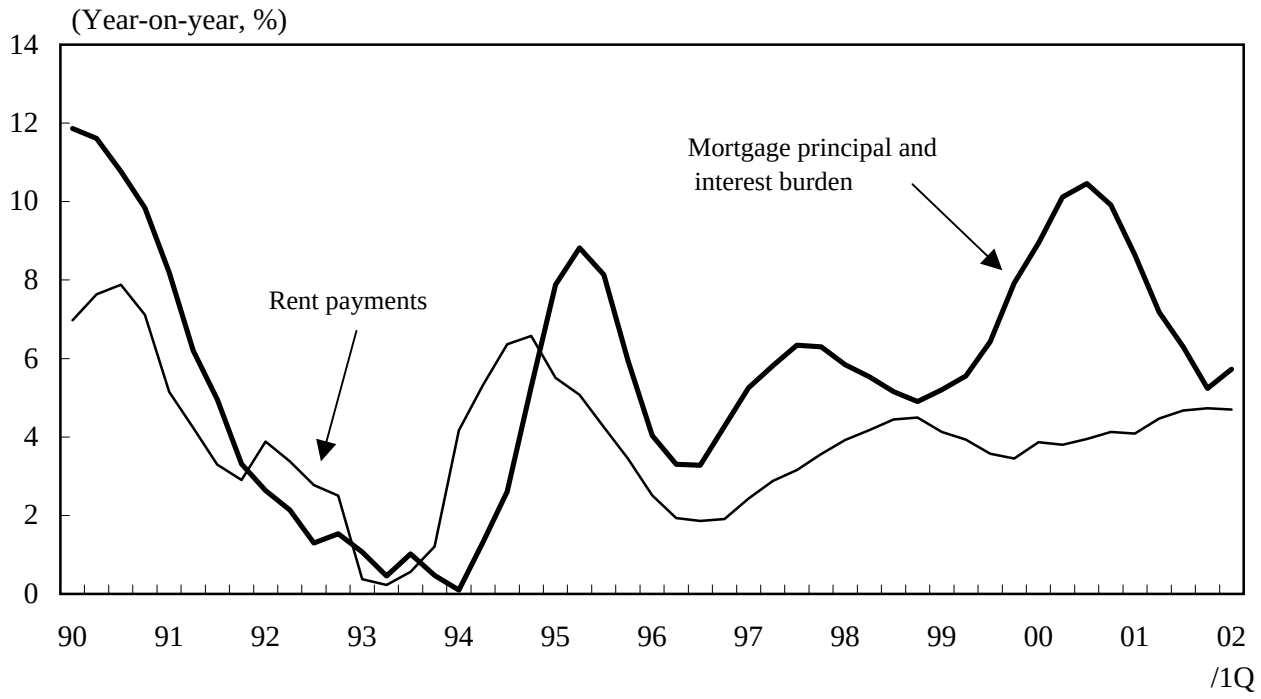
Note: Seasonally adjusted by X-11.

Source: FRB

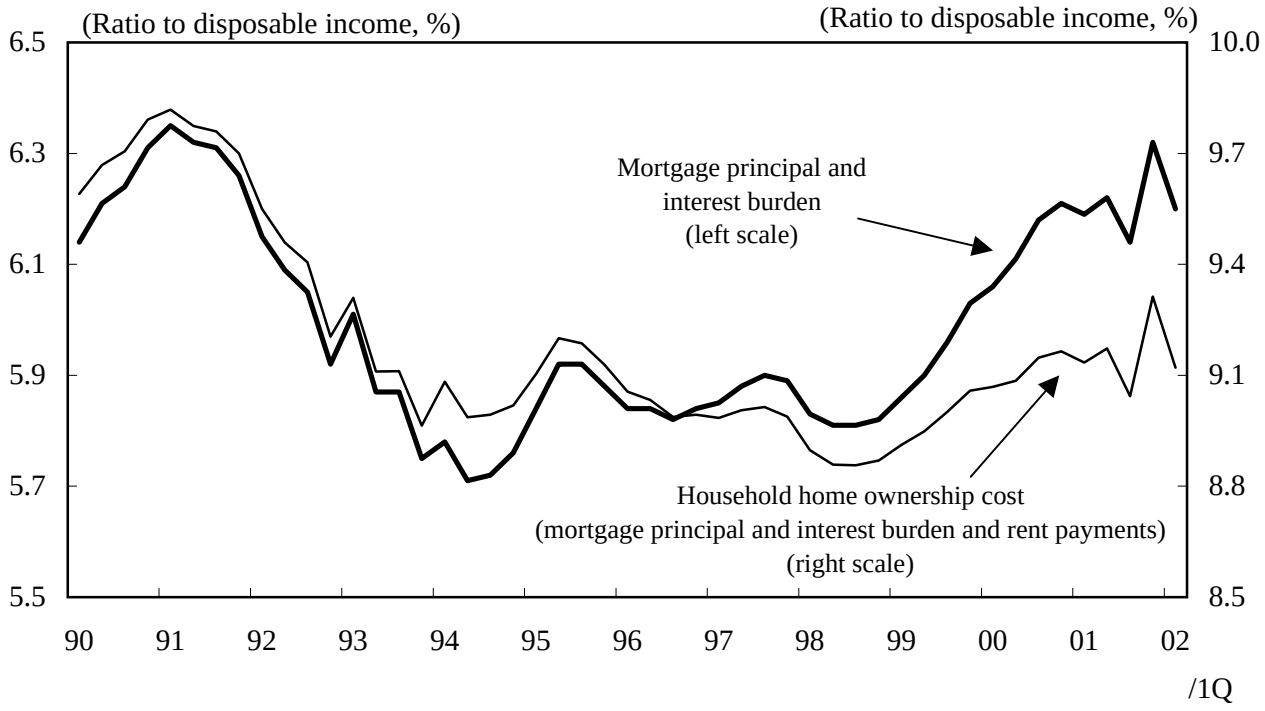
(Figure 21)

