Preliminary draft

Price Expectations of Japanese Households under Deflation: Evidence from Original Survey Data[1]

by

Masahiro Hori and Satoshi Shimizutani[2]

October 2004

[1] This paper is a revised version of Hori and Shimizutani (2003) to include data extension to the latest. This study was originally prepared for the "International Workshop on Overcoming Deflation and Revitalizing the Japanese Economy" (September 2003) sponsored by the Economic and Social Research Institute. We'd like to thank David Weinstein, Fumio Hayashi, Koichi Hamada, Anil Kashyap, Yutaka Kosai and other participants at the conference for their constructive comments. We'd like to appreciate useful comments from participants in the project "Macro/Financial Issues and International Economic Relations: Policy Options for Japan and the United States" (May and October 2004) sponsored by University of Michigan and Hitotsubashi University, ESRI Conference "Japanese Monetary Policy: Experience and Future" (June 2004) and ESRI seminar (September 2003). Moreover, we would like to express thanks to the Price Policy Division, especially Hitoshi Otose, Yoshio Kanda and Masaru Hadano for providing us with micro-level data from the "Kokumin Seikatsu Monitors." The views expressed in this paper are those of the authors and do not represent those of the Cabinet Office or the Japanese government.

[2] Masahiro Hori, Cabinet Office; e-mail: masahiro.hori@mfs.cao.go.jp.
Satoshi Shimizutani, Institute of Economic Research, Hitotsubashi University and Visiting Fellow at ESRI; e-mail: sshimizu@ier.hit-u.ac.jp.

Abstract

The Japanese economy has suffered from deflation since the mid-1990s. Despite the importance of overcoming deflation for policymakers and academics in Japan, there has been little recent research on price expectations in Japan. This study takes advantage of an original and rich quarterly household-level data set to estimate average price expectations, to examine what changes price expectations, and to look at how changes in price expectations affect household consumption.

Our empirical estimates indicate that price expectations range from minus 0.2 percent to zero percent in 2001 and 2002. However, we see a big jump up to 1 percent in the first quarter of 2003, followed by decline to 0.2 percent in the second quarter and a steady increase toward the first quarter of 2004, which marked 0.8. Price expectations are dependent on current price movements and lagged expectations. Awareness of monetary policy announcements does not largely change price expectations in Japan, since a series of quantitative easing caused revision of price expectations only for small portion, i.e., 5-10% of people surveyed. The jump in the first quarter of 2003 was caused by the Iraq war. We also confirm that deflationary expectations discourage consumption in households with debts, mainly durables, through postponing the timing of purchases.

We should notice that a series of quantitative easing were not very much effective to alter the expectations of all households; rather, only the Iraq war was an influential impact to change price expectations. Note that the degree of revision for those who revised expectations was similar order among those events examined in this study, but that the share of households affected is very much different. Keeping this in mind, the monetary authorities should implement quantitative easing in more aggressive and understandable ways if it intends to alter deflationary expectations.

1. Introduction

A decade has passed since the Japanese economy got mired in deflation in the middle of the 1990s (Figure 1). GDP deflator has been negative since 1994 with an exception of a hike in 1997 due to an increase in consumption tax rate. CPI (excluding fresh foods) reached to zero in 1995 and has been negative after 1998. Although we observe some signs of recovery in the economy and price changes are close to zero, deflation has not come to the end. Massive expansions in fiscal and monetary policies in the recession have not sufficient to discourage the decade-long deflation completely. For those who believe that deflation is harmful for the economy, further policy actions to stop the continued decrease in prices are still dispensable to mitigate demerits caused by deflation; a hike in real interest rate and real debt burden.

The key factor to combat deflation is how to revise deflationary expectations since deflation invites deflationary expectations and they in turn exacerbate deflation. Thus, the remedy to stop the deflationary process should be drawn from an analysis on what changes price expectations. Surprisingly, however, there has been little serious research on the level and formation of price expectations in Japan. It is more surprising that monetary authorities operate their policies without announcing (or even knowing) current price expectations. Despite the importance of measuring price expectations, most policy discussions assume *a priori* that current actual price changes reflect price expectations, and that both of them are the same, which is a naïve assumption. Although several studies tackled the estimation of price expectations based on time series analyses or on Carlson and Parkin (1975) that utilizes some information from business survey data, those studies still rely on strong and unrealistic assumptions.

This study takes advantage of an original and rich household level data set from the "Kokumin Seikatsu Monitors (People's Life Monitors)" collected by the Cabinet Office from 2001 to 2004. We take advantage of this innovative survey in Japan to address the

following three issues.

First, we use the household-level data to estimate price expectations directly. This data set is unique in that it asks the respondents directly about their price expectations. A similar approach has been adopted in “Survey of Consumers” compiled by the Survey Research Center of the University of Michigan for more than 40 years. Without relying on any strong assumptions, we directly calculate average price expectations based on the responses. The calculated levels of price expectations themselves contain new information and serve as the chart for monetary policy.

Second, the panel structure of the data enables us to examine the causes of change in price expectations. We track the same households and examine whether a household changes its price expectation. We also utilize direct information on household responses to changes in monetary policy (i.e. quantitative easing), or to some exogenous shocks including the attack on Iraq by the United States and the United Kingdom.

Third, we also address the consequences of change in price expectation on household behavior. Especially, we will focus on the effect of change in price expectation on consumption and saving among households. Deflationary expectations may ease the budget constraints of households by increasing real income and stimulate consumption. On the other hand, if a household anticipates that deflation will continue in the future, it will deter the purchase of luxury goods, which dampens current consumption. Moreover, if a household combines deflationary expectations with anxiety toward the future regarding business cycles or employment, deflationary expectations might discourage current consumption. Thus, the direction that deflationary expectations affect household consumption depends on empirical studies.

This study proceeds as follows. The next section provides some related literature on price expectations mainly in Japan. The third section estimates quarterly average price expectations based on micro-level data from our unique data. The fourth section

examines what changes price expectations, focusing on exogenous shocks such as monetary policy or change in international environments. The fifth section evaluates how changes in price expectations affect household consumption. The final section discussed policy implications drawn from our empirical studies and concludes.

2. Previous Studies on Measurement of Price Expectations

Contrary to countless studies on inflation, there is relatively little literature on deflationary expectations in Japan partly because the Japanese economy has only a few experiences with deflation in the past. If we widen our scope of past studies to price expectations, regardless of inflation or deflation, there are several streams in the research that aim to measure price expectations and that examine the expectation generating process. Regarding estimates of price expectations, there are four popular ways to measure them.

The first approach is to ask a respondent directly about price expectation in a consumer survey. This strategy is straightforward, and does not rely on any strong assumptions to calculate average level of price expectation. This approach has been adopted by the University of Michigan's "Survey of Consumers" for more than 40 years. However, it has not been seriously considered in Japan. This study is probably the first attempt to adopt the consumer survey approach in Japan.

The second method is to use inflation indexed bonds to measure price expectations (Kitamura [1997, 2004]). This is also a straightforward approach to utilize direct information from market participants and now the NIKKEI QUICK provides data on price expectations after ten years from the end of June 2004[3]. According to the weekly survey, price expectations increased from 0.3 in March to 0.7 in June and, after reaching 1% in August, the figure declined to 0.8 as of the end of September. However, such an indexed

[3] The method to calculate price expectations follows Kitamura (2004).

bond was issued March 2004 for the first time in Japan and we are not able to utilize it for a longer period.

The third way is to employ the expectation-augmented Phillips curve. Unfortunately, the estimated Phillips curves are sensitive to measurement of output or employment gaps in explanatory variables and do not fit well for the case of Japan (Fukuda and Keida [2001]), while price expectation based on the curve works well in the United States. Rather, the merit of the expectation-augmented Phillips curve approach is to measure structural changes in price expectations[4].

The fourth and the most popular way in Japan to measure price expectations is to employ the methodology by Carlson and Parkin (1975). Many studies on price expectations in Japan rely on this method, which assumes that the distribution of expectations is normal and agents have common symmetric thresholds to perceive change in price expectations[5]. It also requires another assumption that price expectations do not deviate from actual price movements for a certain period. Although this method needs the information only of the directions of price expectations, it heavily depends on strong assumptions mentioned above whose applicability has never seriously examined. Hori and Shimizutani (2003) revealed the normality assumption, the core of the C-P method, is violated in Japanese household-level data.

