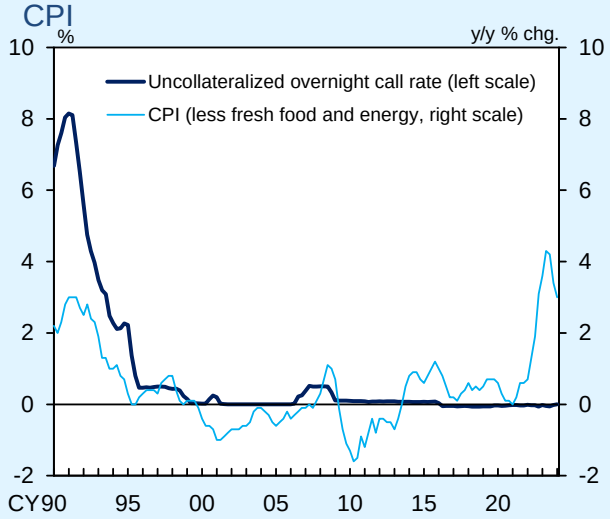
(Box 5) Assessing Financial Conditions in Terms of Interest Rates

In general, monetary easing by central banks is undertaken with the intention of stimulating aggregate demand and employment by creating accommodative financial conditions, which in turn pushes up wages and prices by tightening labor market conditions. In this context, the degree of monetary accommodation needs to be assessed broadly in terms of developments in interest rates, firms' funding conditions, and financial market developments. This box provides an overview of ways to assess financial conditions, focusing on interest rate developments.

Chart B5-1: Nominal Short-Term Rate and CPI



Sources: Bank of Japan; Ministry of Internal Affairs and Communications.
Note: The CPI figures are staff estimates and exclude mobile phone charges and the effects of the consumption tax hikes, policies concerning the provision of free education, and travel subsidy programs.

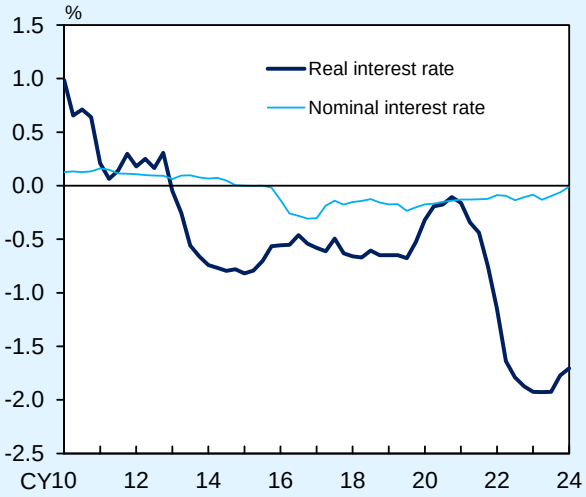
From a theoretical point of view, the following three points are important to bear in mind when assessing financial conditions in terms of interest rates. First, a low nominal interest rate does not necessarily imply a highly accommodative environment. While short-term interest rates in Japan have remained close to 0 percent for a long period of time, since the late 1990s, the average inflation rate from 2000 to the early 2010s was below 0 percent (Chart B5-1). When people expect prices to fall in the future, they have less incentive to borrow for the purpose of consumption or investment. Therefore, in terms of decision-making by economic agents, it is important to look at the real interest rate, which is the nominal interest rate minus the expected rate of inflation.

As described in Box 4, there are various measures of inflation expectations, and their levels should be interpreted with some caution.

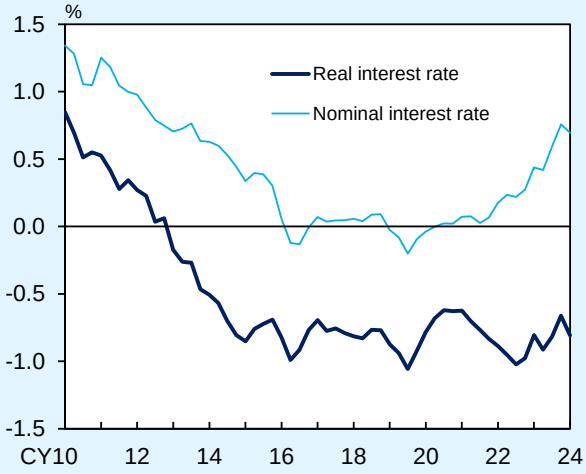
As such, the composite indicator of inflation expectations -- an aggregate of these various measures with some assumptions -- is used to estimate the level of real interest rates at the macro level (Chart B5-2). It suggests that, although nominal interest rates for one-year maturity have fluctuated only slightly, short-term (one-year) real interest rates, reflecting higher inflation expectations, (1) have generally remained negative following the introduction of Quantitative and Qualitative Monetary Easing (QQE) in 2013 and (2) have become even more negative since 2022. Meanwhile, long-term (10-year) real interest rates (1) have been clearly negative since 2013, mainly due to a substantial decline in nominal interest rates. Moreover, (2) despite a moderate rise in nominal interest rates from 2022, real interest rates have been more or less unchanged, mainly because of a simultaneous increase in long-term inflation expectations.