Debt ratios taking account of rent payments

(1) Mortgage principal and interest burden and rent payments



(2) Mortgage liabilities taking account of rent payment amounts

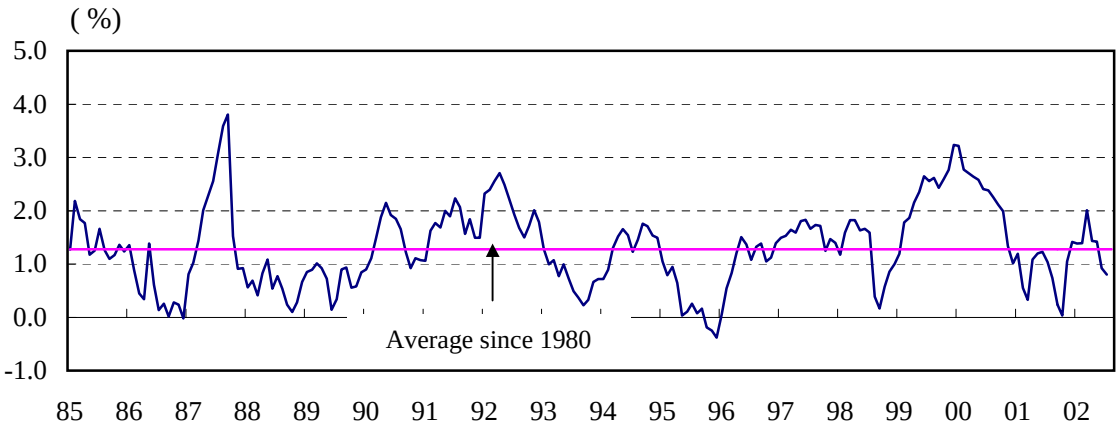


Source: Mortgage principal and interest burdens from FRB; rent payments and disposable income figures from the Department of Commerce Bureau of Economic Analysis.

(Figure 22)

Recent share price weakness

(1) Yield spread (S&P 500)

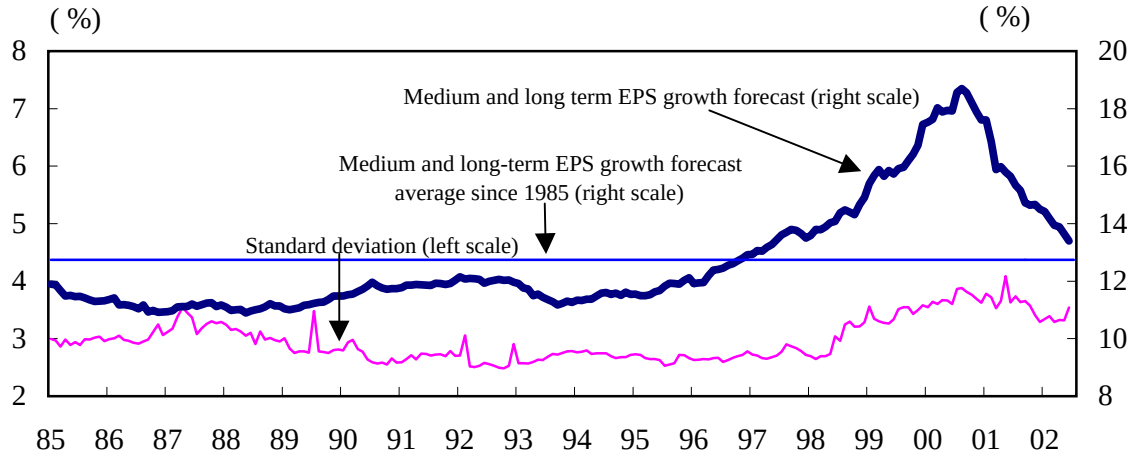


Note: Yield spread = Yield on 10-year Treasury bonds - Yield on stock (= 1/PER), month end value
Yield on stock is actual yield on the S&P 500 (weekly)

Source: Datastream

Most recent is July 9

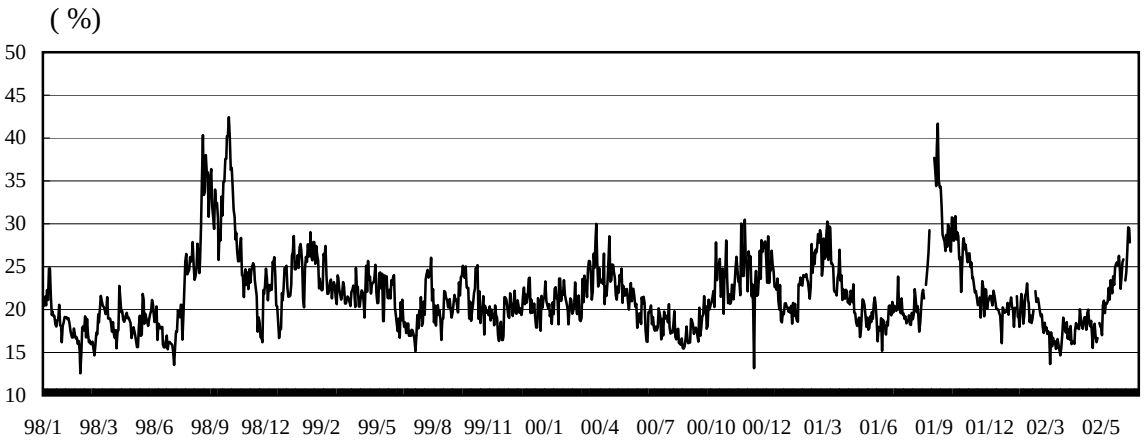
(2) Analyst medium and long-term EPS growth forecasts



Source: Thomson Financial I/B/E/S

Most recent is June

(3) Implied volatility of share price options (S&P 500)