On the contrary, most studies on price expectation in the Untied States take advantage of price expectation data from a household survey called "Survey of Consumers" and from professional economists, called the "Livingston survey". Based on those surveys, many studies examine the formation process of price expectations (i.e. rational vs. adaptive) and some of them compare them between households and

[4] Shimizutani and Yogi (2003) focus on an unusual experience in the Okinawan history to evaluate the impact of devaluation on inflation expectations. Their estimates demonstrate that devaluation due to the Nixon shock if August 1971 increased price expectations by 5 to 7 percent.

[5] Previous studies based on the Carlson and Parkin method are reviewed in Hori and Shimizutani (2003). Fukuda and Keida (2001) find that the performance of the Phillips curve in Japan improves by adding the expectation term obtained from the C-P method.

professional forecasters. Roberts (1998), a recent representative study, uses both surveys mentioned above to examine the formation of expectations to conclude that expectations are neither perfectly rational nor as unsophisticated as simple autoregressive models would suggest. Moreover, a more recent work by Carroll (2003) employs Mankiw and Reis (2001, 2002) to show that empirical household expectations are not rational, but that dynamics in expectations are well explained by a model to assume that households' views derive from news reports or those of professional forecasters.

The lack of empirical data that directly collects price expectations in Japan has seriously hampered these types of studies on price expectations. Before examining the formation of expectations, they need construction of price expectation data based on strong assumptions. Therefore, our data set serves as a breakthrough for research on price expectations in Japan.

3. Data

This study uses an original and rich micro-level data from the "Kokumin Seikatsu Monitors" (henceforth "monitors"). The Price Division of the Cabinet Office has those monitors to ask them timely questions about current policy matters including price or consumer policy issues. The sample size is about 2,400 for each survey and is allocated to each prefecture[6] proportionally to its population size. The sample is not randomly chosen; each prefecture publicly recruits voluntary respondents, paying attention to unbiased distribution in age, employment, and regions in each prefecture[7]. The voluntary application to monitors motivates respondents to answer each survey to the best of their ability and increases the response rate to more than 90–95 percent.

The survey was implemented twelve times between the second quarter of 2001 and

[6] There are 47 prefectures in Japan.

[7] In general, the number of applicants is larger than that of openings. Each prefecture contracts with selected respondents to answer eight questionnaires a year and pays12,000 yen (about US$100).

ended in March of 2004[8]. A monitor is surveyed quarterly (March, June, September and December 1st). Although some households are dropped after a fiscal year, most of them remain in the next year, which enables us to construct a longer panel data.

Apart from perception for the past year and expectations for the next year described below, the income questions also include uncertainty about employment, pensions, or social security. The consumption questions contain concrete reasons for increases or decreases in consumption for the past year and the next year. The price questions include the effect of change in monetary policy (i.e. quantitative easing) or exogenous shocks (i.e. the attack on Iraq) on price expectation and their reasons. The debt questions ask the burden of loans out of monthly salary and the effect of deflation on debt burdens.

In addition, we have detailed information on household characteristics such as head of household age, sex, employment status (industry if employed), residential status, family size, annual income level and regions. The basic characteristics of the monitors are summarized in Table 1. The average age of the surveyed households, i.e., respondents or their spouses, is around 50. The average annual income of head of household is around 5.5 million yen. About 90 percent of the monitors are female.

The most notable merit of this survey is to ask respondents directly not only directions, which all other consumer surveys in Japan rely on, but also changes in price, income, and consumption expectations in figures.

4. How Much Are Price Expectations of Japanese Households?

First, we aim to estimate household-level price expectations from our unique survey. The exact wordings of the questions related to price expectations in the "Kokumin Seikatsu Monitors" are as follows (henceforth, "price expectation"). The similar questions and answers are provided for perception of current price compared with the

[8] A pre-survey to contain similar questions was performed in the first quarter of 2001. The remaining four surveys are performed on an ad-hoc basis.

previous year (henceforth, “current price”).

(A) “During the next 12 months, do you think that prices in goods and services you frequently purchase on daily basis will go:

(1) up,

(2) remain the same,

(3) down

(4) uncertain?”

(B) If you answered ‘up’ or ‘down,’ how much do you think the price level will change during the past 12 months?

(C) If you cannot provide an actual number, please select from among the following choices:

(1) less than 20 percent
(2) minus 10 percent to minus 20 percent
(3) minus 5 percent to minus 10 percent
(4) minus 2 percent to minus 5 percent
(5) minus 0 percent to minus 2 percent
(6) plus 0 percent to plus 2 percent
(7) plus 2 percent to plus 5 percent
(8) plus 5 percent to plus 10 percent
(9) plus 10 percent to plus 20 percent
(10) more than 20 percent”

Figure 2-1 reports the estimates of average price expectation based on our survey. In what follows, we confine our sample to those who responded in actual figures, that is those choose (2) in (A) or select (1) or (3) in (A) and answered in (B)[9].

We have several interesting observations. Price expectations range from minus 0.2 percent to zero percent in 2001 and 2002. However, we see a big jump up to 1 percent in

[9] We also calculate price expectations based on the medium of multiple choices if excluding (1) or (10) and found that those trends are parallel when we either measure the expectation in actual figures or estimate it using the medium of multiple choices. We rely on the responses in (B) rather than (C) since it is hard to justify why the medium of each choice is taken and what figures are allocated for answers (1) or (10). We will focus on the data obtained from the actual figures while responses based on multiple choices are used to exclude contradictory answers.

the first quarter of 2003, followed by decline to 0.2 percent in the second quarter and a steady increase toward the first quarter of 2004, which marked 0.8. On the contrary, perception of current price was around minus 1.3 until the first quarter of 2002 and then the figures have gradually approached zero. Finally, it turned out to be positive in the last quarter of 2003 and now reached to one percent in the beginning of 2004. We should notice that perception of current price follows the development of the CPI (bold line in the figure) well. In other words, responses capture the actual trend in price development quite well. We also observe that perception of current price is always lower than the price expectation. This might reflect that household price expectations always have an inflationary bias.

One might think that changes in the samples cause those trends. To address that issue, we also plot the figures from the households that responded in all surveys. Figure 2-2 demonstrates that this is not the case. The trends in plotted variables are similar to those in Figure 2-1.

In sum, we observe deflationary expectations in 2001 and 2002, which ended by a big hike in the first quarter of 2003 and that price expectations have increased after the second quarter of 2004. Price expectations always have inflationary bias in this period, which exceeds perception of current prices tracks the development with the CPI.

5. The Determinants of Change in Price Expectation

The next question is what changes price expectations with a goal to examine whether household price expectations are revised independently of income or past price movements. Concretely, we focus on the effect of exogenous shocks such as implementation and announcement of monetary policy after 2001. Our data set has a panel structure, which enables us to investigate the formation of price expectations clearly after controlling heterogeneity in households.

Before running regressions to test what determines price expectations, we preview some important factors that are plausibly related with the formation of expectations.

First, price expectations naturally depend on the lagged and current actual price developments. The correlation coefficient is 0.3 between the price expectations and the lagged expectations. This implies the persistence or inertia of price expectations; once deflationary expectations are generated, we observe that those expectations last for a time. The coefficient between price expectations and perception of current price movements is 0.5. This indicates an adaptive behavior of households in the formation of expectations.

Second, income expectation or current income might affect price expectations. The questions related with income have exactly the same structure as those in the price questions explained above, including the multiple choices. Figure 3-1 describes the obtained series on current income and income expectations. As clearly observed, both of them have ranged from minus 1.5 percent to minus 3 percent. We should note that there is no "jump" in the first quarter of 2003 when a surge in price expectations is observed. In this sense, we cannot explain the hike in price expectation by income factors[10].

Third, we should consider the exogenous factors that affect price expectations. Our survey asked the monitors directly about their responses to changes in monetary policy or to exogenous shocks such as the attack on Iraq by the United States and the United Kingdom.

First, we should briefly describe the facts in the monetary policy first summarized in Table 2. The Bank of Japan has performed "quantitative easing" to increase the money supply to combat deflation since March 2001. This policy includes (1) a change in the operating target for money market operations, (2) CPI guidelines for the duration of the new procedures, (3) an increase in the current-account balance at the Bank of Japan and declines in interest rates, and (4) an increase in outright purchase of long-term government

[10] This trend is unchanged if we look at the results based on the same households that responded in all the surveys. See Hori and Shimizutani (2003).

bonds. The policy target was revised to expand in August, September and December including a reduction in the official discount rate from 0.15 to 0.10. In 2002, the Bank began to consider a new policy package to purchase stocks directly from the market in September and the operating target was revised again in October. In 2003, the Bank began to examine the possible purchase of asset-backed securities and the operating goal was revised in April, May, October and January in 2004.

