

**(Box 2) Households' Tolerance of Price Rises**

In order for inflation to rise moderately in a stable manner, it is essential to create an environment in which people accept price rises to some extent. When households' tolerance of price rises -- hereafter households' tolerance -- is low, a rise in inflation could make consumers' attitudes toward spending defensive, and as a result hinder the positive feedback between improvements in economic conditions and inflation.

On this point, we take "comments on the rise in prices" from the *Opinion Survey on the General Public's Views and Behavior* as a measure for households' tolerance. Chart B2-1 shows that, following the introduction of QQE in 2013, the level of households' tolerance shifted upward in a favorable direction compared to past levels. However, it has not maintained its high level in a stable manner so far, as it declined temporarily in the second half of 2014 to 2015 and more recently declined slightly once again in late 2017.

We investigate the background of these developments by working with individual respondents' data obtained in the above survey and decompose changes in households' tolerance into factors such as households' perceived inflation and its outlook, as well as views on employment, per household income (wages), economic conditions, and their outlook. The results are shown in Chart B2-1, which indicates that sharp rises in households' perceived inflation and its outlook put downward pressure on their tolerance. Conversely,

**Chart B2-1: Households' Tolerance of Price Rises**

**1. Estimation Model Specification**

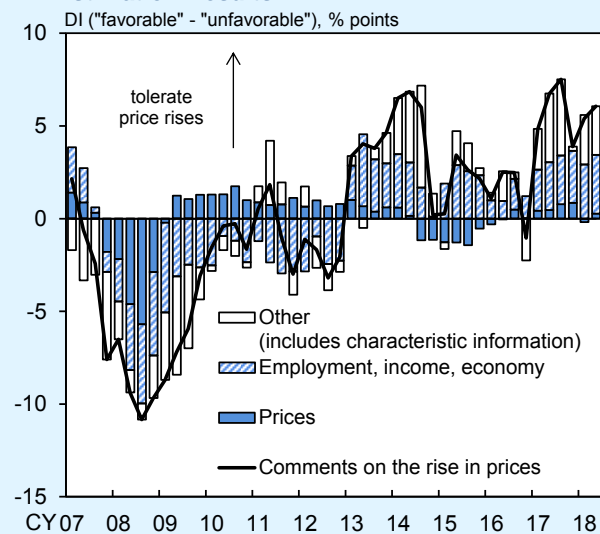
(Ordered Probit Model)  
 Dependent variable:  
*Opinion Survey on the General Public's Views and Behavior*  
 "Comments on the rise in prices"

Explanatory variable:

(1) Perception of the present price levels	} Prices
(2) Outlook for price levels one year from now	
(3) Outlook for price levels over the next five years	
(4) Employment and working conditions	} Employment, income, economy
(5) Present income	
(6) Income one year from now	
(7) Present economic conditions	
(8) Economic conditions one year from now	

Note: Gender, level of income, and age are also controlled for.

**2. Estimation Results**



Source: Bank of Japan.  
 Notes: 1. Comments on the rise in prices are chosen among three alternatives: "rather favorable," "difficult to say," and "rather unfavorable."  
 2. Estimation is done using effective samples in which all the relevant questions for the estimation were answered.  
 3. Figures show deviations from the displayed period average.

improvements in households' views on employment, wages, economic conditions, and their outlook drive households' tolerance in a favorable direction. Therefore, in order for households to be more tolerant of price rises, it is necessary to avoid sharp rises in inflation and promote improvements in the employment and income situation, such as wages, as well as growth expectations of the economy.

These tendencies also can be confirmed using the newly generated long historical data.<sup>44</sup> On inspection, the effects of inflation on households' tolerance seem to change during different phases. In this regard, we estimate a regime-switching model where households' tolerance shifts between an "easy to rise" regime and an "easy to decline" regime depending on the level of real wage growth, which is defined as the difference between wage growth and CPI inflation. The estimation results in Chart B2-2 show that when real wage growth is low, the probability of being in the easy to decline regime is high. In other words, when nominal wage growth is lower than CPI inflation, households tend to not accept price rises.

These findings suggest that households' tolerance depends not only on price developments, but largely on the perceived state of current employment and income situations, such as wages, as well as their outlook. Going

## Chart B2-2: Households' Tolerance of Price Rises as well as Wages and Inflation

### 1. Estimation Model and Results

(Regime Switching Model)

Comments on the rise in prices = constant + coefficient × CPI inflation  
 + coefficient × wage growth  
 + coefficient × QQE dummy variable

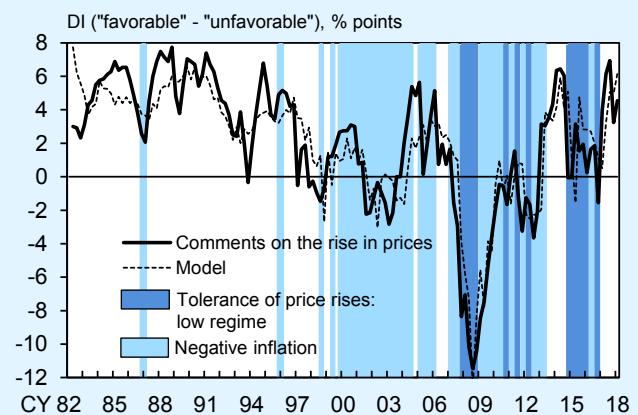
(a) Comments on the rise in prices are taken from the *Opinion Survey on the General Public's Views and Behavior* for 2004/Q4 onward. Periods prior to this are extrapolated using its relations with the overall livelihood DI series in the *Consumer Confidence Survey*, which shows a close resemblance (correlation between the two series is 0.76).

(b) Regimes switch between two states, according to the level of real wage growth.

	Tolerance of price rises: high regime	Tolerance of price rises: low regime
constant	2.09 *** (0.30)	-1.47 *** (0.41)
CPI inflation (y/y % chg. >0)	0.04 (0.18)	-4.87 *** (0.74)
CPI inflation (y/y % chg. <0)	0.04 (0.43)	
Wage growth (y/y % chg.)	0.92 *** (0.11)	
QQE dummy (2013/Q2 onward =1)	2.43 *** (0.44)	

Estimation period: 1982/Q2 to 2018/Q1. () indicates standard errors. \*\*\* denotes statistical significance at the 1 percent level.

### 2. Estimation Results



Sources: Bank of Japan; Ministry of Health, Labour and Welfare; Ministry of Internal Affairs and Communications; Cabinet Office.

Notes: 1. Dark shaded areas indicate periods where the probability of the low tolerance regime exceeds 50 percent and the annual CPI inflation rate is positive. Light shaded areas indicate periods where the annual CPI inflation rate is negative. Comments on the rise in prices are normalized to be zero at the average from 2004/Q4.

2. Definition of wage growth is total cash earnings and that of CPI inflation is CPI all items (adjusted for changes in the consumption tax rate). Real wage growth is defined as the difference between wage growth and CPI inflation. We take the 8-quarter backward moving average of quarter-on-quarter real wage growth as a determinant of regime probabilities.

<sup>44</sup> The question "comments on the rise in prices" has been included in the *Opinion Survey on the General Public's Views and Behavior* since the June 2004 survey. In the above analysis, we extend this series by using its relation to the overall livelihood DI series in the *Consumer Confidence Survey* (Cabinet Office), which tends to show a close resemblance.

forward, as factors suppressing wage growth dissipate and the growth potential of the economy as a whole strengthens with labor market conditions continuing to tighten, households' tolerance of price rises is expected to gradually increase.