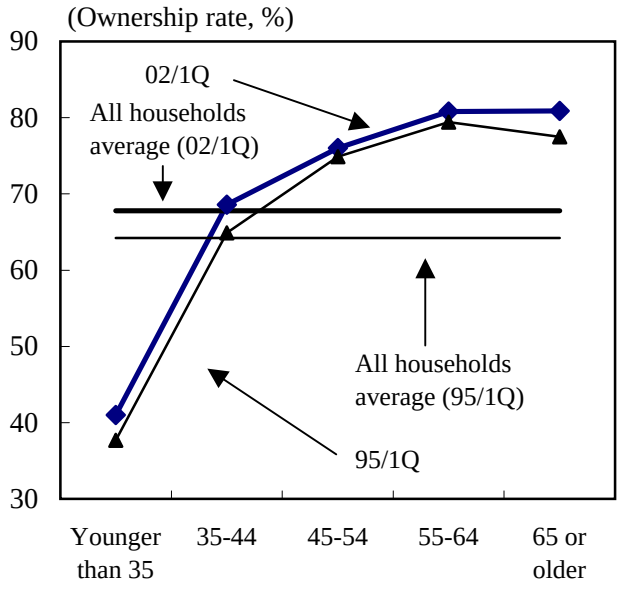
Source: Bloomberg

Most recent is July 12

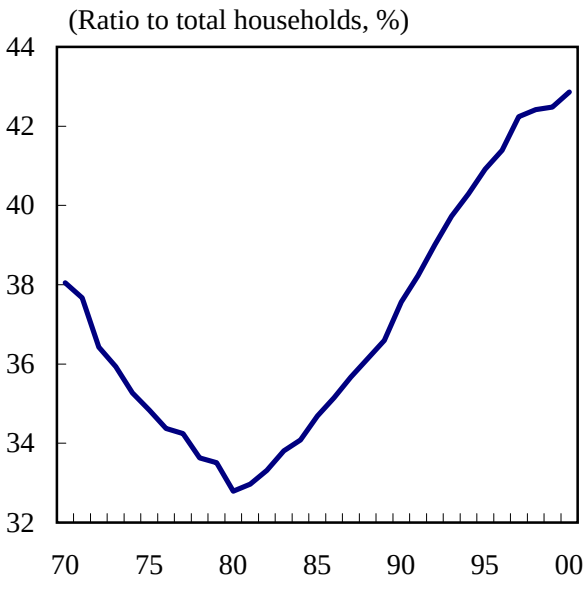
(Figure 23)

Impact of demographic factors on housing demand

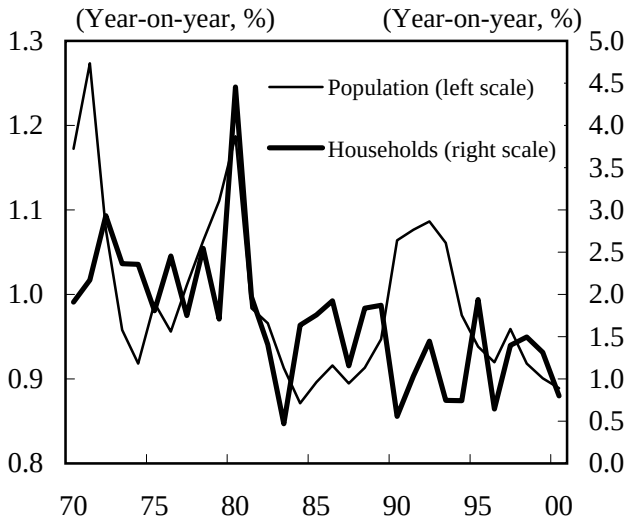
(1) Household ownership rates broken down by age group



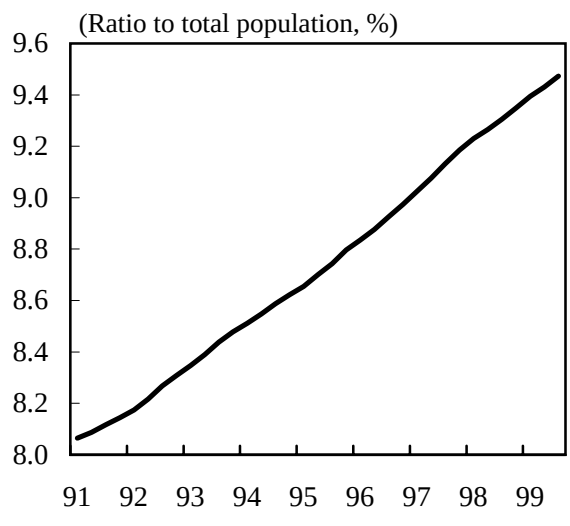
(2) Percentage of households with head of household age 35-54