Our survey asked the monitors their responses to some of those monetary policy shocks related with quantitative easing and several policy changes, which have been expected to contribute to alter the deflationary expectations. This type of monetary policy was brand new and a kind of regime change in Japan, but, as far as we know, there is no other survey to ask households how they reacted to those policies directly.

Figure 4 summarizes household responses to the policy in the 2002 March survey. About a half of the respondents knew about the policy[11]. However, out of those who knew about the policy, the share of respondents who revised their price expectations was less than 10 percent. More than 60 percent answered that there was no effect on their expectations and approximately 30 percent responded that they were not sure of the effect. Further, the survey asked the reasons for the respondents who knew about but did not react to the policy. About 10 percent answered that the magnitude was too small. About a half recognized that the quantitative easing policy cannot affect the economy, and the remaining 40 percent did not understand the mechanism of the policy effect.

Our survey also contains information on the respondents' answers to other type of exogenous shocks, such as terrorist attacks or the war in Iraq, reported in Figure 5. As regards the terrorist attack on the United States in September 2001, about 10 percent of respondents revised their expectations and about 40 percent responded they did not change their expectations and 20 percent lowered their expectations, probably due to anticipation

[11] The same questions were also asked in the second to fourth quarter in 2001 which of all observed the similar trend.

of the future economy. On the other hand, the Iraq war made more than half of respondents revise their expectations. Naturally, those figures are much larger than the cases of monetary policy change.

Based on those previews on several candidates to explain price expectations, we employ the following specifications to test jointly whether those factors affect price expectations.

$$P^{e}_{i,t+1} = \alpha_0 + \alpha_1 * P^{e}_{i,t} + \alpha_2 * P_{i,t} + \alpha_3 * Y_{i,t} + \alpha_4 * M_t + \alpha_5 * X_t + \alpha_6 * Macro_t + \alpha_7 * Z_{i,\tau} + \varepsilon_{i,t+1} \quad (1)$$

where $P^{e}_{i,t+1}$ is a household's price expectation at time t+1. $P_{i,t}$ is the current price change and $Y_{i,t}$ is the current income change, both of which are perceived by households. $Macro_t$ contains oil price change and composite index, or dummy variables for each quarter to control macroeconomic factors. Although not reported, $Z_{i,\tau}$ includes the squared age of head of households and logarithm of annual head of household income in fiscal year τ [12]. The last is an error term.

Our main interests are coefficients on $M_{i,t}$ and $X_{i,t}$. $M_{i,t}$ is a monetary policy shock at time t and takes two forms: a dummy for those who knew each change in monetary policy right after those events (henceforth, "knowledge dummy") and that for who actually revised their expectations (henceforth, "revision dummy"). As regards the "Knowledge dummy", the survey asked the respondents whether they knew the policy changes in quantitative easing implemented four times in 2001. In other cases of the policy changes, we assume that households are supposed to know them. Moreover, we allocate one for the respondents once they answered they knew the policy change. This is also the case with the "revision dummy", which takes one once a household changed its

[12] The information on household characteristics are obtained once in every fiscal year.

expectations due to each event of policy change. $X_{i,t}$ refers other exogenous shocks such as the terrorist attack in 2001 and the Iraq war in 2003, which takes a form of a dummy variable for respondents who revised their expectations[13].

Table 3-1 reports the results based on the "knowledge dummy". We notice that the coefficients on current price and lagged price expectations are positive and significant. Those on current price are 0.2-0.4 and those on price expectation are 0.1-0.3. In other words, price expectations have some elements of inertia of expectations and adaptive behaviors. On the contrary, the coefficients on current income are not significant in most cases and the estimated coefficients are much smaller than those on price factors. Those estimates imply that price factors matter for the formation of price expectations but they are not strongly correlated with current income[14].

What interests us is that the coefficients on the "knowledge dummy" are not significant in all cases. This finding demonstrates that knowledge of those policy changes, which occupies around a half of all respondents, did not result in changing their price expectations, which is consistent with the previews on household responses to those policies reported in Figure 4. In other words, about a half of households knew those changes of monetary policy but they did not alter price expectations only because they knew the events.

On the other hand, Table 3-2 shows the results based on the "revision dummy" for monetary policy and other exogenous shocks. The households in this sample in those regressions are those who knew the changes in monetary policy *and* actually revised their expectations and thus the coefficients on those dummies are expected to be positively significant. We run those regressions to measure how much price expectations were revised due to those events. The "revision dummy" takes one after all periods once a

[13] The survey assumes that all respondents knew those events.
[14] This might be because the survey asks the respondents about their income, rather than business conditions.

household revised expectations in response to monetary policy changes while one is allocated to those who changed due to the terrorist's attack or the Iraq war in the period.

First, we utilize cross-sectional variation to measure the magnitudes of their revisions. We observe that the findings on perception of current price, lagged price expectation and current income change in Table 3-1 are generally still valid for those in Table 3-2. Moreover we observe that the coefficients on "revision dummy" are positive and significant and the impacts decreased as time passed. Notice that that on the change of the governor revised price expectations of those respondents insignificantly. On the contrary, the coefficients on dummy variables for terrorist's attack on September 11 and the Iraq war are positive and significant.

Those cross-sectional regressions are not adjusted for by macroeconomic factors. Then, we turn to the panel estimates to pool those cross-section data with some variables on macroeconomic factors. The lower table in Table 3-2 demonstrates the results. We observe several interesting findings. First, the coefficients on policy changes related with quantitative easing are significant and large with the magnitude of 0.8 - 0.9 percent points in the first event (March, 2001), about 0.3 - 0.4 percent points in the second (August, 2001) and the third (September) though those in the latter two episodes are not always significant. The coefficients after those events are not significant. If we sum up the effects which proves to be significant, the magnitude is roughly comparable with those caused by other exogenous factors discussed below.

If we see the effect of monetary policy except quantitative easing, the examination of purchase of asset-backed securities had positive effects in some cases. However, we see no significant effect in the new initiative toward financial system stability or change of the governor from Hayami to Fukui.

On the other hand, the coefficients on the terrorist's attack and the Iraq war are positive and significant with the coefficients of 1.2 - 1.5. We should notice that the Iraq

war dummy for the first quarter of 2003 is large and significant without those dummies but the magnitude of the coefficient vastly decreased after including the dummy (results are omitted). This implies that the hike in the first quarter of 2003 was caused by those exogenous shocks.

In sum, what we found in this section is as follows. Current price developments and lagged price expectations contribute to form price expectations, which the adaptive behavior and inertia of expectation contribute to explain some parts of changes in price expectations. Current income does not have strong explanatory power. Those who knew about the quantitative easing policy did not revise their expectations at all. However, the policy was effective for those who knew about the policy and actually revised their expectations, which is true for the earlier episodes. Other exogenous shocks such as terrorist attacks or the war in Iraq are influential on price expectations, whose magnitude is comparable with those in monetary policy shocks in 2001. The temporary surge of price expectations in the first quarter of 2003 was attributable to those events. Those shocks raised price expectations by more than one percent, which are comparable with the sum of the monetary shock effects for those who revised their expectations in the earlier events.

6. The Effect of Deflationary Expectations on Consumption

Lastly, we turn to examine how price expectations affect household behavior. Naturally, we focus on the effect of deflationary expectations on household consumption. Deflationary expectations widen a household's budget constraints and stimulate consumption. On the other hand, if a household anticipates that deflation will continue in the future, it will deter the purchase of luxury goods, which dampens current consumption. Moreover, if a household combines deflationary expectations with anxiety toward the future regarding business cycles or employment, deflationary expectations

might discourage current consumptions. Thus, what deflationary expectations affect household consumption depends on empirical studies. The relationship between household balance sheet and consumption was discussed by Mishkin (1977, 1978) to examine the effects in the great depression and 1973-75.

