Sayuri Shirai: Japan's economic activity, prices, and monetary policy – monetary policy in the past and present

Speech by Ms Sayuri Shirai, Member of the Policy Board of the Bank of Japan, at a meeting with business leaders, Asahikawa, 13 June 2013.

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I. Introduction

Good morning. It is a great honor to have this opportunity to visit Hokkaido and meet representatives of the city of Asahikawa. It is my first time to visit this place, so I am really looking forward to learning from you about this region through an exchange of views. In addition, I would like to express my sincere gratitude for your cooperation with the activities of the Bank of Japan's local office in Asahikawa and Sapporo Branch.

As you may know, the Bank introduced a new monetary policy called *Quantitative and qualitative monetary easing* (QQE) at the Monetary Policy Meeting (MPM) held on April 3 and 4, 2013. And I would like to examine this new policy here today. Let me first briefly outline the sequence of my speech. In the next section, Section II, I will explain the Bank's outlook for economic activity and prices in Japan on the basis of the *Outlook for Economic Activity and Prices* (hereafter the Outlook Report). Then, I would like to consider QQE – whose expected effects are incorporated in the Outlook Report – by focusing on the main features of this new policy. In Section III, I will review the previous policy – *Comprehensive monetary easing* (CME) – to facilitate an understanding of the essence of QQE, and I will also introduce my related proposal, which was presented at the March MPM. In Section IV, I will discuss my views and suggestions on the Outlook Report. Following my speech, I am looking forward to receiving your candid opinions about the content of my speech as well as the situation of the local economy.

II. Economic activity, prices, and the new monetary policy

I will begin my presentation by describing the Bank's outlook for economic activity and prices presented in the Outlook Report released in April. After that, I will explain the features of the new monetary policy and the transmission mechanisms.

A. Outlook for economic activity and prices

In the light of recent developments in economic activity and prices, Japan's economy has been picking up. It is likely to return to a moderate recovery path around mid-2013, mainly against the background that domestic demand remains resilient due to the effects of monetary easing as well as various economic measures, and that growth rates of overseas economies gradually pick up. Thereafter, while the economy will be affected by the front-loaded increase and subsequent decline in demand prior to and after the two scheduled consumption tax hikes, it is likely to continue growing as a trend from fiscal 2013 toward fiscal 2015, at a pace above its potential, as a virtuous cycle among production, income, and spending is maintained (Chart 1).

Regarding prices, the year-on-year rate of change in the consumer price index (CPI; all items less fresh food) has recently been around 0 percent or slightly negative. The outlook for prices as measured by the year-on-year rate of change in the CPI – excluding the direct effects of the consumption tax hikes – is expected to follow a rising trend; as such, it will reflect factors such as the improvement in the output gap (the difference between actual and potential GDP) as well as the rise in medium- to long-term inflation expectations. According to the "median" of the Policy Board members' forecasts, the CPI inflation is likely to reach about 2 percent toward fiscal 2015 (Chart 2). Chart 2 indicates the rate of change in prices

with and without the effects of the consumption tax hikes.[1] The output gap is expected to follow a moderate improving trend (Chart 3). Moreover, as a tightening of labor market conditions is expected to become evident, nominal wages are likely to see gradual upward pressure (charts 4 and 5). In addition, some indicators suggest a recent rise in medium- to long-term inflation expectations (Chart 6). These expectations are likely to continue on a rising trend under QQE and the pace of increase may accelerate – especially after the actual rate of price change turns from negative to positive this year, gradually converging to around the 2 percent target. Import prices are also expected to continue rising during the projection period (fiscal 2013–2015), reflecting upward pressure for the time being from developments in the foreign exchange market and assuming that international commodity prices will follow a moderate rising trend in line with global economic growth.

B. Upside and downside risks to Japan's economy

With respect to the upside and downside risks to the Bank's aforementioned baseline scenario for economic activity, the following five factors were examined: (1) developments in global financial markets; (2) performance of overseas economies; (3) firms' and households' medium- to long-term growth expectations; (4) the extent of the front-loaded increase and subsequent decline in demand prior to and after the consumption tax hikes; and (5) fiscal sustainability in the medium to long term. Following a review by the Bank, these risks were assessed as being "balanced," although uncertainty remained high, including that regarding developments in overseas economies (Chart 7). As for upside and downside risks specific to prices, the following uncertainties were examined: (1) developments in firms' and households' medium- to long-term inflation expectations; (2) the responsiveness of prices to the output gap; and (3) developments in import prices reflecting fluctuations in international commodity prices and foreign exchange rates. After the Bank examined these matters, it assessed that the risks on the price front as "largely balanced"; however, considerable uncertainty surrounds developments in medium- to long-term inflation expectations (Chart 7). Regarding these risk assessments, my personal views will be explained in Section IV.

C. Quantitative and Qualitative Monetary Policy (QQE)

Next, I would like to consider QQE, which was introduced at the MPM held on April 3 and 4. The aforementioned Outlook Report certainly reflects the projected effects of the new monetary policy. QQE was adopted after analyzing the effectiveness and limitations of the previous CME, and the aim was to maintain the 2 percent price stability target adopted in January 2013 under CME. This will be explained in detail in Section III. Here, I would like to examine the four main aspects related to QQE.

Aspect 1: Increase in purchases of Japanese Government Bonds (JGBs) and extension of their maturities

The first characteristic of QQE is the purchase of JGBs as the most important tool toward achieving the 2 percent price stability target at the earliest possible time. The integration of JGB purchases under a regular purchase operation (informally called the *Rinban* operation) with the Asset Purchase Program was finally achieved, as explained in Section III. Moreover, the average remaining maturity of the Bank's JGB purchases was decided to be extended from the current level of *slightly under three years* (after integrating the two operations) to *about seven years* (six to eight years) by purchasing JGBs with maturities of up to 40 years; this was done to exert further downward pressure on the whole yield curve (Chart 8). The

[1] To measure the impact of the monetary policy, it is important to look at indicators other than the effects of the consumption tax hikes. This is because the impact of the tax hikes is effective only during the first year of implementation; it is thus temporary and should be analyzed separately from the effects of monetary easing.

yearly pace of increase in the amount outstanding of JGBs held by the Bank was set at *about 50 trillion yen*, and it will continue *over two years*, thereby doubling the amount outstanding from the end of 2012 to the end of 2014 (Chart 9). I believe that these changes constitute a considerable departure from previous practices both in terms of "quantity" (based on the size of the program) and "quality" (based on the maturity length).

Aspect 2: Increase in purchases of risk assets

The second characteristic of QQE is an increase in the purchase of two risk assets – exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs). Considering the market size and the risk volume borne by the Bank, the yearly purchase amount was set at 1 trillion yen and 30 billion yen, respectively, over two years. This would double the amount outstanding of ETFs from the end of 2012 to the end of 2014. Regarding CP and corporate bonds, it was decided to maintain the amounts outstanding of these holdings given the already low levels of *risk premia* (expected excess returns demanded by investors relative to safe assets) after the decision in January.

Aspect 3: Emphasis on inflation expectations and adopting the "quantity" target

Third, QQE emphasizes the expectations of markets, firms, and households – particularly medium- to long-term inflation expectations – as one of the most important channels for achieving the 2 percent target. This feature draws a clear line between QQE and the previous CME. If firms and households expect inflation to rise in the medium to long term, that may positively affect the current levels of sales prices and wages. Moreover, as long as the pace of increase in inflation expectations exceeds that in long-term nominal interest rates, long-term interest rates in real terms will decline and thus support an accommodative monetary environment. I will touch on the concept of inflation expectations later.

Let me add a few more comments on this issue. As described in Section III, the Bank previously held the view that it might take some time to achieve the 2 percent target; this was because (1) firms and households are accustomed to past low-price movements and (2) collective efforts are necessary to strengthen potential economic growth and hence inflation expectations. I still take this view. The important point here, however, is that there is no time like the present. For example, the Japanese government has adopted stimulative measures in addition to making ongoing reconstruction efforts while expressing the clear determination to raise potential economic growth through various strategies. Expectations of stronger monetary easing since the end of 2012 have already favorably affected some markets, including the exchange rate, stock, and J-REIT markets. Firms and households have a more positive outlook for the economy. In this favorable environment, I believe that it may be possible to accelerate the pace of rise in medium- to long-term inflation expectations in a stable manner by adopting a bold monetary policy. At the same time, I honestly feel that the Bank should maximize its monetary easing measures to demonstrate its strong determination to conquer deflation.