(3) Population and household growth rate



(4) Immigration



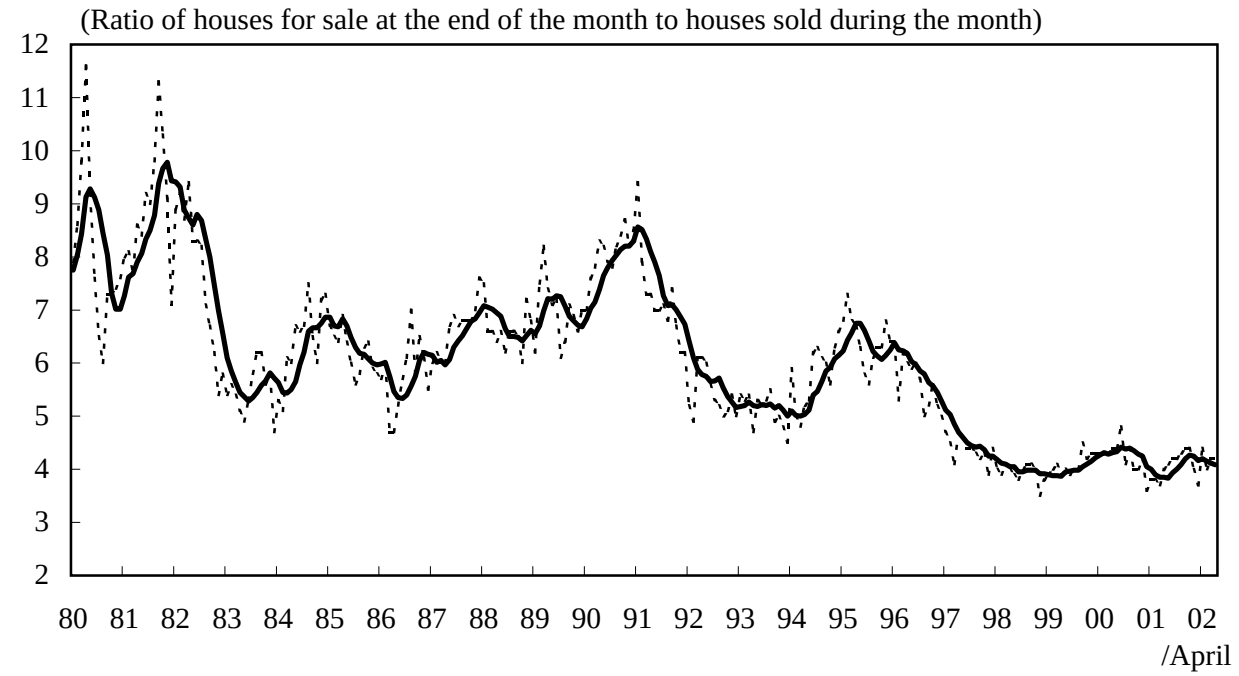
Source: Department of Commerce

Note: "Immigrant" defined as resident born outside the country.

(Figure 24)

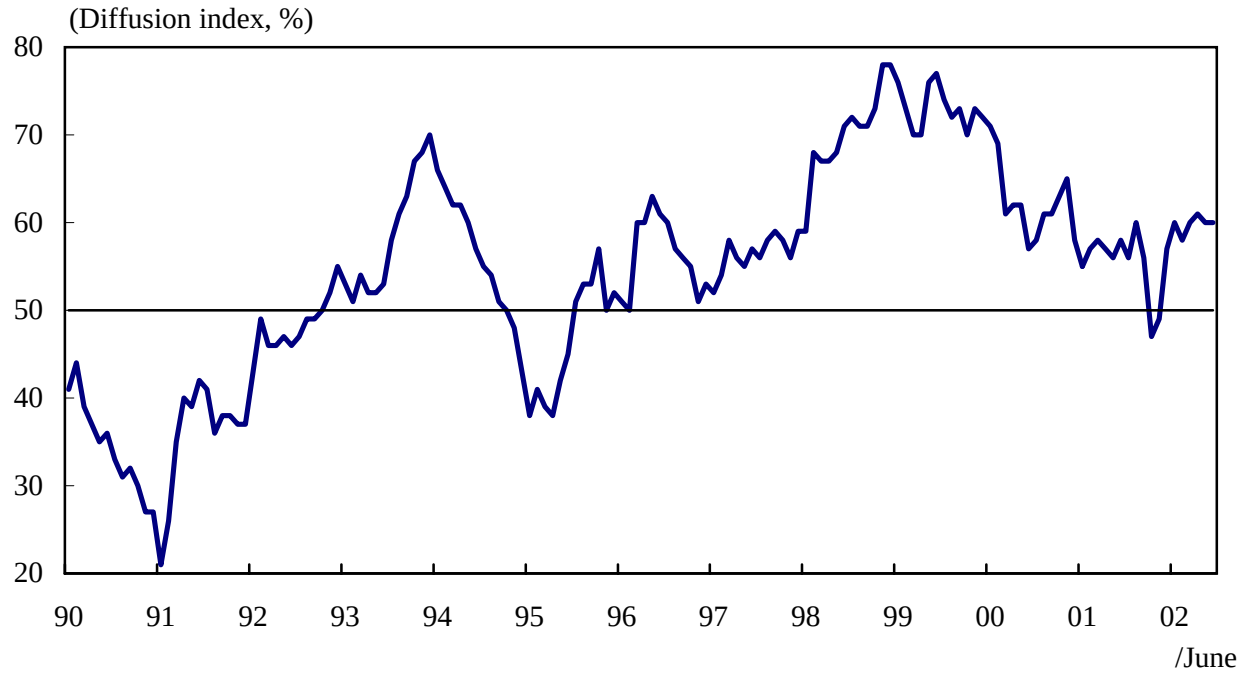
Housing price trends

(1) New-home inventories



Note: Bold line indicates 6 month moving average
Source: Department of Commerce Census Bureau

(2) Home builder business sentiment index (NAHB index)