In addition to quantitative evaluation of the effect of deflationary expectations on consumption, we also pay attention to what types of goods are more affected by price expectations. Moreover, we examine the difference in the effect for households with and without any loans to address the possibility that deflationary expectations raise the real debt burden that discourages consumption further.

The trend in consumption from our survey data is reported in Table 2. We observe that current and expected consumption was very weak until the third quarter of 2001 marked about minus 0.5 percent and then they have recovered steadily to around one percent in the first quarter of 2004.

In what follows, we estimate consumption functions to examine the effect of price expectation on household consumption. The basic specification is as follows.

$$C_{i,t} = \alpha_0 + \alpha_1 * Y^e{}_{i,t+1} + \alpha_2 * Y_{i,t} + \alpha_3 * P^e{}_{i,t+1} + \alpha_4 * (P^e{}_{i,t+1} * D_{it}) + \alpha_5 * D_{it} + \alpha_6 * Risk_{it} + \alpha_7 * X_{it} + \alpha_8 * Time + \varepsilon_{i,t} \quad (2)$$

$$C^e{}_{i,t} = \alpha_0 + \alpha_1 * C_{i,t} + \alpha_2 * Y^e{}_{i,t+1} + \alpha_3 * Y_{i,t} + \alpha_4 * P^e{}_{i,t+1} + \alpha_5 * (P^e{}_{i,t+1} * D_{it}) + \alpha_6 * D_{it} + \alpha_7 * Risk_{it} + \alpha_8 * X_{it} + \alpha_9 * Time + \varepsilon_{i,t+1} \quad (3)$$

where the dependent variable is consumption over the past year (C_{it}) or that over the next year (C^e_{it+1}). Those variables are measured both in actual figures. The explanatory variables include income over the past year (Y_{it}), expected income over the next year (Y^e_{it+1}), and price expectation over the next year (P^e_{it+1}). Moreover, they contain a

dummy for a household with any debt (D_{it}), risk perceptions ($Risk_{it}$) for being unemployed and for social security and pensions, respectively. In addition, X_{it} includes a variety of dummies to control a household's demographics including a squared age of head of household and the logarithm of head of household annual income level. Time dummies are also included for each quarter from the second of 2001 to the first of 2004.

Table 4-1 reports the estimation results. First, if we have consumption over the past year as the dependent variable, the coefficients on income over the year, expected income over the next year and current price change are positive and statistically significant in most cases. The coefficients on price expectations we should focus on are also positive and significant and the impact is around 0.1. In other words, inflationary expectation stimulates current consumption and deflationary expectations discourage consumption. The effects of household debts or their interaction with price expectations are ambiguous.

Second, what we observed for expected consumption is basically applicable to the case of current consumption as the dependent variable. We note that the coefficients on current consumption and income expectations are positive and significant. What we should pay attention to is the coefficients on price expectations are positive, which imply that deflationary expectations dampens expected consumption. If we include an interaction term between price expectations and debt payment dummy, the coefficient is large and significant while significance of those on price expectations disappears. This finding means that that price expectation affects expected consumption for those who have debt payment. In other words, deflationary expectations dampen expected consumption through an increase in debt burden

Next, to examine what types of goods are more affected by price expectation, we focus on the durables. Our survey asks the following question to respondents.

(Question)

"Do you plan to purchase more durables over the next year relative to the past year?"

(Answer)

(1) plan to buy more (2) remain the same

(3) plan to buy less (4) uncertain

We create a new dummy variable to allocate 1 for choice 1, 0 for choice 2 and –1 for choice 3. We replace the dependent variables to the dummy variable. We estimate the regression by the ordered probit estimation.

The left hand side of Table 4-2 reports the results. This basically replicates the results in Table 3-1. The coefficients on current income and expected income are positive and significant. Consciousness of risk to be unemployed or concerns for future income or job clearly discourages durables goods purchase. The effects of price expectations are ambiguous. If we include an interaction term between price expectation and debt payment dummy, the coefficient on price expectation is positive and significant to imply that price expectation stimulates respondents to buy durable goods, which in turn implies that deflationary expectations discourage consumers to buy durables. However, the effects for the samples with debt are ambiguous.

Moreover, the right hand side of Table 4-2 investigates the timing of durable goods purchase directly. The dependent variable is a dummy variable to allocate 1 for those who postpone purchase of durables and 0 for those who do not. The coefficients on price expectations are negative and significant. This means that deflationary expectations deter the timing of durables goods purchases. This is also true for those households with debt.

In sum, the empirical findings in the section demonstrate deflationary expectations discourage household consumption including durables through postponing the timing of purchase.

7. Conclusion

This study takes advantage of an original and rich quarterly household-level data to estimate price expectations, to examine what changes price expectations, and to explore how changes in price expectations affect household consumption.

Our empirical estimates indicate that price expectations range from minus 0.2 percent to zero percent in 2001 and 2002. However, we see a big jump up to 1 percent in the first quarter of 2003, followed by decline to 0.2 percent in the second quarter and a steady increase toward the first quarter of 2004, which marked 0.8. Price expectations are dependent on current price movements and lagged expectations. Awareness of monetary policy announcements does not largely change price expectations in Japan, since a series of quantitative easing caused revision of price expectations only for small portion, i.e., 5-10% of people surveyed. The jump in the first quarter of 2003 was caused by the Iraq war. We also confirm that deflationary expectations discourage consumption in households with debts, mainly durables, through postponing the timing of purchases.

We should notice that a series of quantitative easing were not very much effective to alter the expectations of all households; rather, only the Iraq war was an influential impact to change price expectations. Note that the degree of revision for those who revised expectations was similar order among those events examined in this study, but that the share of households affected is very much different. Keeping this in mind, the monetary authorities should implement quantitative easing in more aggressive and understandable ways if it intends to alter deflationary expectations.

(References)

Carlson, J. A. and Parkin, M (1975). "Inflation Expectations," *Economica*, vol.42, pp.123-138.

Carroll, Christopher D. (2003). "Macroeconomic Expectations of Households and Professional Forecasters," *Quarterly Journal of Economics*, pp.269-298.

Fisher, Irving (1933). "The Debt Deflation Theory of Great Depressions," *Econometrica*, pp. 337-57.

Fukuda, Shinichi and Yoshida, Masayuki (2001). "A Perspective on Empirical Studies on Inflation Expectation," (in Japanese), *Research and Statistics Department Working Paper Series*, Bank of Japan.

Hori, Masahiro and Satoshi Shimizutani (2003). "What Changes Deflationary Expectations? Evidence from Japanese Household-level Data," *ESRI Discussion Paper Series*, No.65.

Kitamura, Yukinobu (1997). "Indexed Bonds and Monetary Policy: The Real Interest Rate and The Expected Rate of Inflation," *Bank of Japan Monetary and Economic Studies*, vol.15, no.1, pp.1-25.

Kitamura, Yukinobu (2004). "Information Contents of Inflation Indexed Bond Prices: Evaluation of U.S. Treasury Inflation-Protection Secutiries, "*Bank of Japan Monetary and Economic Studies*, forthcoming.

Mankiw, N. Gregory and Reis, Ricardo (2001). "Sticky Information: A Model of Monetary Nonneutrality and Structural Slumps," *NBER Working Paper* No.8614.

Mankiw, N. Gregory and Reis, Ricardo (2002). "Sticky Information Versus Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve," *Quarterly Journal of Economics*, CXVII, pp.1295-1328.

Mishkin, Frederic (1977). "What Depressed the Consumer? The Household Balance Sheet

and the 1973-75 Recession, " *Brookings Paper on Economic Activity*, no.1, pp.123-164.

Mishkin, Frederic (1978). "The Household Balance Sheet and the Great Depression," *Journal of Economic History*, vol. XXXVIII, no.4, pp.918-937.

Roberts, John M., (1998). "Inflation Expectations and the Transmission of Monetary Policy," *Federal Reserve Board FEDS working paper* No. 1998-43.

Shimizutani, Satoshi and Yogi, Tatsuhiro (2003). "Currency Devaluation and Price Expectation: Lessons from Okinawa in the 1970s" (in Japanese), *ESRI Discussion Paper Series* No.30, Economic and Social Research Institute, Cabinet Office.