The next question is how to raise medium- to long-term inflation expectations. For this purpose, the Bank decided to change the *main operating target for money market operations* from the *uncollateralized overnight call rate* (i.e., interest rates) to the *monetary base* (i.e., "quantity"). There are several reasons for adopting the monetary base, which comprises cash (banknotes and coins in circulation) and reserve deposits (financial institutions' current account deposits with the Bank). Using the monetary base, it is intuitively easier for the public and market participants to grasp the essence of monetary easing: an increase in the "quantity" can easily be connected to a large-scale supply of cash, thereby creating an image of inflation. In addition, the monetary base is often used in financial markets as a reference for measuring the scale of monetary easing across central banks. Moreover, the monetary base is a basic concept presented in macroeconomic textbooks, and so it is globally known. Finally, changing the main operating target effectively signals a change in the monetary policy framework. Thus, it was decided that the monetary base should rise at an annual pace

of about 60–70 trillion yen over two years; this would double the amount outstanding from 138 trillion yen at end-2012 to about 200 trillion yen at end-2013 and further to 270 trillion yen at end-2014 (Chart 9). The last figure would account for nearly 60 percent of nominal GDP – far above the levels of other advanced economies.

Aspect 4: Effective communication strategies

The fourth characteristic of QQE is that the Bank uses the number "two" a great deal: 2 percent price stability target; a time horizon of about two years; doubling the monetary base and the amounts outstanding of JGBs and ETFs; and doubling the average remaining maturity of JGB purchases. The Bank does so to send a clear message about the new framework and its strong determination to achieve the 2 percent target. Indeed, positive reactions have been received both domestically and abroad regarding the clarity of the new communication strategy. Nonetheless, I personally believe that there is still room for improvement in terms of communication strategies, as described in Section IV.

D. Transmission mechanism for achieving the 2 percent target under QQE

Impact on economic activity and prices

Regarding the transmission mechanism of monetary easing on economic activity under QQE, several channels have been considered. With the first channel, the purchase of assets continues to exert downward pressure on long-term nominal interest rates and the risk premia of risk asset prices (Chart 8). This channel would contribute to increasing firms' business investment, households' durable consumption and residential investment by (1) a decline in the funding cost of firms and households, (2) improvement in firms' balance sheets, and (3) the *wealth effect*.

With the second channel, the continuation of JGB purchases by the Bank may encourage financial institutions as well as institutional and individual investors to shift some of their portfolios to risk assets; they would do so in the process of adjusting some of their asset management policies away from deflation-oriented strategies. The so-called *portfolio rebalance effect* is intended to promote some degree of risk-taking among a wide range of financial institutions and investors, and it is necessary to energize Japan's economy. Some of that risk money could be allocated to viable emerging, growing firms. The effects of the first and second channels are expected to be greater than those envisaged under the previous monetary easing policy, CME.

Regarding the third channel, increases in medium- to long-term inflation expectations are expected to lead to a decline in long-term interest rates in real terms, thereby increasing business investment by firms as well as residential investment and consumption of durable goods by households. In addition, the anticipation of higher inflation may hasten these investment and consumption activities. These three channels may lead to an expansion of aggregate demand, an improvement in the output gap, and a rise in medium- to long-term inflation expectations, thereby raising the rate of price changes.

Impact on long-term interest rates

So far, I have explained the transmission mechanisms of monetary easing with regard to the impact on economic activity and prices. Now, I would like to review the impact of QQE from the viewpoint of long-term interest rates. Generally, it is widely known that long-term interest rates can be decomposed into two components: (1) the risk premia (such as term premium, liquidity premium); and (2) the expected path of short-term interest rates, as shown in Chart 8. Based on this understanding, the Bank's JGB purchases are expected to generate downward pressure mainly on the risk premia and then on the expected path of short-term interest rates (this latter effect is called the ''signaling effect''). Moreover, the Bank's commitment to continue with QQE as long as it is necessary for maintaining the 2 percent

price stability target in a stable manner is also likely to enhance the downward pressure. Meanwhile, an improvement in the economic outlook and a gradual rise in medium- to long-term inflation expectations may lead to an increase in the expected path of short-term interest rates. This path may also be influenced by a rise in overseas long-term interest rates, which reflects improvement in overseas economies. The downward pressure is also observed in other countries, including the United States, which have purchased financial assets under the nontraditional monetary policy.

Developments in long-term interest rates since the adoption of QQE reflect those downward and upward pressures. As for the outlook, even in the phase of intensified upward pressure, the continuation of the large-scale asset purchases is likely to maintain that downward pressure, and it may even reinforce that pressure with the cumulative growth of the amount purchased – in addition to the commitment to achieve the 2 percent target in a stable manner. These effects, together with a gradual rise in medium- to long-term inflation expectations, are likely to be reflected in long-term interest rates, which would eventually stabilize at levels consistent with the 2 percent price stability target. Moreover, the Bank continues to closely monitor market developments within a flexible operational framework and through discussions with market participants, and it expects that both short- and long-term interest rates will move largely on a stable path.

E. Why are inflation expectations so important?

To achieve the 2 percent target, it is important to consider the positive relationship between the rate of price change and the output gap – a relationship known as the Phillips curve. It is expected that the curve will steepen and shift upward as inflation expectations rise (Chart 10). As these expectations grow, firms may find it easier than before to reflect changes in the output gap and production cost in their sales prices, thereby contributing to a steepening of the Phillips curve. At the same time, an upward convergence of inflation expectations toward the 2 percent level is likely to shift the curve upward. Currently, there is active debate among Japanese economists as to whether the curve will shift upward as the Bank expects or remain flattened, since flattening of the curve is observed in many advanced economies. This issue will be addressed in Section IV.

Factors contributing to flattening of the Phillips Curve

In the case of Japan, some have pointed out that deregulation (for example, in distribution and telecommunications), intensified competition in the domestic and foreign markets as well as the financial crisis and associated plunge in domestic demand since the second half of the 1990s have exerted constant downward pressure on corporate margins and wages. Consequently, firms, supermarkets, and large discount stores began to set their sales prices according to their competitors' – rather than in response to the output gap or cost developments. The active use of online shopping has also accelerated this kind of price-setting behavior. The smaller the size of the firm, the lower is its capability to negotiate prices with its client firms, which makes it difficult to transfer the input cost to the final sales prices. This phenomenon is also evident in the Bank's March 2013 *Tankan* (Short-Term Economic Survey of Enterprises in Japan). This can be referred to as firms' price-setting behavior in a deflationary environment.

Furthermore, medium- to long-term inflation expectations dropped sharply mainly in the 1990s (Chart 11). There is a view that the long-standing negative output gap (or demand shortage), limited structural reforms – particularly in various nonmanufacturing sectors – and slow supply responses extended the period of sluggish productivity growth. This helped lower the medium- to long-term growth expectations of firms and households, thereby depressing their inflation expectations (Chart 6). Moreover, it could be said that the prevalence of the *zero lower bound*, as explained in Section III, weakened the effectiveness of monetary easing and thus contributed to lowering medium- to long-term inflation expectations.

Converging to the 2 percent medium- to long-term inflation expectations

A number of other advanced economies successfully lowered their medium- to long-term inflation expectations from the high levels in the 1990s, and those expectations gradually converged to more or less 2 percent. Such a decline also coincided with a drop in actual inflation. There is a consensus among central banks that this phenomenon is closely associated with the establishment of central bank independence and the adoption of inflation targeting (or a framework to emphasize price stability). In the case of the United Kingdom, for example, the Bank of England (BOE) adopted inflation targeting in 1992, with the initial target being set in the range of 1–4 percent. The target was subsequently changed to 2.5 percent in 1997 and further to 2 percent in 2004.[2] Chart 12 shows that the medium- to long-term inflation expectations in that country converged to around 2.5 percent in the 1990s and have been around 2 percent since 2004. For the United Kingdom and the United States, which have been successfully stabilizing those expectations at around 2 percent, the current view is that expectations should be maintained at the current stabilized level. This issue will be brought up again in Section III.

Given that inflation expectations remain low in Japan, what the Bank is trying to do is to raise those expectations toward around the 2 percent level, which is comparable to that of other advanced economies. In this process, the Phillips curve could become steeper and shift upward as inflation expectations and firms' price-setting behavior change.

III. The previous Comprehensive Monetary Easing (CME) and my proposal at the March MPM

A. What is a nontraditional monetary policy?

So far, I have explained the outlook for economic activity and prices as well as the new monetary policy, QQE. After listening to my remarks, you may wonder why the Bank adopted QQE, which represents a drastic leap from the previously adopted CME. To understand the essence of QQE, it is necessary, I believe, to review the effectiveness and limitations of CME as well as the factors that contributed to adopting the 2 percent price stability target in January 2013 under CME. Moreover, I should explain clearly what factors and thoughts led to my proposal at the March MPM and how they are related to QQE. That thinking was substantially influenced by my having received many inquiries and responses from a wide range of people domestically and abroad.