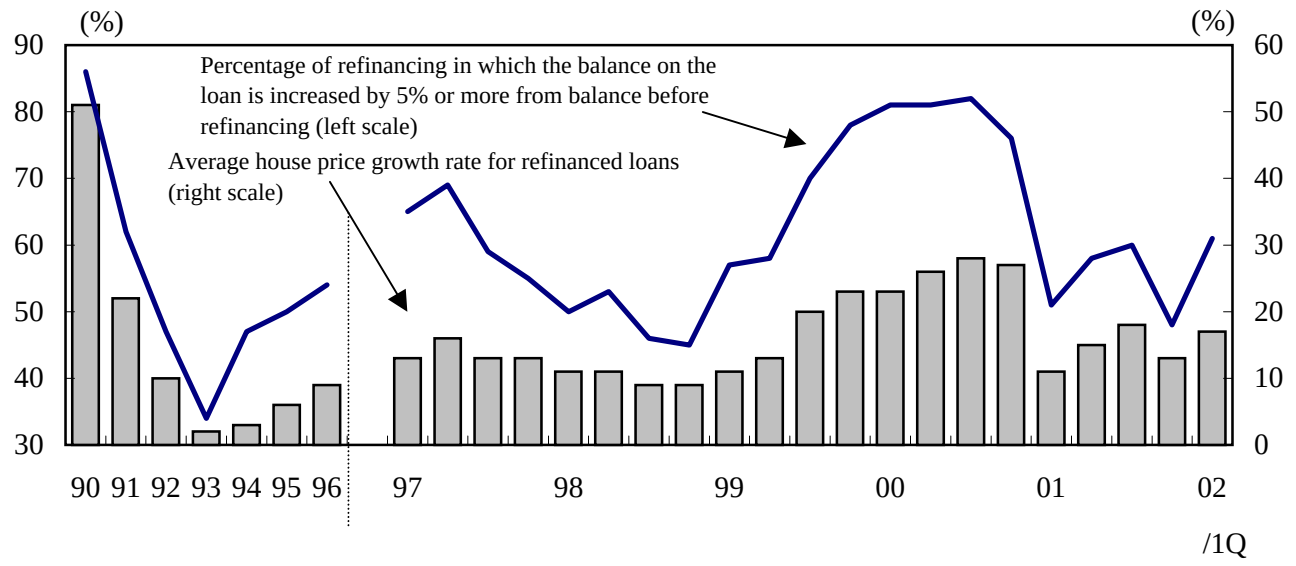


Source: National Association of Home Builders

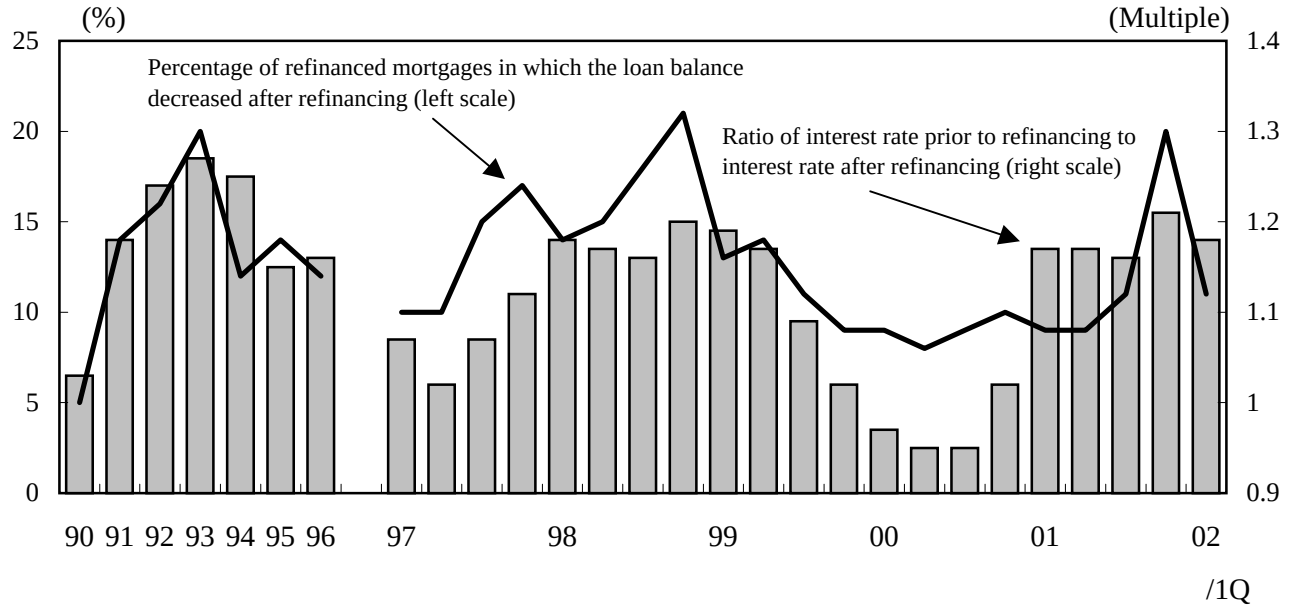
(Figure BOX 1-1)

Cash out refinancing

(1) Cash out refinancing



(2) "Interest savings" refinancing



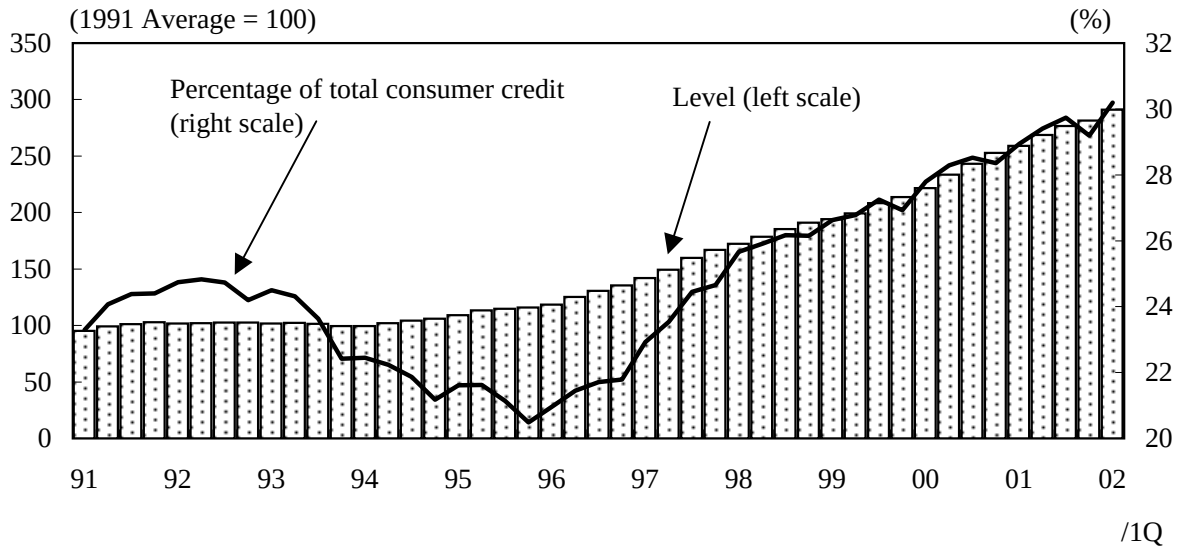
Note: Quarterly survey results not published prior to 1996.