Figure 1: Price Movements from 1980

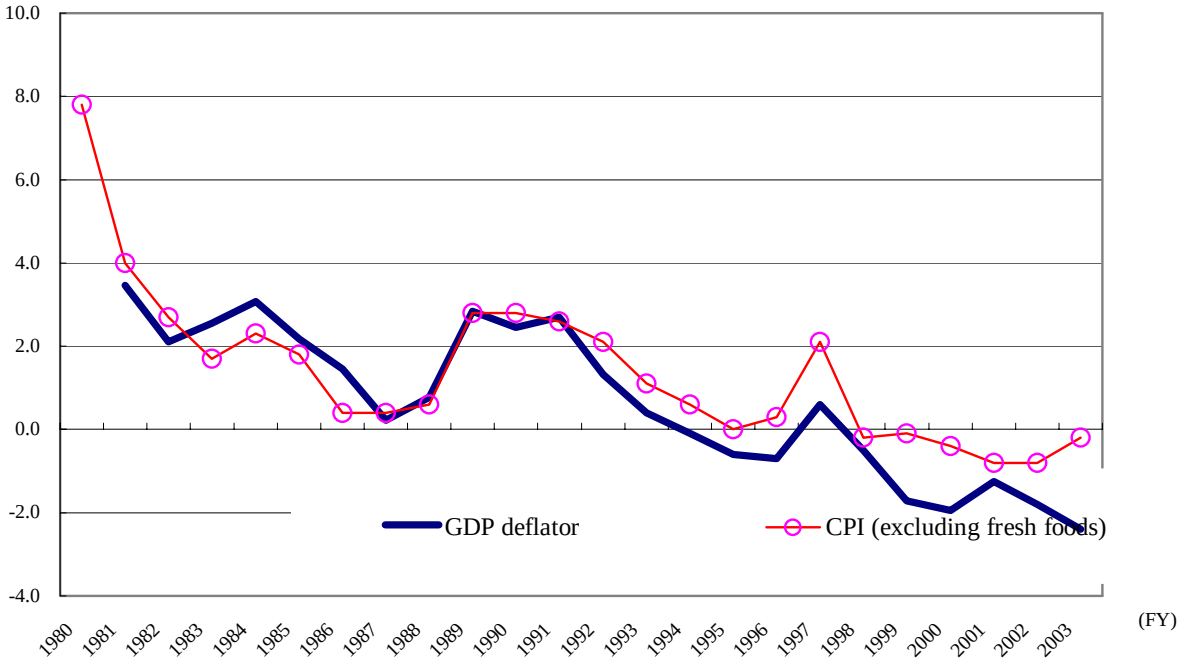


Figure 2-1: Current Price and Price Expectations (Average, All Sample)

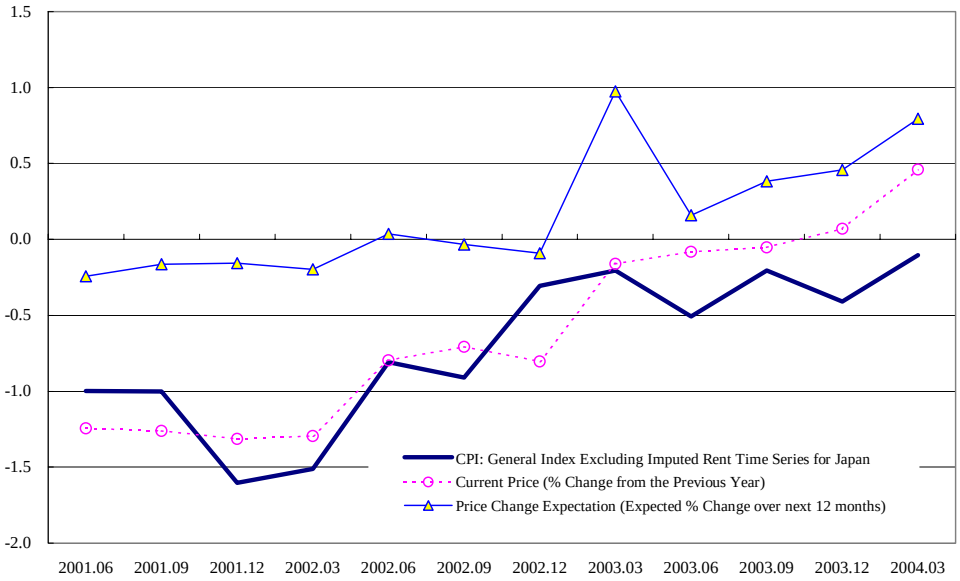


Figure 2-2: Current Price and Price Expectations (Average, Full-Cover Sample Only)

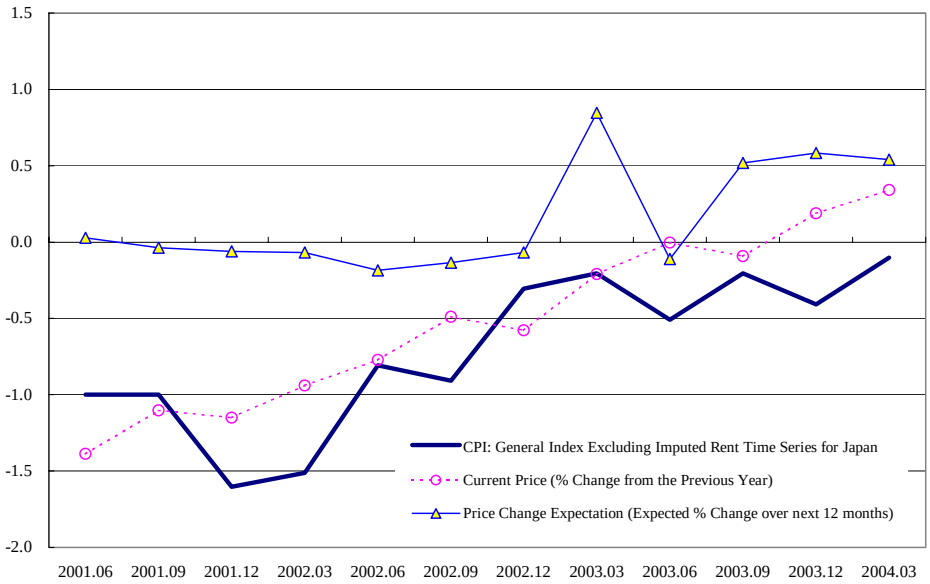


Figure 3: Income and Consumption (Actual and Expectations; Average, All Sample)

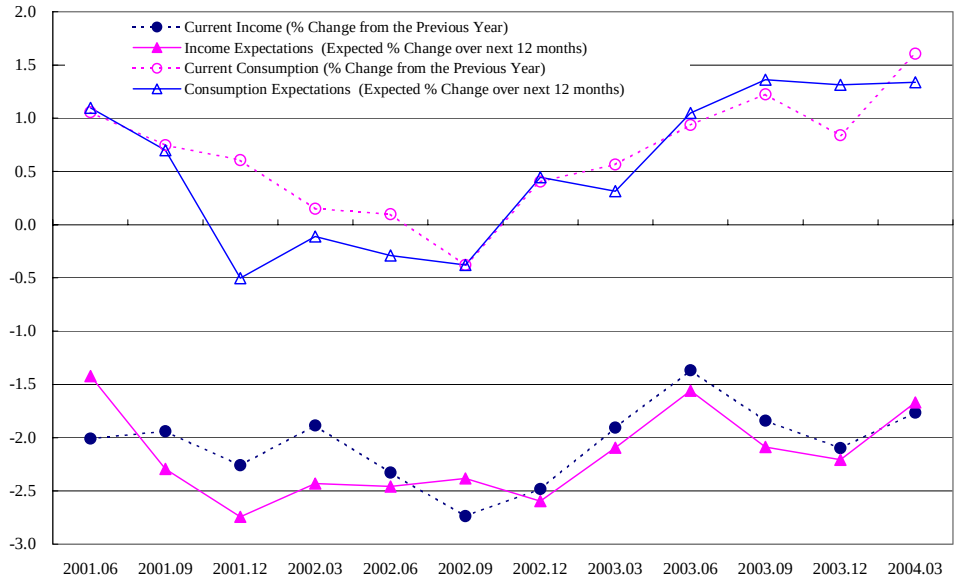
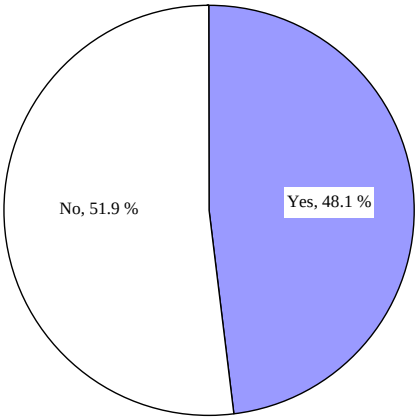
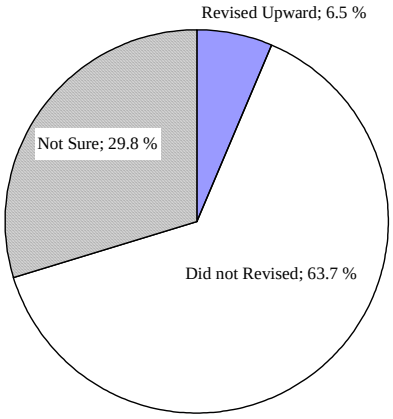