In general, monetary easing in a recessionary phase is conducted mainly through a reduction in a very short-term nominal interest rate – namely the *policy interest rate*. In the case of Japan, this refers to the *uncollateralized overnight call rate*. There are some cases, however, where the policy interest rate drops to nearly zero, leaving limited room for further decline. Japan faced this situation immediately after the collapse of Lehman Brothers in 2008.[3]

Under such a situation, CME attempts to create an accommodative monetary environment by exerting downward pressure on *longer-term* interest rates, which remain in positive territory despite the policy rate reaching nearly zero. For example, yields on JGBs often function as the benchmark for measuring the long-term fixed interest rates related to mortgages, loans, bonds, and so on. Therefore, downward pressure on JGB yields is likely to

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[2] In 1997, the BOE achieved operational responsibility for setting interest rates and established the Monetary Policy Committee. Currently, inflation below 2 percent is judged to be just as bad as inflation above 2 percent. If actual inflation becomes more than 3 percent or less than 1 percent, the Governor of the BOE must write an open letter to the Chancellor, explaining the reasons for such a deviation and prescriptions for correcting it.

[3] Specifically, the Bank lowered its policy rate from around 0.5 percent to around 0.3 percent in October 2008 and further to around 0.1 percent in December 2008.

contain funding costs, which makes it easier for firms and households to increase their economic activities. This policy – often called the *nontraditional monetary policy under the zero lower bound on interest rates* – is also applied by other central banks, such as in the United States and United Kingdom, where very short-term interest rates have declined to nearly zero.

B. Basic features of CME

Under CME, which was introduced in October 2010, the policy rate was lowered from around 0.1 percent to around 0–0.1 percent, which amounted to adopting the so-called *virtually zero-interest rate policy*. However, as already mentioned, the main element of CME was to generate downward pressure on longer-term interest rates by purchasing JGBs (and Treasury discount bills [T-Bills]), and not on short-term interest rates, which had already declined significantly. In addition to the impact on the funding cost, the JGB purchases were expected to generate downward pressure on the *risk premia*, thereby supporting the foundation of risk asset markets. In addition, the wealth effect and portfolio rebalance effect were considered. To enhance those effects, the Bank also purchased various risk assets directly.

For this purpose, the Bank established the *Asset Purchase Program* (hereafter the Program) on its balance sheet to purchase various financial assets. The assets purchased under the Program covered JGBs (with remaining maturity from *one to three years*), T-Bills, CP, corporate bonds, ETFs, and J-REITs. The Bank concentrated its purchases of JGBs and T-Bills to exert downward pressure on longer-term interest rates in particular. The total amount outstanding of the Program was increased gradually from an initial 35 trillion yen to 65 trillion yen at end-2012. The amount was scheduled to expand further to 101 trillion yen by end-2013 and to 111 trillion yen by end-2014. Thereafter, the amount of 111 trillion yen was to be maintained for an undefined period of time (Chart 13).

On the issue of the Program after 2014, I would like to provide some details. In January 2013, the Bank introduced the *open-ended asset purchasing method*, which was to start in early 2014. This meant that the Bank would purchase financial assets of about 13 trillion yen monthly – comprising about 2 trillion yen on JGBs, 10 trillion yen on T-Bills, and 1 trillion yen on CP and corporate bonds – without setting any termination date. Based on this monthly purchase, the amount outstanding of the Program was expected to rise by 10 trillion yen to 111 trillion yen in 2014. The amount outstanding of 111 trillion yen was scheduled to be maintained from 2015 onward since the quantity of monthly purchased JGBs and T-Bills would roughly meet their maturing totals.[4] Regarding CP and corporate bonds, the amount of 1 trillion yen would be allocated from 2014 onward to roughly meet the maturing total.

With my talking about the Program in this way, you may wonder whether the Bank attached more importance to the quantity of assets, rather than to exerting downward pressure on the yields and risk premia. Indeed, the Bank regarded both as equally important. In other words, although the Bank emphasized downward pressure on longer-term interest rates and the risk

[4] The amount outstanding of JGBs held by the Bank was scheduled to increase to 44 trillion yen by end-2013 and further to 48 trillion yen by end-2014. The amount of 48 trillion yen was scheduled to be maintained from 2015 onward. T-Bills are the second-largest assets held by the Bank, and the amount outstanding was scheduled to grow to 24.5 trillion yen by the end of 2013 and further to 30.5 trillion yen by end-2014. The amount of 30.5 trillion yen was scheduled to be maintained from 2015 onward.

premia as the primary purpose of CME, in practice the Bank strengthened monetary easing by emphasizing the expansion of the quantity and committing to achieving that at any cost.[5]

C. Adopting the 2 percent price stability target

In addition to introducing the open-ended asset purchasing method, an equally important policy decision was made in January 2013. Namely, the Bank finally adopted the 2 percent price stability target in terms of the year-on-year rate of change in the CPI, and it committed to pursuing monetary easing to achieve this target as early as possible.

Why was the 2 percent target adopted?

Before January 2013, the Bank's view on price stability – expressed as the *price stability goal in the medium to long term* – was defined as being in a "positive range of 2 percent or lower"; the expression *"1 percent for the time being"* was also added. So why did the Bank not simply adopt the 2 percent target from the outset? This was because the expression had to cover diverging views (from lower to higher) of the Policy Board members with respect to the appropriate level of medium- to long-term inflation. Moreover, adopting such an expression was (1) to take into account past price movements (or price perceptions among households and firms); and (2) to accommodate the view that a longer-term goal could be achieved in conjunction with efforts to reinforce potential economic growth through various constituents, including the government, the Bank, financial institutions, and firms. These factors implied that it might take time to achieve the 2 percent target.

Therefore, the numerical value of 2 percent was not excluded – even before January 2013. Nonetheless, I retrospectively take the view that the word "goal" (especially the connotation of the related term *medo*, which was adopted in the Japanese version) and the ambiguous references to the range held nuances of passiveness. As a result, the public and market participants were not sure whether the Bank was ultimately pursing the 2 percent level or a lower one and whether the Bank was firmly determined to overcome deflation. Against this background, the adoption of the 2 percent target in January 2013 was very important since it meant that these problems were finally eliminated. Furthermore, from the beginning of my appointment as a member of the Policy Board, I have consistently advocated that medium- to long-term inflation should be well above 1 percent. Therefore, I regard the adoption of the 2 percent target as a major achievement in the history of the Bank's conduct of monetary policy.

Why was the 2 percent value appropriate?

Now, some of you may wonder why 2 percent was chosen as the medium- to long-term target. Conceptually, price stability should refer to a situation of zero inflation or no change in general prices. Why then should the Bank need to seek higher inflation? The main reason is that, as explained in Section II, 2 percent is a widely shared goal among many central banks in advanced economies as the medium- to long-term inflation target. The next question is thus why central banks should choose the value of 2 percent. It reflects the fact that central banks commonly believe it important to avoid the aforementioned zero lower bound situation, in which there is limited opportunity for a further decline in the policy rate.

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[5] This approach was taken because the Bank wished to underline the difference from the *Quantitative monetary easing* (QE) policy adopted from 2001 to 2006, and it also reflects some lessons learned during that experience. Under QE, the size of *reserve deposits* – namely, the "quantity" of the liability of the Bank – was placed as the primary operational target; monetary easing was thus strengthened by expanding this quantity. Regarding the differences between QE and CME, please refer to my speech entitled "Japan's Monetary Policy in a Challenging Environment," Speeches at the Bank of Italy and the Eurasia Business and Economics Society Conference Held in Rome, Bank of Japan, 2013.

Global discussions on the 2 percent target

For your reference, I would like to briefly introduce recent global-level discussions on this issue. In 2010, Dr. Olivier Blanchard, Economic Counsellor and Director of the Research Department of the International Monetary Fund (IMF), pointed out that the U.S. economy had been facing the zero lower bound since the global financial crisis began in 2008 and that it was proving costly. If the U.S. economy had begun with higher average inflation and thus higher short-term nominal interest rates when entering the recession, the Federal Reserve could have lowered the interest rate more and thereby reduced the drop in output and deterioration of fiscal positions. Dr. Blanchard subsequently suggested that a higher inflation target up to about 4 percent could be pursued in normal times and that medium- to long-term inflation expectations should be anchored at that level – up from the current level of 2 percent. Moreover, new research results have been released on this issue, and they appear to support the higher inflation target.[6]

Recognizing this debate, at Chairman Bernanke's press conference held after the Federal Open Market Committee in March 2013, one journalist raised the issue of increasing the inflation target from 2 percent to a higher level to allow a further decline in interest rates. The chairman then acknowledged that the U.S. economy faced the zero lower bound (despite the 2 percent goal) and stressed 2 percent inflation, not zero inflation, as the appropriate price stability goal. He said, "if you have zero inflation, you're very close to the deflation zone, and nominal interest rates will be so low that it would be very difficult to respond fully to recessions. And so, historical experience has suggested that 2 percent is an appropriate balance between the cost of inflation and the cost [of the zero lower bound]."[7]

Moreover, as Dr. Blanchard and Chairman Bernanke observe, it is generally viewed that deflation is less desirable than inflation after considering the benefits and costs. If deflation is prolonged, the sales unit price and wages tend to decrease (or such a deflation expectation prevails), such that firms and households may find that funding costs are rising in real terms – notwithstanding very low long-term nominal interest rates. Consequently, investment and consumption activities supported by external funding could be discouraged, thereby possibly dampening economic growth. Moreover, in the context of Japan, deflation may lead to excessive appreciation of the yen, sluggish asset prices, and shortages in tax revenues; thus, a deteriorating fiscal balance results.