Source: Freddie Mac, Household Refinancing Survey

(Figure BOX 1-2)

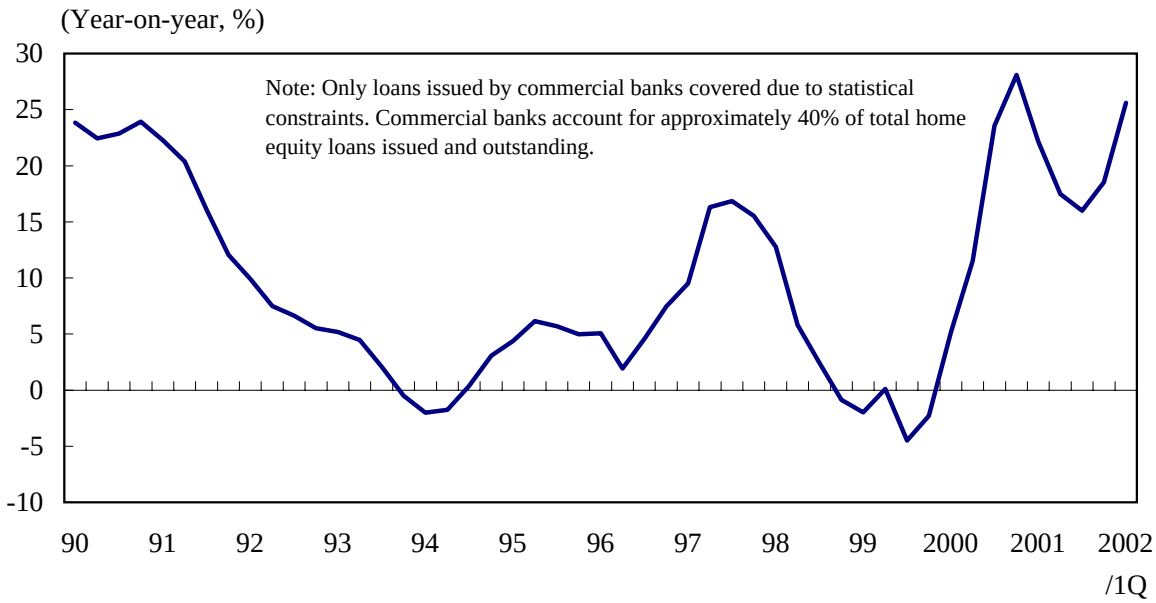
Home equity loans

(1) Home equity loans balance



Note: Weight within consumer credit calculated as: Home equity loans balance / (Consumer credit balance + Home equity loans balance).

(2) "Credit line" style home equity loans balance

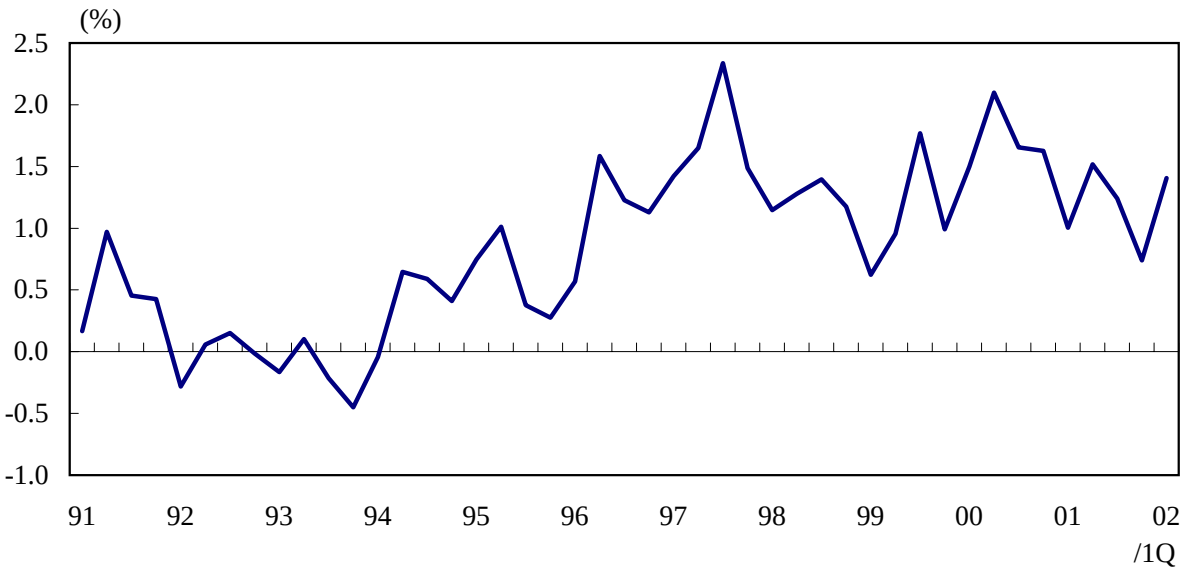


Source: FRB

(Figure BOX 1-3)