Figure 4: Knowledge and Reaction to the Easy Monetary Policy Announcement (March 2002 Survey)

(1) Do you know about the BOJ's "Quantitative Monetary Easing" that was introduced on March 19, 2001? (June 2001 Survey)



(2) Did you revise your price expectations in response to the "Quantitative Monetary Easing"? (June 2001 Survey)



(3) Reason why the people surveyed did not react to the "Quantitative Monetary Easing" Announcements. (March 2002 Survey)

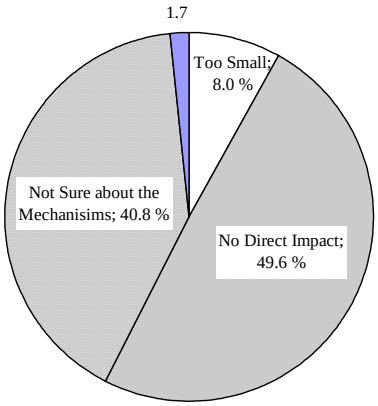
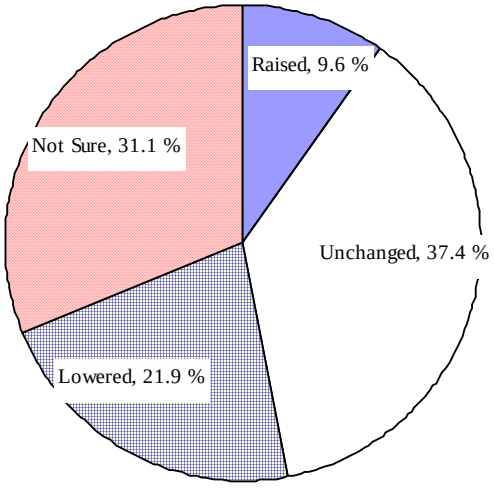


Figure 5: Reaction of Price Expectations to News (Terrorism, Iraq War)

(1) Did you revise your price expectations in response to the September 11th Terrorism? (December 2001 Survey)



(2) Did you revise your price expectations in response to the Iraq War? (March 2003 Survey)

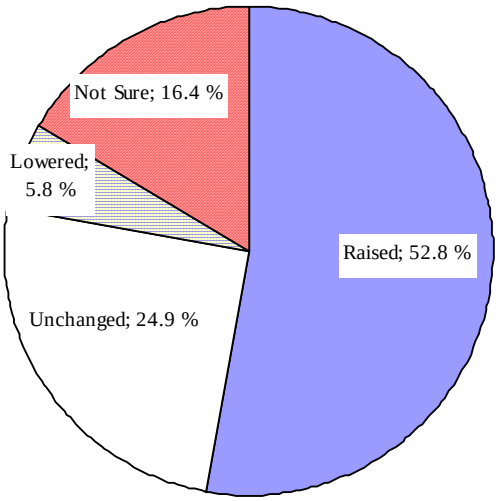


Table 1: Basic Characteristics of the Monitors

	Obs	Mean	Std. Dev.	Min	Max
Age of the Person Surveyed	27,520	48.41	12.87	20	80
Sex of the Person Surveyed (Male=1)	27,468	0.11	0.31	0	1
Age of Household Head	27,432	51.13	12.87	20	93
Sex of Household Head (Male=1)	27,432	0.90	0.30	0	1
Annual Income of Household Head (10 thouand yen)	27,376	546.48	327.81	50	2,500
Number of Family Members	27,488	3.50	1.36	1	6
Distribution of Family Type					
Single Household Dummy	27,456	0.03	0.18	0	1
Married Couple (without Children) Household Dummy	27,456	0.23	0.42	0	1
Two Generation Household Dummy	27,456	0.55	0.50	0	1
Three Generation Household Dummy	27,456	0.16	0.37	0	1
Other Household Dummy	27,456	0.03	0.16	0	1
Distribution of Residence Type					
Own House Dummy	27,508	0.83	0.38	0	1
Rental House Dummy	27,508	0.12	0.33	0	1
Company House Dummy	27,508	0.03	0.18	0	1
Other House Dummy	27,508	0.01	0.12	0	1

(Note) This table is based on the sample from the second quarter of 2001 to the first quarter of 2004.

Table 2: Changes in Monetary Policy from 2001 to the First Quarter of 2004

Year	Month	Changes in Monetary Policy
2001	19, Mar.	New Procedures for Money Market Operations and Monetary Easing [**]
		Change in the operating target for money market operations
		CPI guidelines for the duration of the new procedures
		Increase in the current-account balance at the Bank of Japan (5 trillion yen) and declines in interest rates (0.15%)
		Increase in outright purchase of long-term government bonds (400 billion yen)
2001	14, Aug.	Change in the Guideline for Money Market Operations [**]
		Increase in the current-account balance at the Bank of Japan (6 trillion yen)
		Increase in outright purchase of long-term government bonds (600 billion yen)
2001	18, Sep.	Change in the Guideline for Money Market Operations and Reduction in the Official Discount Rate [**]
		Change in the operating target for money market operations (above 6 trillion yen)
		Declines in interest rates (0.10%)
2001	19, Dec.	Change in the Guideline for Money Market Operations [**]
		Change in the operating target for money market operations (10 - 15 trillion yen)
		Increase in outright purchase of long-term government bonds (800 billion yen)
2002	28, Feb.	On Today's Decision at the Monetary Policy Meeting
		Change in the operating target for money market operations for the end of year
		Increase in outright purchase of long-term government bonds (1 trillion yen)
2002	18, Sep.	Introduction of "the Purchase/Sale of Japanese Government Securities with Repurchase Agreements" [*]
2002	30, Oct.	Change in the Guideline for Money Market Operations [*] (echoed with Government's Policy Package)
		Change in the operating target for money market operations (15 - 20 trillion yen)
		Increase in outright purchase of long-term government bonds (1.2 trillion yen)
2002	17, Dec.	Measures to Faciliate Smooth Corporate Financing
2003	20, March	Change of the Governor (from Hayami to Fukui)
2003	25, Mar.	On Today's Decision at the Monetary Policy Meeting
		Change in the operating target for money market operations (17 - 22 trillion yen)
		Increase in outright purchase of long-term government bonds (1 trillion yen)
2003	8, Apr.	Examination of Possible Purchase of Asset-Backed Securities [*]
2003	30, Apr.	Change in the Guideline for Money Market Operations [*]
		Change in the operating target for money market operations (22 - 27 trillion yen)
2003	20, May	Change in the Guideline for Money Market Operations
		Change in the operating target for money market operations (27 - 30 trillion yen)
2003	11, Jun.	Purchase of Asset-Backed Securities
2003	12, Sep.	Review of Extending Maturities of the Purchase/Sale of Japanese Government Securities with Repurchase Agreements
2003	10, Oct.	Enhancement of Monetary Policy Transparency
		On Today's Decision at the Monetary Policy Meeting
		Change in the operating target for money market operations (27 - 32 trillion yen)
2003	16, Dec.	Review of the Conditions regarding the Purchase of Asset-Backed Securities
2004	20, Jan.	Changes in the Guideline for Money Market Operations
		Change in the operating target for money market operations (30 - 35 trillion yen)
		Modification of the Conditions regarding the Purchase of Asset-Backed Securities
2004	26, Feb.	Study of the Introduction of a Facility to Enhance Liquidity of Japanese Government Securities Markets

(Note) Data source is the BOJ's web (www.boj.or.jo/en/seisaku).
[**] refers to all cases to construct both "knowledge dummy" and "revision dummy" and [*] does to those to make "revision dummy".