D. Effectiveness and limitations of CME

With regard to the effectiveness of CME, JGB yields and the risk premia dropped to a significant degree, which supported the economy. On the other hand, I have to admit that CME was not successful in conquering deflation – partly owing to a series of domestic and external situations, such as the Lehman shock, the European sovereign debt crisis, the Great East Japan Earthquake, and the Thailand floods of 2011, and the effects of developments in the relations between Japan and China. More importantly, I sensed that there was a growing opinion among the public and market participants that the 2 percent price stability target was not achievable with the previously announced monetary policy framework. This meant that

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[6] For example, one study pointed out that the incidence and effects of the zero lower bound could be greater than previously estimated in the United States. Another study indicated that raising the inflation target in a liquidity trap could have an expansionary effect on output.

[7] Interestingly, Chairman Bernanke continued to comment on this matter by stating that the issue of an appropriate level for the inflation target was being debated in academic circles and that trying to quantify this target was an interesting question. He also acknowledged that hitting the zero lower bound has become more common, although it was a very rare event a few years ago (he appears to have referred to the aforementioned research results). These remarks give the impression that he does not exclude the idea of raising the inflation target if more research results point in this direction in the near future.

the Bank's framework was regarded as having limited credibility. My view is that the following three factors have contributed to the prevalence of such a perception.

D–1. Complexity problem in the monetary policy framework: co-existence of the two operations

First, the Bank's monetary policy framework under CME gave an impression of complexity; consequently, the framework was not well understood compared with those of other central banks. In particular, I would like to stress that the most serious complexity problem arose from the fact that the purchase of JGBs was conducted through two types of operations: (1) one under the Program, and (2) the other as a regular JGB purchase operation (which, as noted earlier, is informally referred to as a *Rinban* operation). From the beginning of my appointment as a member of the Policy Board, I have repeatedly emphasized at the Bank that it should integrate these two operations to avoid unnecessary complexity as well as other problems, which I will now explain.

A *Rinban* operation aims at purchasing JGBs (on the asset side of the Bank) according to an increase in the banknotes issued (on its liability side). An increase in the amount outstanding of JGB holdings under the *Rinban* operation was limited relative to that of the Program – despite the large amount outstanding of 65 trillion yen at end-2012. However, the *Rinban* operation purchased a wide range of remaining maturity from *slightly less than one year up to 30 years*. This differed substantially from the Program, under which JGBs were purchased with a remaining maturity of only *one to three years*. Furthermore, the maximum amount of JGB holdings under this operation was set at the amount outstanding of banknotes issued. The imposition of a cap on JGB holdings – often called the Banknote Principle – reflected two purposes: one was to provide the so-called *growth currency* (*seicho tsuka* in Japanese) and the other was to avoid the misperception of monetization.

Issues from the viewpoint of "growth currency"

With regard to the first purpose, the Bank positioned the *Rinban* operation as a means of providing growth currency so that this operation could be separated from that for monetary easing. The growth currency idea reflects the view that the amount outstanding of banknotes issued tends to rise in line with the size of the economy (i.e., nominal GDP). Since economic growth calls for a more or less proportionate growth in the amount outstanding of banknotes issued, those banknotes could be regarded as growth currency. Thus, banknotes could be considered a long-term liability of the Bank since they are related to the size of the economy; therefore, it was appropriate to purchase JGBs as a long-term asset according to the amount outstanding of banknotes issued. In such a situation, purchasing JGBs could be regarded as relatively "neutral" to short-term business cycles and price movements; it would therefore have a limited impact on the JGB market. In other words, the purchase of JGBs to fulfill this long-term purpose did not constitute an operation for monetary easing. Indeed, other central banks such as the Federal Reserve and BOE engage in purchasing their treasury securities (including long-term ones) in "normal" times as a counterpart to the increase in the amount outstanding of banknotes issued; thus, a regular purchase operation similar to that of *Rinban* is normally adopted elsewhere.

However, it seems that such a viewpoint no longer prevails in the downturn triggered by the global financial crisis (Chart 14). I think this is because the recent increase in the amount outstanding of banknotes issued is caused by factors other than economic growth – specifically, aggressive monetary easing and its effects. For example, the declining opportunity cost of holding banknotes (and coins) caused by extremely low short-term interest rates may have led to higher demand for banknotes relative to the growth of the economy. This may lead to difficulty in differentiating the purchase of treasury securities between that corresponding to the increase in the amount outstanding of banknotes issued and that related to monetary easing. Since the global financial crisis began, the Federal Reserve and BOE have deviated from such an operation temporarily and have purchased

treasury securities (and other assets) far beyond the amount outstanding of banknotes. Moreover, all those purchased assets are regarded as a result of monetary easing. In other words, other central banks have maintained the same purchasing method of regular operations by switching the purpose to an accommodative monetary policy and, in some cases, lengthening the maturity of the purchase operation.

Issues from the viewpoint of "monetization" and complexity

The Bank differentiated the JGB purchase under the Program from the regular *Rinban* operation, and it regarded the former only as a tool of ''temporary'' monetary easing. This action reflected the view that avoiding the misperception of monetizing the fiscal deficit was a priority.

Since the establishment of the Program in October 2010, however, the duration of monetary easing has become longer, and the total amount of JGBs purchased under the two operations has already exceeded the amount outstanding of banknotes; this has virtually broken the Banknote Principle. In addition, the separation of the two operations has caused the problem of the true scale of monetary easing (as well as the average maturity length of JGBs purchased) to be underestimated by the public and market participants; this is in contrast to the actions of the Federal Reserve and the BOE, which covered the total amount of asset purchases. The Bank decided, therefore, in August 2011 to place a footnote describing the yearly amount of JGB purchases under the *Rinban* operation in the public statements on monetary policy whenever monetary easing was increased. Contrary to the initial purpose, however, inserting the footnote appears to have amplified perceptions of complexity without promoting an understanding of the Bank's intention. Furthermore, the Bank occasionally explained to the public and market participants that its scale of monetary easing was similar to that of other central banks by comparing the size of the Bank's balance sheet both in its absolute value and in terms of GDP. However, this behavior may have caused some kind of inconsistency since the balance sheet reflected the results of JGB purchases under the two operations – despite the Bank's declaration that only the Program constituted monetary easing. To deal with this complexity and inconsistency, I therefore believed that there was a strong rationale for merging the two operations.

For separate reasons, I also strongly believed that it was necessary to integrate the two operations when I started to consider a maturity extension of JGB purchases from the maximum three years to about five years in late 2012. This was because lengthening the maturity under the Program was likely to give a sense of overlap with the *Rinban* operation – given that, as of March 2013, the average maturity of the *Rinban* operation was about four years and that of the Program about two years.

D–2. Monetary easing perceived as a piecemeal approach and lack of boldness

The second factor contributing to the perception over limited credibility was related to the way the Bank conducted monetary easing. Since its introduction in October 2010, the size of the Program was increased nine times. If the total size of the increase under the Program is taken into account, it is fair to say that the Bank's monetary easing was quite substantial (Chart 13). Nonetheless, the scale of increase undertaken each time was in the range of 5–10 trillion yen, and it seems that many people viewed such a piecemeal approach as lacking boldness. In addition, it was pointed out that the Bank's communication strategy was not so effective, and the perception spread domestically and globally that the Bank was being passive in tackling deflation. Moreover, there are deep-rooted views that exiting accommodative monetary policies in the past – for example, the *Zero interest rate policy* in August 2000 and *Quantitative monetary easing* in March 2006 – was too early. Such past experiences appear to have added to the view that the Bank might not be determined to be a deflation fighter.

D–3. Limitation of monetary easing under the program

The third factor contributing to a perceived lack of credibility was associated with the eroding effectiveness of monetary easing under the Program. The intensified purchase of JGBs up to a maximum remaining maturity of three years has already flattened the yield curve within that maturity zone, leaving limited room for further decline. The next possible move could then be considered as extending the maturity beyond three years. We may then recall the case of extending the maximum maturity from two years to three years in April 2012. At that time, market expectations over the maturity extension preceded our decision – based on the observation that the increase in the committed amount under the Program was gradually getting harder to achieve. With such expectations, extending the maturity not only reduced the effectiveness of monetary easing, but it also generated a sense that the Bank was being passive with respect to monetary policy. Since the early part of this year, market expectations about the maturity possibly being extended to five years have emerged, and these mainly reflect a sense of deadlock under the Program. And such market expectations were already reflected in the yield curve. This experience suggested that it was necessary for the Bank to look for a completely different framework for purchasing JGBs.