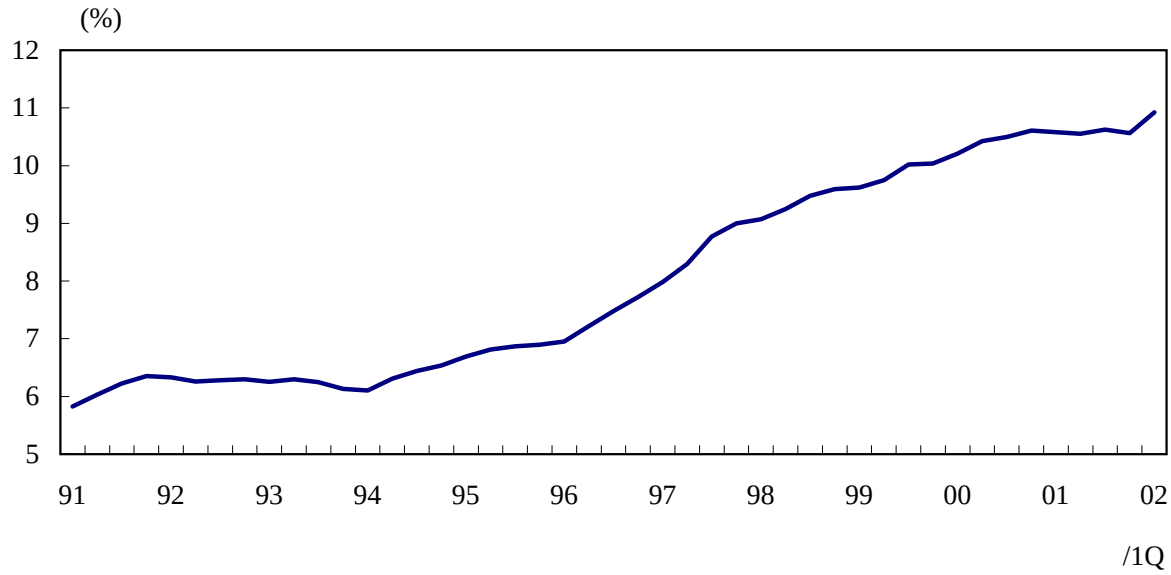
Home equity loans utilization rate

(1) Rate of new home equity loans utilization



Note: (Newly generated "credit line" style home equity loans during the term) / (Net housing assets the previous term)

(2) Cumulative home equity loans utilization rate



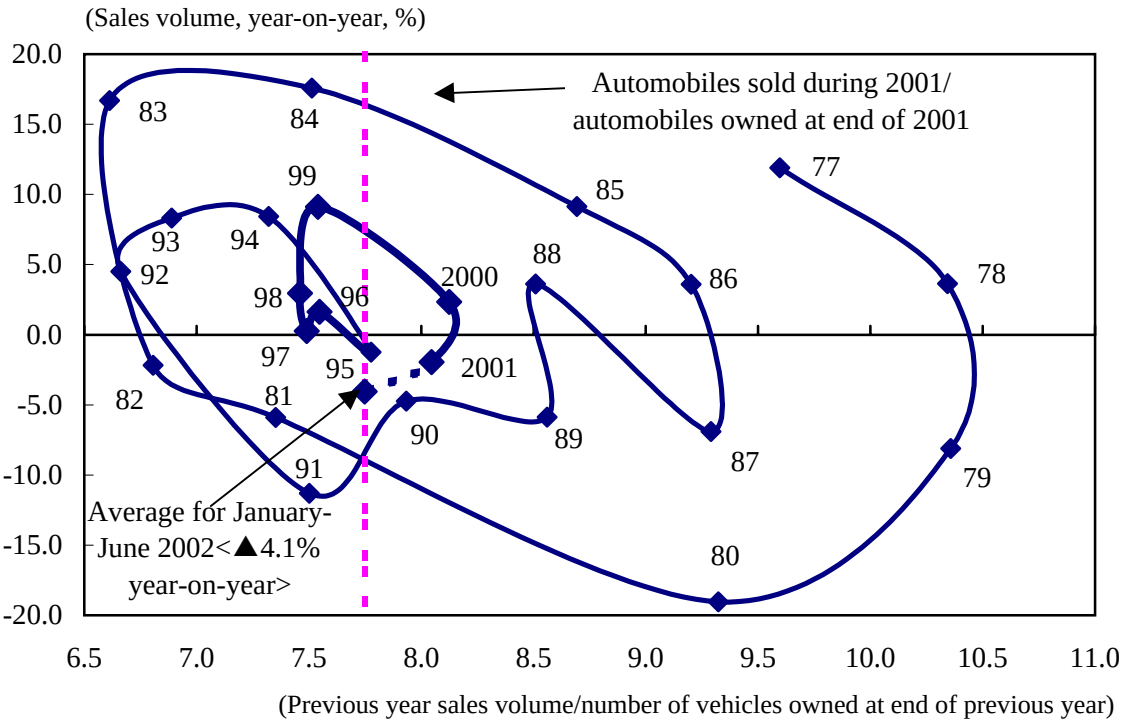
Note: ("credit line" style home equity loans balance at end of term) / (Net housing assets the previous term)

Source: FRB

(Figure BOX 2-1)

Automobile stock cycle (1)

(1) Automobile stock cycle



Source: Department of Commerce, Japan Automobile Manufacturers Association

(2) Changes in factors defining the automobile stock cycle

(%,year)

	70-74	75-79	80-84	85-89	90-94	95-99	2000
(a) Depriciation rate	42.7	40.8	38.7	38.1	36.7	38.3	38.4
(a') Vehicles age (Note1)			7.3	7.7	8.2	8.5	8.5
(b) Licensed driver growth rate	3.0	2.7	1.6	1.3	1.2	1.3	1.8
(C)Growth rate in number of vehicles owned per licensed driver	1.6(Note2)	0.5	0.2	1.1	0.0	0.3	1.5

Notes: 1. Vehicle age is a weighted average of passenger cars and trucks in use (based on percentage of sales volumes).