Table 3-1: Determinants of Price Expectations (Knowledge Dummy)

Dependent Variable:	Cross-Section Regressions				Panel Regressions	
Price Change Expectations (t)	<1>	<2>	<3>	<4>	<5>	<6>
Current Price Change (t)	0.379 ***	0.291 ***	0.177 ***	0.382 ***	0.317 ***	0.314 ***
	[0.039]	[0.021]	[0.025]	[0.024]	[0.008]	[0.008]
Lagged Price Change Expectation (t-1)	0.111 **	0.249 ***	0.341 ***	0.157 ***	0.228 ***	0.230 ***
	[0.054]	[0.028]	[0.036]	[0.030]	[0.011]	[0.011]
Current Income Change (t)	0.016	0.010	-0.005	0.035 ***	0.007 *	0.007 *
	[0.017]	[0.011]	[0.012]	[0.012]	[0.004]	[0.004]
Dummy Variable (Know=1)						
Quantitative Easing (Mar., 2001)	0.386				0.159	0.135
	[0.329]				[0.136]	[0.139]
Quantitative Easing (Aug., 2001)		0.085			-0.100	-0.105
		[0.175]			[0.153]	[0.161]
Quantitative Easing (Sep., 2001)			-0.176		0.161	0.082
			[0.224]		[0.127]	[0.144]
Quantitative Easing (Dec., 2001)				0.081	-0.092	0.090
				[0.217]	[0.101]	[0.108]
Macro Factors						
Oil Price Change					0.006 ***	
					[0.002]	
Composite Index					0.000	
					[0.008]	
Time Dummies	no	no	no	no	no	yes
Number of obs	201	873	799	788	6699	6699
Adj R-squared	0.3534	0.2748	0.1893	0.2926	0.2643	0.2703
Root MSE	2.3034	2.5641	3.1416	2.9255	2.5399	2.5295
Estimation Periods	Jun-01	Sep-01	Dec-01	Mar-02	From 2001.2Q To 2004. 1Q	From 2001.2Q To 2004. 1Q

Table 3-2: Determinants of Price Expectations (Revision Dummy)

Dependent Variable: Price Expectations (t	Cross Sectional Regressions					
(Change for the next	<1>	<2>	<3>	<4>	<5>	<6>
Current Price Change (t)	0.371 ***	0.284 ***	0.179 ***	0.388 ***	0.269 ***	0.312 ***
	[0.038]	[0.021]	[0.025]	[0.023]	[0.024]	[0.024]
Lagged Price Change Expectation (t-1)	0.084	0.247 ***	0.314 ***	0.147 ***	0.237 ***	0.135 ***
	[0.052]	[0.028]	[0.035]	[0.030]	[0.027]	[0.022]
Current Income Change (t)	0.011	0.010	-0.005	0.035 ***	-0.005	-0.006
	[0.016]	[0.010]	[0.012]	[0.012]	[0.009]	[0.010]
Dummy Variable (in response to each Policy Announcement)						
Quantitative Easing (Mar.19, 2001)	2.962 ***					
	[0.776]					
Quantitative Easing (Aug.14, 2001)		1.662 ***				
		[0.509]				
Quantitative Easing (Sep.18, 2001)			1.724 ***			
			[0.488]			
Quantitative Easing (Dec.19, 2001)				1.355 ***		
				[0.506]		
Quantitative Easing (Oct.30, 2002)					0.620 *	
					[0.338]	
Quantitative Easing (Apr.30, 2003)						0.716 **
						[0.360]
Number of obs	201	876	802	793	924	662
Adj R-squared	0.3939	0.2834	0.1966	0.307	0.2204	0.2706
Root MSE	2.2301	2.5445	3.1256	2.9446	2.314	2.034
Estimation Periods	Jun-01	Sep-01	Dec-01	Mar-02	Dec-02	Jun-03

Dependent Variable: Price Expectations (t)	Cross Sectional Regressions					
(Change for the next y	<7>	<8>	<9>	<10>	<11>	<12>
Current Price Change (t)	0.336 ***	0.274 ***	0.309 ***	0.401 ***	0.175 ***	0.392
	[0.016]	[0.024]	[0.024]	[0.029]	[0.025]	[0.029]
Lagged Price Change Expectation (t-1)	0.342 ***	0.238 ***	0.135 ***	0.212 ***	0.314 ***	0.212
	[0.021]	[0.027]	[0.022]	[0.041]	[0.035]	[0.040]
Current Income Change (t)	-0.003	-0.005	-0.005	0.008	-0.004	0.011
	[0.006]	[0.009]	[0.010]	[0.013]	[0.012]	[0.012]
Dummy Variable (in response to each Policy Announcement)						
Quantitative Easing (Oct.10, 2003)	0.628 ***					
	[0.235]					
New Initiative Toward Financial System		0.794 **				
Stability (Sep.18, 2002)		[0.399]				
Examination of Purchase of Asset-Backed			0.676 *			
Securities (Apr.8, 2003)			[0.388]			
Change of the Governor (Hayami to Fukui)				0.463		
(Mar.20, 2003)				[0.469]		
Dummy Variable						
Terrorist Attack (Sep.11, 2001)					1.651 ***	
					[0.367]	
Iraq War (Mar.20, 2003)						1.317 ***
						[0.200]
Number of obs	1856	924	662	893	802	893
Adj R-squared	0.3571	0.2209	0.2695	0.2225	0.2042	0.2577
Root MSE	2.2318	2.3133	2.0355	3.0578	3.1108	2.9878
Estimation Periods	Dec-03	Dec-02	Jun-03	Mar-03	Dec-01	Mar-03
	Mar-04					

Dependent Variable: Price Expectations (t	Panel Regressions (2001. 2Q-2004.1Q)					
(Change for the next	<13>	<14>	<15>	<16>	<17>	<18>
Current Price Change (t)	0.304 ***	0.304 ***	0.300 ***	0.301 ***	0.301 ***	0.300 ***
	[0.010]	[0.010]	[0.009]	[0.009]	[0.009]	[0.009]
Lagged Price Change Expectation (t-1)	0.212 ***	0.211 ***	0.212 ***	0.214 ***	0.214 ***	0.213 ***
	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]	[0.012]
Current Income Change (t)	0.008 *	0.007 *	0.008 *	0.008 *	0.008 *	0.008 *
	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]	[0.004]
Dummy Variable (in response to each Policy Announcement)						
Quantitative Easing (March 19, 2001)	0.886 ***	0.881 ***	0.850 ***	0.861 ***	0.856 ***	0.839 ***
	[0.187]	[0.187]	[0.185]	[0.186]	[0.186]	[0.186]
Quantitative Easing (August 14, 2001)	0.411 *	0.376	0.349	0.406 *	0.379 *	0.351
	[0.230]	[0.231]	[0.229]	[0.229]	[0.230]	[0.229]
Quantitative Easing (September 18, 2001	0.412 ***	0.382 **	0.271	0.406 **	0.382 **	0.263 *
	[0.159]	[0.160]	[0.160]	[0.159]	[0.160]	[0.160]
Quantitative Easing (December 19, 2001	0.326	0.325	0.290	0.379 *	0.375 *	0.329
	[0.203]	[0.203]	[0.202]	[0.203]	[0.203]	[0.203]
Quantitative Easing (October 30, 2002)	-0.072	-0.312	-0.303	-0.085	-0.296	-0.309
	[0.228]	[0.261]	[0.259]	[0.227]	[0.261]	[0.260]
Quantitative Easing (April 30, 2003)	0.390	0.043	0.070	0.407	0.070	0.080
	[0.281]	[0.324]	[0.321]	[0.280]	[0.323]	[0.322]
Quantitative Easing (October 10, 2003)	0.556	0.451	0.441	0.494	0.390	0.412
	[0.358]	[0.361]	[0.358]	[0.360]	[0.363]	[0.361]
New Initiative Toward Financial System		0.388	0.344		0.360	0.343
Stability (September 18, 2002)		[0.259]	[0.257]		[0.259]	[0.258]
Examination of Purchase of Asset-Backed		0.618 *	0.663 **		0.636 *	0.660 **
Securities (April 8, 2003)		[0.333]	[0.331]		[0.332]	[0.330]
Change of the Governor (Hayami to Fukui)		0.137	0.002		0.035	-0.008
(March 20, 2003)		[0.224]	[0.223]		[0.224]	[0.223]
Dummy Variable						
Terrorist Attack (September 11, 2001)			1.347 ***			1.210 ***
			[0.379]			[0.391]
Iraq War (March 20, 2003)			1.538 ***			1.403 ***
			[0.183]			[0.229]
Macro Factors						
Oil Price Change	0.006 ***	0.006 ***	-0.001			
	[0.002]	[0.002]	[0.002]			
Composite Index	0.009	0.007	0.019			
	[0.008]	[0.008]	[0.008]			
Time Dummies	no	no	no	yes	yes	yes
Number of obs	5220	5220	5220	5220	5220	5220
Adj R-squared	0.2556	0.2561	0.2679	0.2615	0.2619	0.2682
Root MSE	2.5082	2.5074	2.4873	2.4982	2.4975	2.4868