E. My proposal for integrating the two operations and monetary expansion

As already mentioned, I was a long-term advocate of integrating the two operations for purchasing JGBs. Since last year's MPMs, I have also raised this issue – in addition to the need for further monetary easing. Consequently, I decided to summarize my arguments as a single package and present it as an official proposal. The content of the proposal, which was presented at the March MPM, can be roughly summarized as follows:

First, the maximum remaining maturity of JGB purchases under the Program should be extended to 30 years by integrating the operation under the Program with the Rinban operation to exert downward pressure on the whole yield curve. An extension of up to 30 years would likely facilitate the Bank's operations, enhance the effectiveness of monetary easing, and signal its firm determination to overcome deflation.

Second, the monthly purchase of JGBs should increase from the current 4 trillion yen (after integrating the two operations) to at least about 5 trillion yen; the open-ended asset purchasing method should be brought forward from early 2014 to the earliest possible date.

In addition, my view was that the average remaining maturity of JGB purchases should be extended from the current level of slightly under three years (after integration) to *over four years* by increasing the purchase of JGBs with a remaining maturity of about five years. Regarding the zoning of the remaining maturity, I felt that it could be divided into the following four zones: *up to three years*; *three to five years*; *five to ten years*; and *ten to 30 years.* This was because the zones up to ten years include two years, five years, and ten years, whose maturity coincides with that of newly issued bonds, which tend to be more liquid than off-the-run issues. However, since the scale of potential demand in each zone involves uncertainty, my proposal stated that such details should be determined based on input provided by the Bank's staff. I was pleased to see integration of the *Rinban* operation with the Program finally being achieved under QQE in April.

F. Similarities and differences between QQE and my proposal

Common features between QQE and my proposal in March include the following: (1) placing JGBs as the most important financial asset purchased by the Bank in order to achieve the 2 percent price stability target as soon as possible; (2) an emphasis on exerting downward pressure on the whole yield curve; and (3) integration of the *Rinban* operation with the Program.

However, there are differences in the size of the purchase. QQE concentrates on purchasing JGBs of about 50 trillion yen (on a net basis) annually over two years. Converting the yearly

purchasing rate into the monthly pace and on a gross basis, QQE is scheduled to purchase 7+ trillion yen monthly over two years – much greater than the amount of at least 5 trillion yen to be purchased through the open-ended asset purchasing method, as suggested under my proposal. The monthly purchase rate of about 5 trillion yen was estimated based on the assumption that monetary easing would continue for longer. However, QQE attempts to achieve the 2 percent target at the earliest possible time and it includes a time horizon of about two years; thus, the purchase rate naturally becomes greater. Although I considered that the rate of about 5 trillion yen was a reasonable figure, after submitting my proposal in March, I began to believe that bolder action was necessary to send a strong signal about the Bank's determination to achieve the 2 percent target.

Furthermore, when QQE was introduced, I supported the monthly purchase rate of 7+ trillion yen based on two reasons. First, the amount appeared to hit the right balance between the amount under my proposal and about 10 trillion yen (which is roughly equivalent to the monthly issue of JGBs by the Ministry of Finance). If the amount had been closer to about 10 trillion yen, the market may have misunderstood this as an operation to monetize the fiscal deficit. Second, the scale of the operation is comparable to that of other central banks, including the Federal Reserve. In the past, the Bank's monetary easing was not seen as bold as that of the Federal Reserve. Under QQE, the monthly purchase of JGBs by the Bank on a net basis amounts to about 4 trillion yen, whereas that of securities by the Federal Reserve is about 85 billion U.S. dollars (of which 45 billion U.S. dollars is accounted for by U.S. Treasury securities and 40 billion U.S. dollars by mortgage-backed securities [MBSs]). Given that Japan is about 40 percent the economic size of the United States (in terms of nominal GDP), Japan's purchase amount is relatively large. In addition, extending the average remaining maturity of JGB purchases by the Bank to about seven years (six to eight years) has made it more or less comparable to that of securities purchases by the Federal Reserve (about nine years in the case of U.S. Treasury securities).

IV. My views and proposals on the outlook report

The Outlook Report mentioned in Section II attracted some attention among the public and market participants since it was the first time for the Bank's views to be released since the introduction of QQE. Indeed, with the Outlook Report, the Bank introduced some changes to its structuring of reports, such as by adopting a compact style of writing. Nonetheless, several divergent opinions, including my own, were expressed at the MPM held on April 26. Here, I would like to explain my views on the Outlook Report along with the content of my proposal.

A. Reasons for extending the projection period by one year

Before proceeding, I would like to explain why the projection period was extended by one year to fiscal 2015 (i.e., a period of three years) in the April report. The most important point is that, at the MPM held on April 3 and 4, the Bank collectively agreed to achieve the 2 percent target (excluding the effects of the scheduled hikes in the consumption tax rate) at the earliest possible time, and it set a time horizon of about two years with the introduction of QQE (which constitutes a new phase of monetary easing in terms of quantity and quality in the era after the promulgation of the new Bank of Japan Law). In such a case, I believe it is a central bank's obligation to indicate the projected timing for achieving the 2 percent target to the public and market participants. The median of the Policy Board members' forecasts indicated that 2 percent inflation would be achieved in fiscal 2015; therefore, it was appropriate to state the projection period (Chart 2). At the same time, the Bank decided to double the monetary base as well as the amounts outstanding of its JGB and ETF holdings over two years, so it was appropriate to present the outlook up to fiscal 2015 by taking into account the lagging effects of monetary easing. Of course, further extension – for example up to fiscal 2016 – could also be considered. However, the degree of uncertainty tends to rise as the projection period lengthens. Chart 7 shows that the range of projected values is

much greater for fiscal 2015 than for earlier periods; thus, further extension may not necessarily be useful. Other central banks treat the projection period differently, but it seems that three years is often selected.[8]

B. Clarification of the descriptions of risk factors

Now, I would like to explain my views over the Bank's risk assessments related to economic activity and prices, as described in Section II.

My proposal on the impact of the consumption tax hikes as a risk factor to the economy

The Bank's overall risk assessment related to the economy was that it was "balanced." Although my view is roughly in line with this assessment, I feel that the Bank should pay greater attention to an analysis of the risk factors associated with the impact of the consumption tax hikes. Let me make it clear that I strongly believe that the consumption tax hikes should be introduced as scheduled with a view to maintaining fiscal soundness and sustainability of the social security system. However, my concern lies in the possibility of the actual inflation projected for fiscal 2014 exceeding the level of inflation anticipated by households; this is because the timing of the tax hikes and the effects of large-scale monetary easing overlap. Therefore, unless households anticipate inflation as reflecting such impacts, households may face a greater-than-anticipated drop in real disposable income; consequently, the downside forces to the economy may become greater than the Bank estimates.

Let me explain my concern in more detail. It is estimated that the first increase in the consumption tax rate in April 2014 from 5 percent to 8 percent will raise inflation for fiscal 2014 by about 2 percentage points. The next hike from 8 percent to 10 percent in October 2015 will lead to an increase by 0.6 percentage point for fiscal 2015. Through active media reporting, households and firms are already familiar with the 2 percent price stability target (with a time horizon of about two years) adopted by the Bank. Households, however, may not know whether the 2 percent inflation for fiscal 2014 is the outcome of the first tax hike or monetary easing.

If both effects are taken into account, actual inflation in fiscal 2014 could approach 4 percent. According to the median of Policy Board members' forecasts (the Bank's view), inflation for fiscal 2014 including the tax hike will reach 3.4 percent (2 percent driven by the tax hike and 1.4 percent driven by such factors as monetary easing and import price increases), as shown in Chart 2. Are households really anticipating such a high level of inflation for fiscal 2014 – well above the 2 percent level? That would mean that households' "short-term" inflation expectations covering the period of fiscal 2014 should be approaching at least around 3 percent (based on the Bank's view); however, such expectations may remain at around 2 percent or less. Some indicators measuring short-term inflation expectations for fiscal 2014 indicate a rising trend, but they appear to be considerably less than around 3 percent (Chart 15).

In addition, recognition of the price increases including the tax rate hikes may spread quickly among households from fiscal 2014, only after the actual implementation. Therefore, I

[8] The Federal Reserve released projections five times (January, April, June, September, and December) in 2012; of those, the first four issues provided projections for three years from 2012 and those in the longer run, while the last issue covered projections for four years and those in the longer run. The European Central Bank (ECB) releases four projections (March, June, September, and December) annually; of those, the first three issues cover projections of two years including the year concerned, whereas the final issue makes projections of up to three years. The BOE provides projections for three years using the "fan chart" without specifying figures.

consider the possibility of a greater-than-expected decline in real income and, thus, aggregated demand.