Chart B5-2: Real Interest Rates by Maturity

1. 1-Year



2. 10-Year



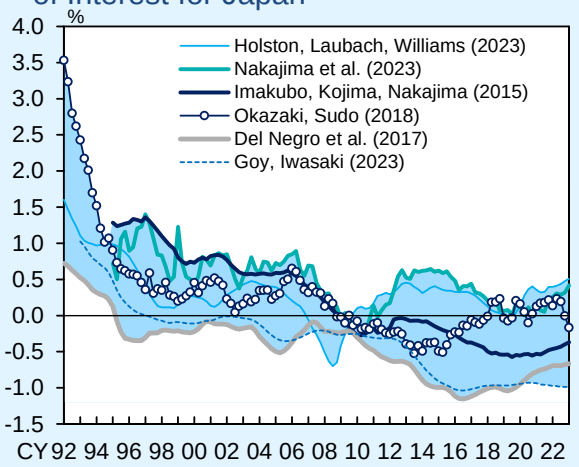
Sources: Bank of Japan; QUICK, "QUICK Monthly Market Survey <Bonds>"; Consensus Economics Inc., "Consensus Forecasts"; Bloomberg.
Note: Figures for real interest rates for each maturity are calculated as government bond yields minus the composite index of inflation expectations (staff estimates) for the corresponding maturity.

Second, for any given real interest rate level, the impact of real interest rates differs between economies with strong and weak funding demand. For example, in an economy with a high potential growth rate, the real interest rate level that is neutral to economic activity and prices -- the so-called natural rate of interest -- also tends to be higher, so the easing effects of any given real interest rate level will be larger. For this reason, the real interest rate gap -- i.e., the difference between the real interest rate and the natural interest rate -- is often used as an indicator to

assess the degree of monetary accommodation.[35] A larger negative real interest rate gap indicates more accommodative financial conditions.

That said, since the natural rate of interest cannot be directly observed in the real world, it must be estimated based on some kind of economic model. As shown in Chart B5-3, all estimates of the natural interest rate using various models show a decline in the long run. At the same time, there is considerable variation in their levels, meaning that it is difficult to specify the level of the natural interest rate.[36]

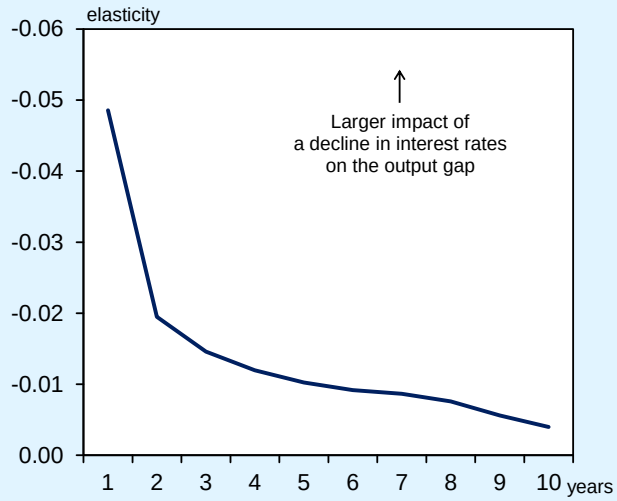
Chart B5-3: Estimates of the Natural Rate of Interest for Japan



Sources: Bank of Japan; Ministry of Finance; Ministry of Health, Labour and Welfare; Cabinet Office; Ministry of Internal Affairs and Communications; Bloomberg; Consensus Economics Inc., "Consensus Forecasts."
Note: The estimates are based on staff calculations using the models proposed in the different papers. The shaded area indicates the range of natural interest rate estimates from the minimum to the maximum.

Third, it is also important to assess financial conditions by taking account of their impact on the real economy. The Bank's *Comprehensive Assessment* in 2016 shows that the effects of a decline in interest rates on the real economy are relatively large in the case of short- to medium-term interest rates and become smaller for longer maturities (Chart B5-4). Therefore, it should be noted that the impact of a decline in interest rates on the real economy may differ by maturity. In addition, as pointed out at the beginning of this box, the degree of monetary

Chart B5-4: Effects of a Decline in Interest Rates on the Output Gap, by Maturity



Sources: Bank of Japan; QUICK, "QUICK Monthly Market Survey <Bonds>"; Consensus Economics Inc., "Consensus Forecasts"; Bloomberg.
Note: For details of the methodology, see Appendix 8 in the *Comprehensive Assessment* released in September 2016. The results are re-estimated using the latest data.

[35] In standard macroeconomic models, an increase in the degree of monetary accommodation, as measured by the real interest rate gap, is assumed to have a positive impact on the output gap. Previous studies such as Laubach and Williams (2003) estimated the natural rate of interest based on this relationship.

Laubach, T. and J. C. Williams (2003), "Measuring the Natural Rate of Interest," *The Review of Economics and Statistics*, vol. 85 (4): 1063-1070.

[36] For details on the estimation methods, see the presentation material by the Monetary Affairs Department, "The Effects and Side Effects of Unconventional Monetary Policy" (available only in Japanese), reported at the first workshop on the "Review of Monetary Policy from a Broad Perspective."

accommodation can also vary depending on factors other than developments in interest rates -- including firms' funding conditions, such as banks' lending stance and credit risk premiums, and developments in financial markets, such as stock prices and foreign exchange rates.

As seen above, to grasp financial conditions in Japan, it is important to make a comprehensive assessment based not only on nominal interest rates but also on real interest rates -- i.e., nominal interest rates minus inflation expectations -- and the natural rate of interest, while carefully examining the impact of financial conditions on the real economy.