Table 4-1: Estimates of Consumption Functions

	Current Consumption (t)					
	OLS		randon effects		fixed effects	
Current Consumption						
Current Income	0.206***	0.206***	0.185***	0.185***	0.185***	0.185***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.018)	(0.018)
Income Expectation	0.033**	0.033**	0.033**	0.033**	0.005	0.005
	(0.016)	(0.016)	(0.016)	(0.016)	(0.020)	(0.020)
Current Price change	0.112***	0.110***	0.074**	0.074**	0.047	0.047
	(0.029)	(0.029)	(0.029)	(0.029)	(0.037)	(0.037)
Price Expectation (X)	0.137***	0.090**	0.099**	0.093**	0.061	0.111**
	(0.037)	(0.044)	(0.038)	(0.043)	(0.047)	(0.054)
(X) * (Y)		0.146**		0.019		-0.155*
		(0.069)		(0.068)		(0.081)
Debt Repayment dummy (Y)	0.215	0.187	-0.0003	-0.003	-0.121	-0.090
	(0.238)	(0.239)	(0.242)	(0.243)	(0.308)	(0.308)
Risk to be unemployed	-0.588**	-0.593**	-0.359	-0.360	0.552	0.550
	(0.255)	(0.254)	(0.273)	(0.273)	(0.389)	(0.389)
Concerns about social sec. & pensi	-0.084	-0.076	-0.132	-0.130	-0.204	-0.203
	(0.261)	(0.260)	(0.268)	(0.268)	(0.358)	(0.357)
Change in Family Members	0.850**	0.848**	0.744*	0.744*	0.690	0.685
	(0.419)	(0.419)	(0.392)	(0.392)	(0.452)	(0.452)
Purchase of residence	3.882***	3.839***	3.459***	3.453***	2.924**	2.978**
	(1.318)	(1.318)	(1.213)	(1.214)	(1.360)	(1.360)
Head of Household Income	0.394**	0.389**	0.409***	0.409*	0.493	0.477
	(0.184)	(0.184)	(0.220)	(0.220)	(0.549)	(0.549)
Head of Household Age	0.032	0.032	0.023	0.023	-0.472	-0.461
	(0.069)	(0.069)	(0.086)	(0.086)	(0.349)	(0.349)
Head of Household Age	-0.001	-0.001	-0.001	-0.001	0.005	0.004
(Squared)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)
Adj R-squared	0.0792	0.083			0.0492	0.0501
Root MSE	8.0421	8.0398				
Number of obs.	5922	5922	5922	5922	5922	5922
Wald chi2			391.67	392.07		

(Note) All regressions include time dummies for each period, whose results are omitted.

	Expected Consumption (t+1)					
	OLS		randon effects		fixed effects	
Current Consumption	0.449***	0.447***	0.398***	0.398***	0.314***	0.315***
	(0.012)	(0.011)	(0.012)	(0.012)	(0.015)	(0.015)
Current Income	-0.002	-0.002	-0.003	-0.003	0.001	0.001
	(0.013)	(0.013)	(0.013)	(0.013)	(0.016)	(0.016)
Income Expectation	0.151***	0.152***	0.158***	0.159***	0.154***	0.154***
	(0.014)	(0.014)	(0.014)	(0.014)	(0.019)	(0.019)
Current Price change	-0.024	-0.029	-0.043	-0.045*	-0.082**	-0.082**
	(0.026)	(0.026)	(0.026)	(0.026)	(0.033)	(0.033)
Price Expectation (X)	0.127***	0.037	0.131***	0.046	0.122***	0.043
	(0.033)	(0.039)	(0.034)	(0.039)	(0.043)	(0.049)
(X) * (Y)		0.272***		0.261***		0.233***
		(0.061)		(0.061)		(0.073)
Debt Repayment dummy (Y)	0.138	0.091	-0.010	-0.053	0.077	-1.194***
	(0.212)	(0.212)	(0.218)	(0.218)	(0.282)	(0.355)
Risk to be unemployed	-0.711***	-0.725***	-0.872***	-0.879***	-1.201**	-0.294
	(0.227)	(0.227)	(0.244)	(0.244)	(0.355)	(0.328)
Concerns about social sec. & pensi	-0.102	-0.081	-0.243	-0.225	-0.298	0.346
	(0.233)	(0.233)	(0.242)	(0.241)	(0.329)	(0.410)
Change in Family Members	-0.011	-0.008	0.003	0.010	0.335	2.281*
	(0.370)	(0.370)	(0.352)	(0.351)	(0.411)	(1.319)
Purchase of residence	1.841	1.782	2.079*	1.990*	2.402*	0.002
	(1.262)	(1.260)	(1.182)	(1.180)	(1.320)	(0.498)
Head of Household Income	-0.212	-0.223	-0.059	-0.066	-0.001	0.315
	(0.163)	(0.163)	(0.192)	(0.192)	(0.498)	(0.309)
Head of Household Age	0.011	0.011	0.022	0.022	0.333	-0.003
	(0.061)	(0.061)	(0.075)	(0.075)	(0.309)	(0.003)
Head of Household Age	-0.001	-0.001	-0.001	-0.001	-0.003	
(Squared)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	
Adj R-squared	0.2911	0.2968			0.1630	0.1655
Root MSE	6.8937	6.8819				
Number of obs.	5479	5479	5479	5479	5479	5479
Wald chi2			1767.32	1790.45		

(Note) All regressions include time dummies for each period, whose results are omitted.

Table 4-2: The Effect of Price Expectations on Durable Goods Purchase

	Ordered probit model Durable Consumption Prospect (1:Increase,0:No Change,-1:Decrease)		Probit model (marginal effects) Timing of Consumption (1: Postpone, 0: Others)	
Current Income	0.008***	0.008***	0.0001	0.0001
	(0.002)	(0.002)	(0.003)	(0.0002)
Income Expectation	0.011***	0.011***	-0.001**	-0.006**
	(0.002)	(0.002)	(0.0003)	(0.003)
Current Price change	0.005	0.006	0.001	0.001
	(0.004)	(0.004)	(0.001)	(0.001)
Price Expectation (X)	0.007	0.013**	-0.011***	-0.010***
	(0.005)	(0.006)	(0.001)	(0.001)
(X) * (Y)		-0.020*		-0.002*
		(0.010)		(0.001)
Debt Repayment dummy (Y)	-0.118***	-0.115***	0.013**	0.009*
	(0.034)	(0.034)	(0.005)	(0.005)
Risk to be unemployed	-0.119***	-0.119***	0.004	0.004
	(0.037)	(0.037)	(0.005)	(0.005)
Concerns about social sec. & pensio	-0.260***	-0.261***	0.007	0.008
	(0.037)	(0.037)	(0.005)	(0.005)
Change in Family Members	0.010	0.010	-0.013**	-0.013**
	(0.060)	(0.060)	(0.007)	(0.007)
Purchase of residence	0.155	0.164		
	(0.204)	(0.204)		
Head of Household Income	0.081***	0.082**	-0.002	-0.002
	(0.027)	(0.027)	(0.003)	(0.003)
Head of Household Age	-0.035***	-0.036***	-0.002**	-0.002**
	(0.010)	(0.010)	(0.001)	(0.001)
Head of Household Age (Squared)	0.0003***	0.0002***	0.00002**	0.00002**
	(0.0001)	(0.0001)	(0.00001)	(0.00001)
Pseudo R2	0.0280	0.0284	0.2882	0.2901
Log likelihood	-5149.8069	-5147.9684	-583.74824	-582.21703
Number of obs.	6042	6042	4612	488