In light of these considerations, I believe that the following description on the possible outcome of the tax hikes in the Outlook Report is inappropriate: "*Fourth, the extent of the front-loaded increase and subsequent decline in demand prior to and after the consumption tax hikes may differ significantly depending on developments in real income and prices at each point in time."* I therefore presented a proposal at the MPM held on April 26 to revise the above description by incorporating more fully the risk related to a potentially large drop in households' real income. At the same time, I took the strong view that the Bank should start to communicate more effectively and immediately to the public and market participants on the outlook for prices *with and without the effects of the tax hikes* so that the impacts of those hikes and other factors would be incorporated in short-term inflation expectations; this would be in contrast to the Bank's previous tendency to stress the price outlook without the effects of the tax hikes.

Based on the need for more insightful analysis, my proposal was meant to be an improvement over the description given in the Outlook Report together with the call for a better communication strategy with the public and market participants. This proposal was presented together with other suggestions related to the "two perspectives," which I will explain later. However, my proposal was rejected by all the other Policy Board members. Thereafter, I decided to withdraw that proposal and support the chairman's proposal on the Outlook Report. I did this because it was not my intention to oppose the chairman's proposal since our basic views do not diverge significantly. I will of course continue to watch developments of prices and inflation expectations closely.

My view on price responsiveness to the output gap as a risk factor to prices

Although I support the overall assessment of risks to prices as being "largely balanced," as discussed in Section II, I feel that the risks are tilted somewhat to the downside, particularly with regard to the responsiveness of prices to the output gap. The Phillips curve may remain flat owing to the high degree of uncertainty associated with the aforementioned issues related to the consumption tax hikes, especially for fiscal 2014 (Chart 10). If many firms perceive that the price increase triggered by the tax hikes could be sufficiently large to constrain household domestic demand, they may partially postpone raising their final sales prices (those related to the effect of the output gap and others) beyond the increase related to the consumption tax hike after fiscal 2015 – not fully within fiscal 2014. In such an event, the responsiveness of prices to the output gap would remain limited and the outcome for prices in fiscal 2014 could be lower than that projected by the Bank.

Meanwhile, it is noted that the environment surrounding firms is gradually changing. The depreciating trend of the yen since late 2012 has contributed to turning the rate of change in yen-based export prices from negative to positive; it has also had moderating effects on inflows of some inexpensive import products. This may help mitigate the deflationary pressure prevailing among firms. Moreover, the moderate movements in foreign currency-denominated commodity prices have avoided a sharp increase in import prices; this is in contrast to the period of the mid-2000s that accompanied sharper yen's depreciation and commodity price surge. Therefore, firms may find it easier to raise their sales prices and wages owing to the healthier prospects for profitability. I will closely watch firms' pricing behavior.

C. My proposal regarding the "two perspectives"

Next, I would like to explain my views about the structure of the Outlook Report. This report consists of three sections: Section I focuses on the baseline scenario of the outlook for economic activity and prices; Section II examines upside and downside risks; and Section III covers the "two perspectives." The first perspective examines whether the outlooks for

economic activity and prices will follow a path of “sustainable growth under price stability” over the next two years or so. The second perspective relates to various risks relevant to the conduct of monetary policy, including (1) the overall assessment of risks to the economic activity and prices and (2) financial imbalances from a longer-term perspective.

I have no objection to this framework. However, the description is not particularly clear and understandable for the public and market participants, and there is a need to improve the structure of the report. For example, it is not easy to understand the connections between sections I and II and the two perspectives in Section III. In addition, I am not sure that using the words “perspectives” without any explanation in the Outlook Report is appropriate. Consequently, readers would easily fail to understand the content relating to the two perspectives and thus not grasp the Bank’s intention. I have maintained such views about clarity of expression ever since I was appointed a member of the Policy Board and have called for improvements at every opportunity within the Bank. As a result, I submitted my official proposal at the MPM held on April 26, using the opportunity of the Outlook Report being released under the new leadership. My proposal called for completely removing the concept of the “two perspectives” from the report; instead, I suggested that what was written relating to the two perspectives in Section III be moved to appropriate sections throughout the entire report. My proposal consists of the following two points.

First, the content described as the first perspective should be moved to the last part of Section I. “Baseline Scenario of the Outlook for Economic Activity and Prices in Japan” and placed there as a summary of the overall assessment.

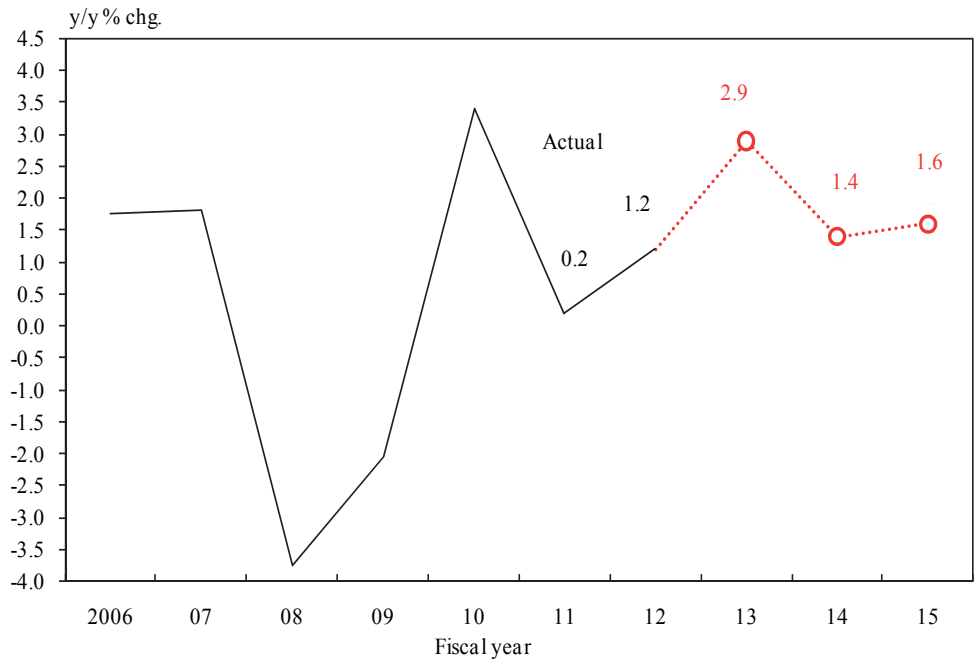
Second, the content related to overall risk assessment of economic activity in the second perspective should be moved to the last part of Section II.A. “Risks to Economic Activity.” Similarly, the content related to prices should be moved to the last part of Section II.B. “Risks to Prices.” The content related to the assessment of financial imbalances should remain in Section III, but it should be moved to a place after the description of the future conduct of monetary policy.

I do not exclude the possibility of using alternative description styles. In any case, I believe that the Bank should make greater efforts to promote an understanding among the public and market participants of its monetary policy and pursue more effective communication strategies. Improving the writing style in official documents including the Outlook Report is one of the first steps toward achieving that goal. I will continue to work on this issue.

That brings me to the end of my presentation. Thank you very much indeed for your kind attention.

Chart 1

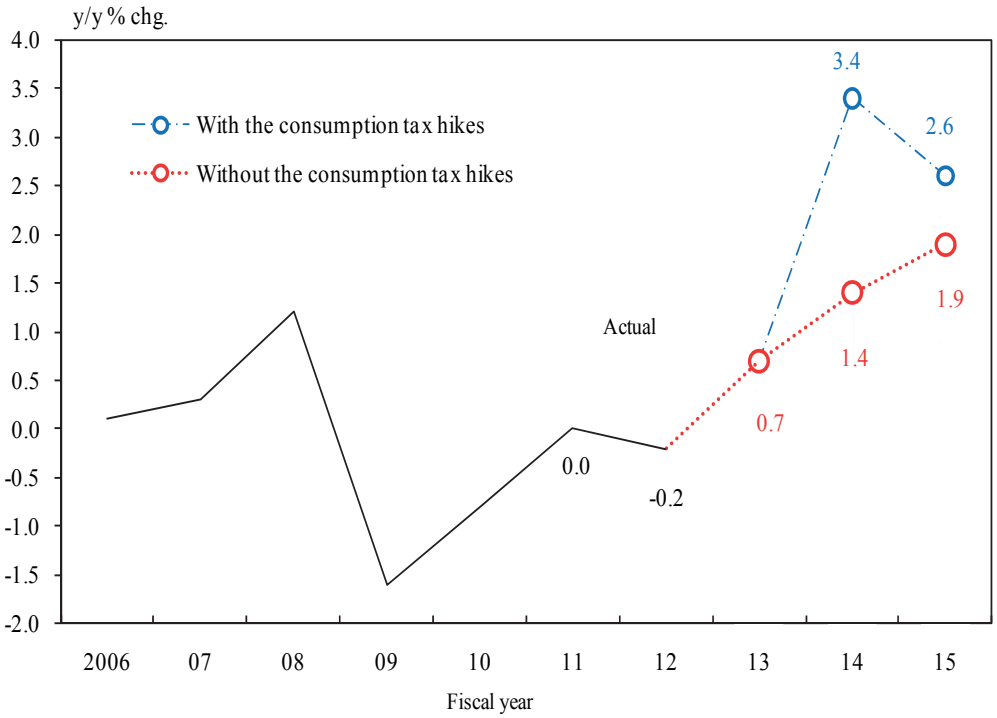
Outlook for economic activity (Real GDP)



Note: The circles in charts 1 and 2 indicate the median of the Policy Board members' forecasts.
Source: Bank of Japan.