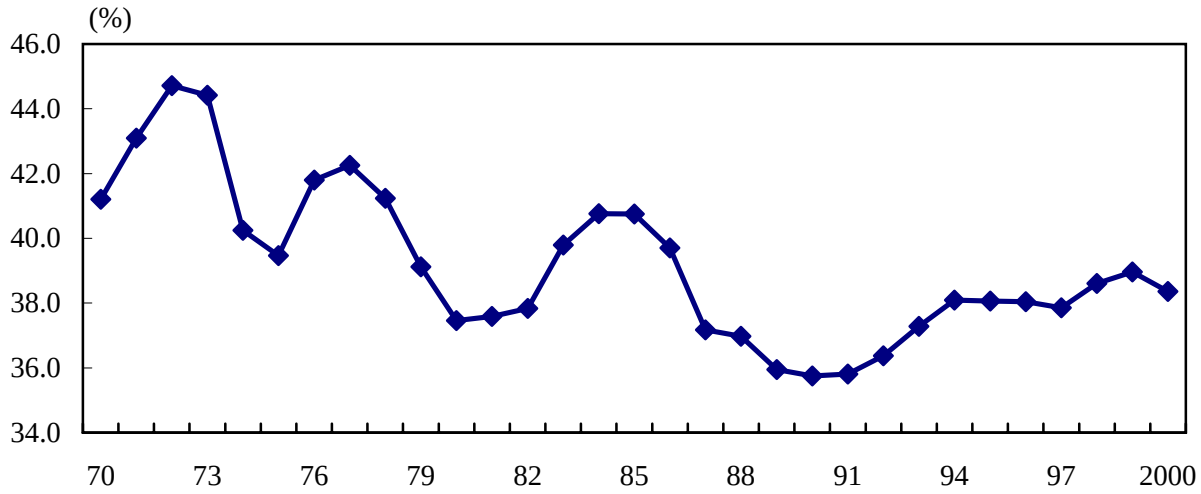
2. 1971-1974 average.

Source: Department of Commerce, Department of Transportation, American Automobile Manufactures Association, Japan Automobile Manufacturers Association

(Figure BOX 2-2)

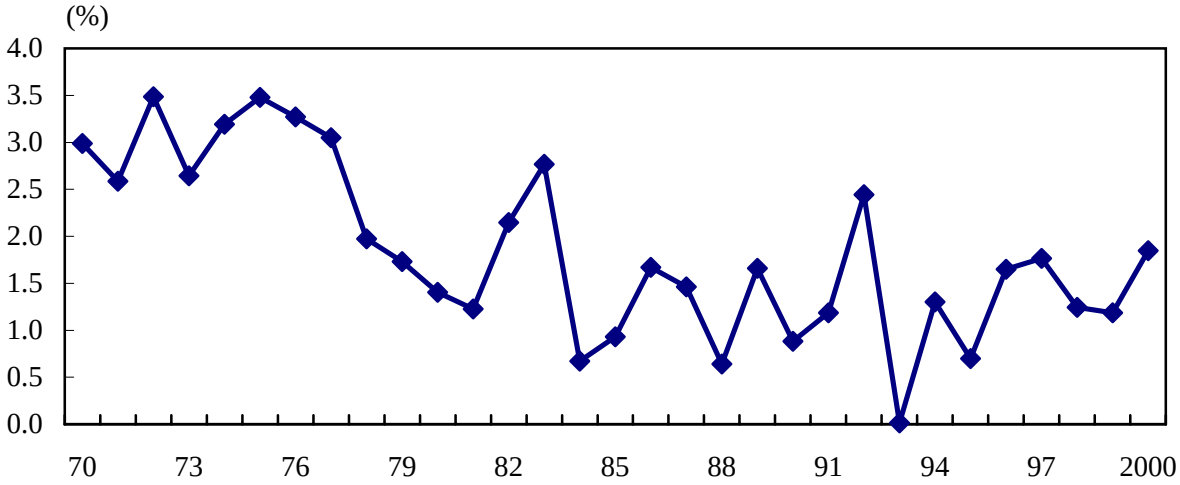
Automobile stock cycle (2)

(3-1) Depriciation rate



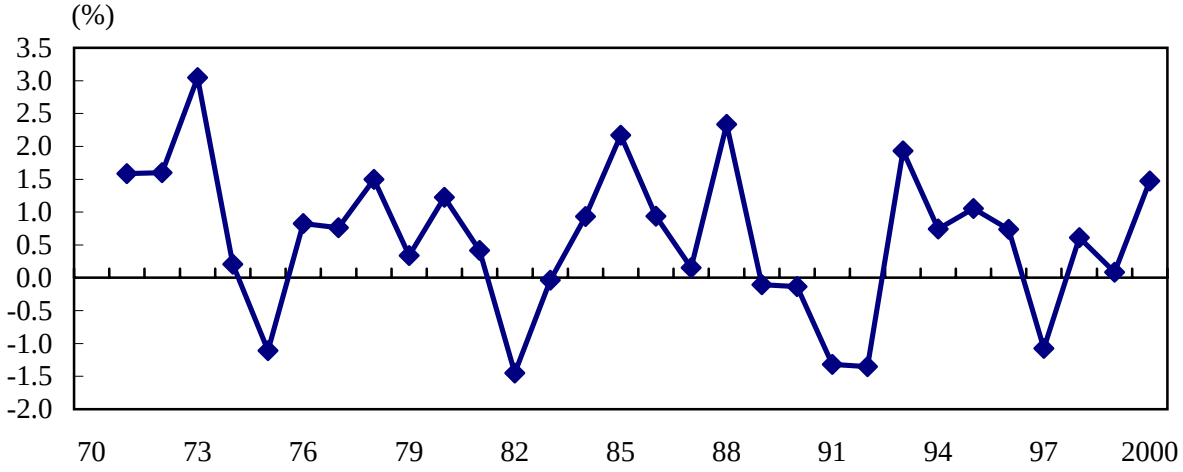
Source: Department of Commerce

(3-2) Licensed driver growth rate



Source: Department of Transportation

(3-3) Ownership rate (number of vehicles per licensed driver) growth rate



Note: Covers the period from 1971 to 2000.
Source: Department of Transportation, Japan Automobile Manufacturers Association

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