Chart 2

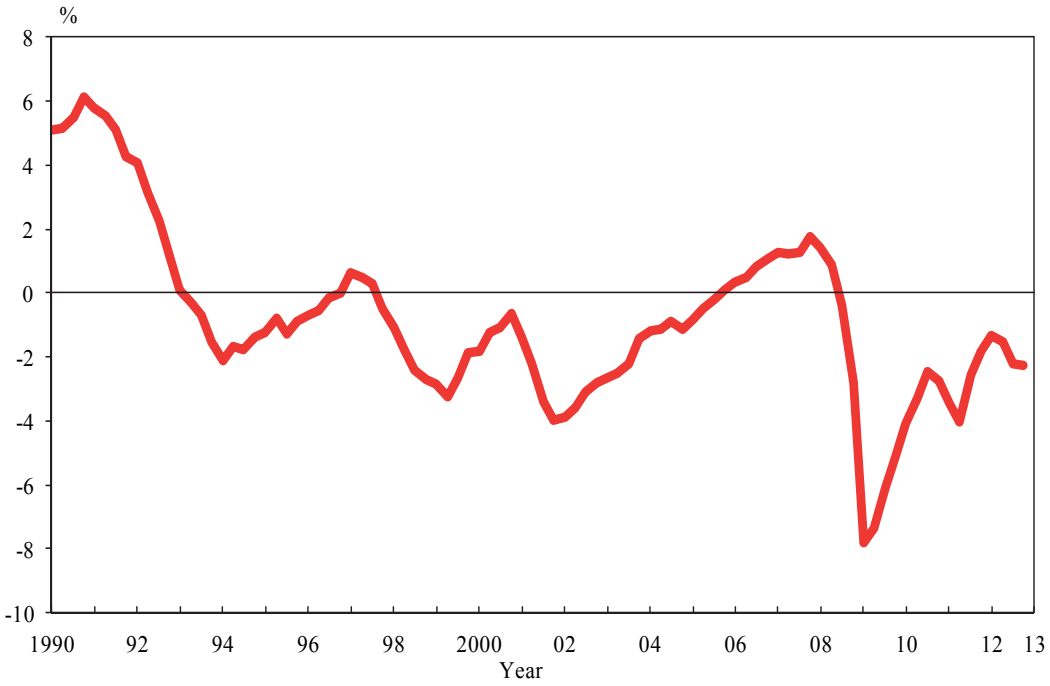
Outlook for prices (CPI)



Source: Bank of Japan.

Chart 3

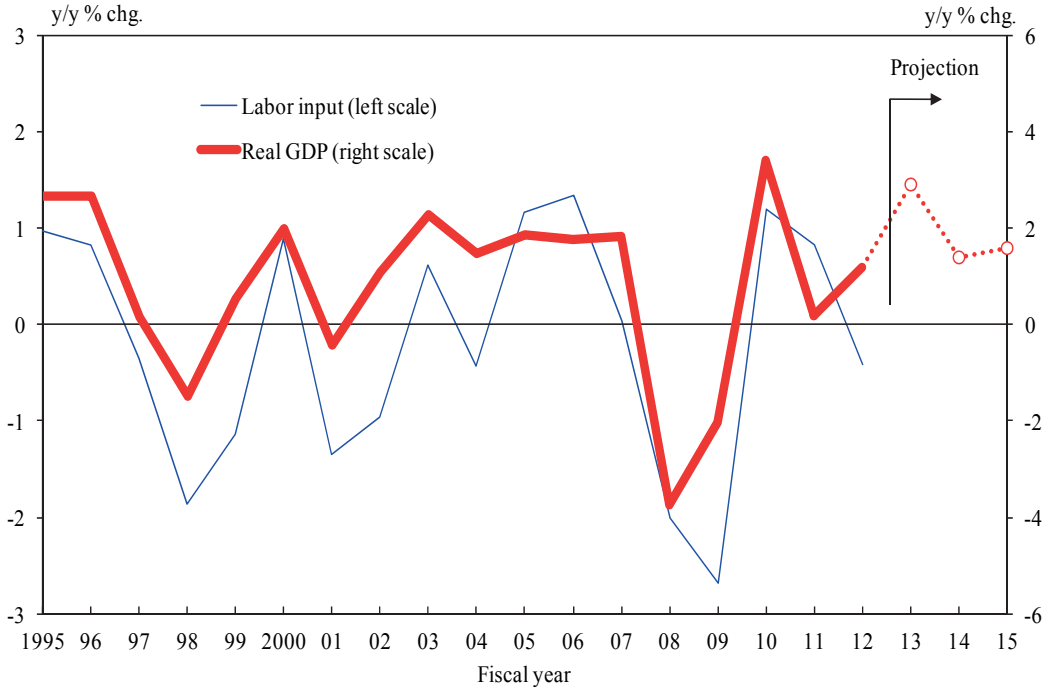
Output gap



Source: Bank of Japan.

Chart 4

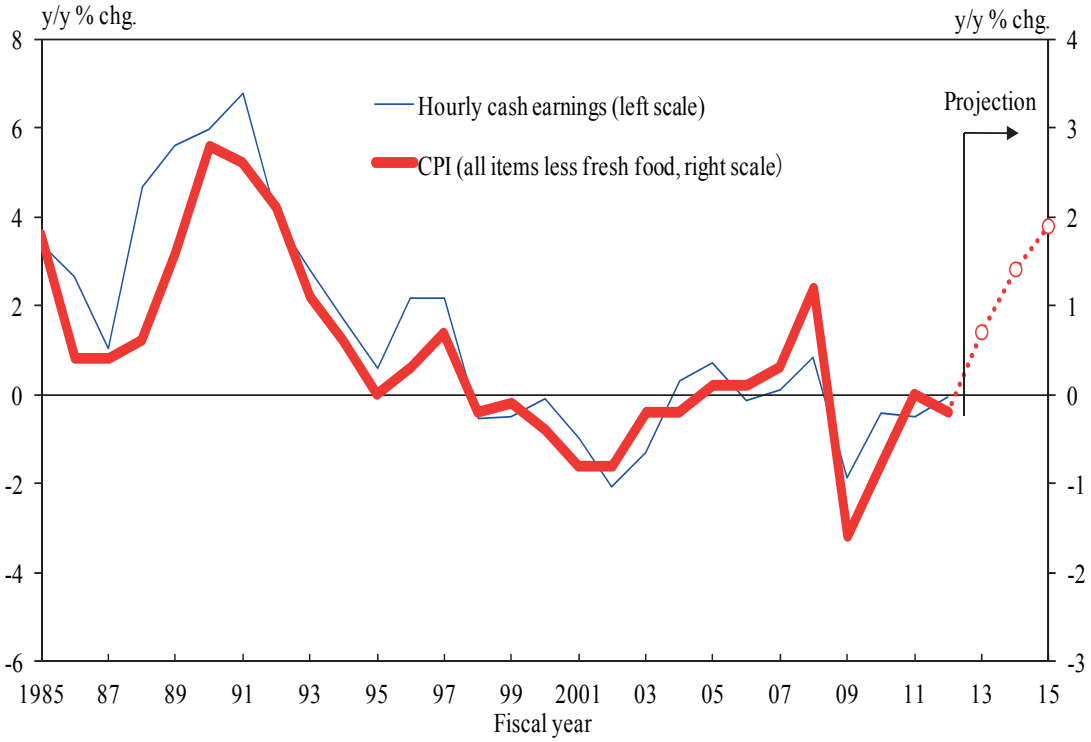
Real GDP and labor input



Note: Labor input = number of employees × total hours worked.
Sources: Cabinet Office; Ministry of Internal Affairs and Communications; Ministry of Health, Labor and Welfare.

Chart 5

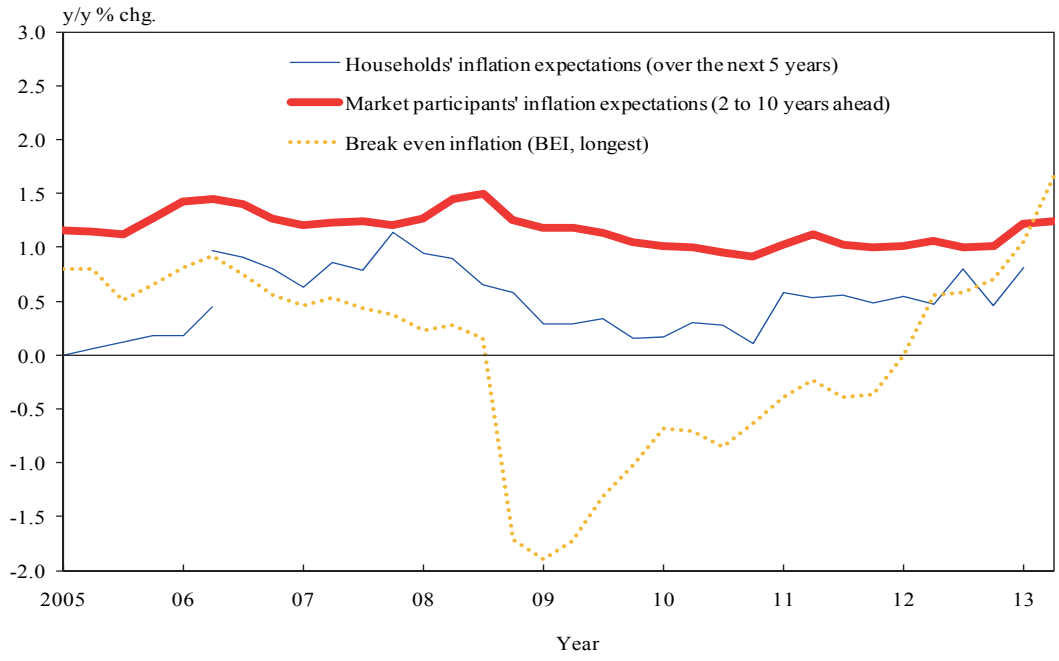
Prices and wages



Sources: Ministry of Internal Affairs and Communications; Ministry of Health, Labor and Welfare.

Chart 6

Medium- to long-term inflation expectations

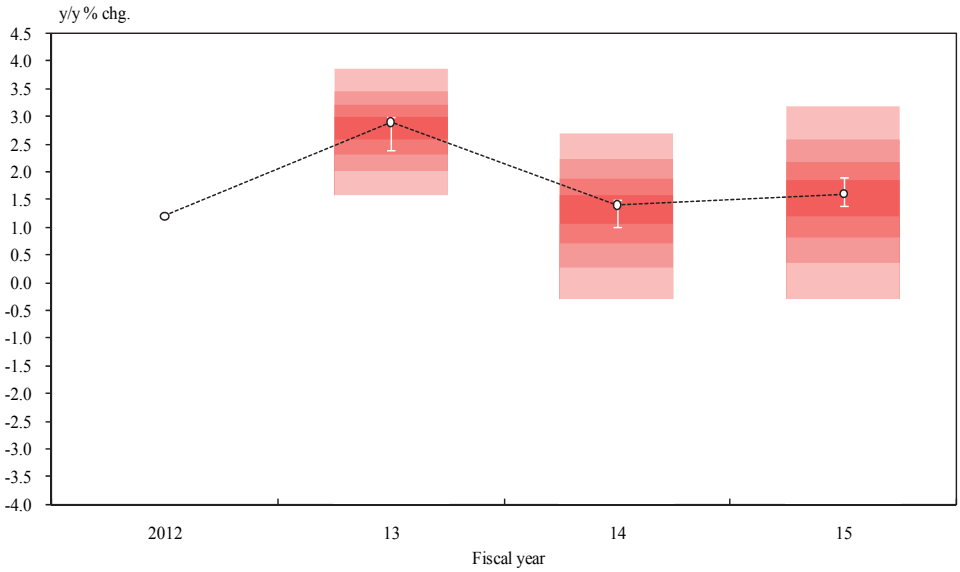


Sources: Bank of Japan; QUICK; Bloomberg.

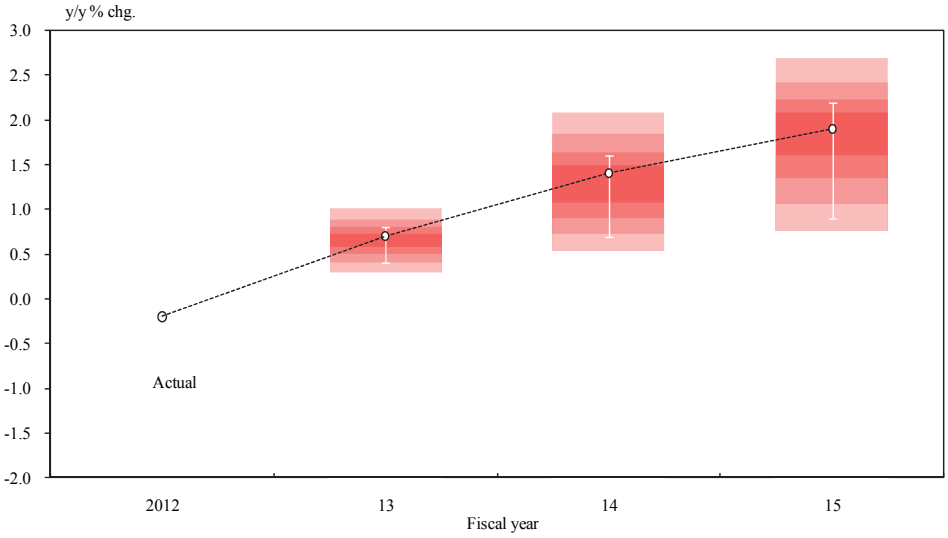
Chart 7

Forecast distribution charts of policy board members

(1) Real GDP



(2) CPI (All items less fresh food [excluding the effects of the consumption tax hikes])



Notes: 1. Based on the aggregated probability distributions (i.e., the Risk Balance Charts) compiled from the distributions of individual Policy Board members, the Forecast Distribution Charts are compiled as follows. First, upper and lower 10 percentiles of the aggregated distributions are trimmed and second, colors indicated below are used to show the respective percentiles of those distributions.

Upper 40% to lower 40%	Upper 30 to 40% & lower 30 to 40%	Upper 20 to 30% & lower 20 to 30%	Upper 10 to 20% & lower 10 to 20%

2. The circles in the bar charts indicate the median of the Policy Board members' forecasts (point estimates). The vertical lines in the bar charts indicate the range of the forecasts of the majority of Policy Board members.

Source: Bank of Japan.

Chart 8

Factors affecting long-term interest rates

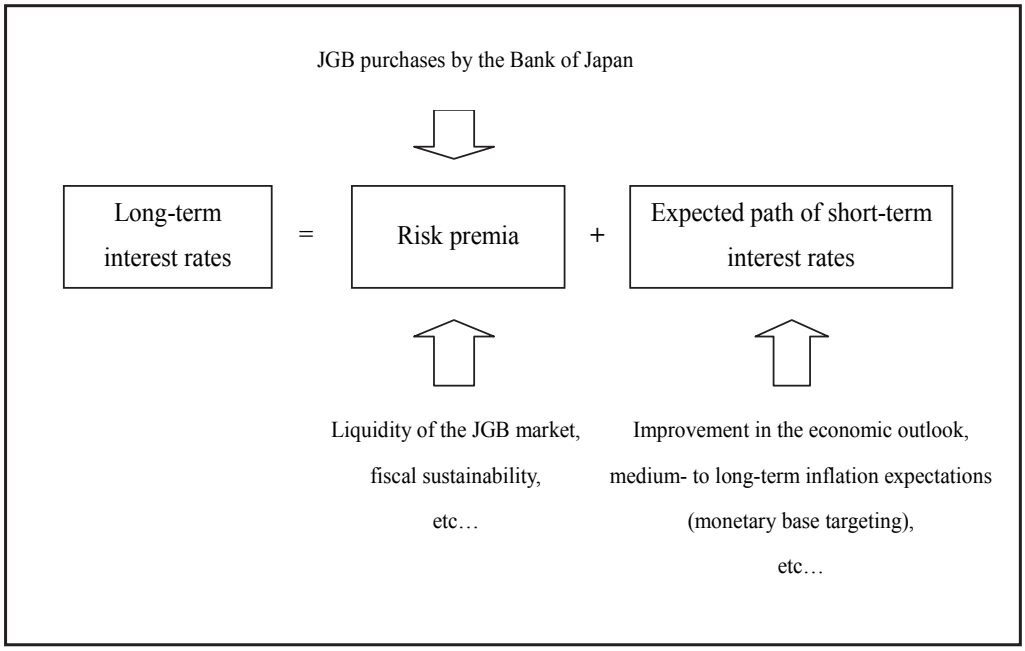
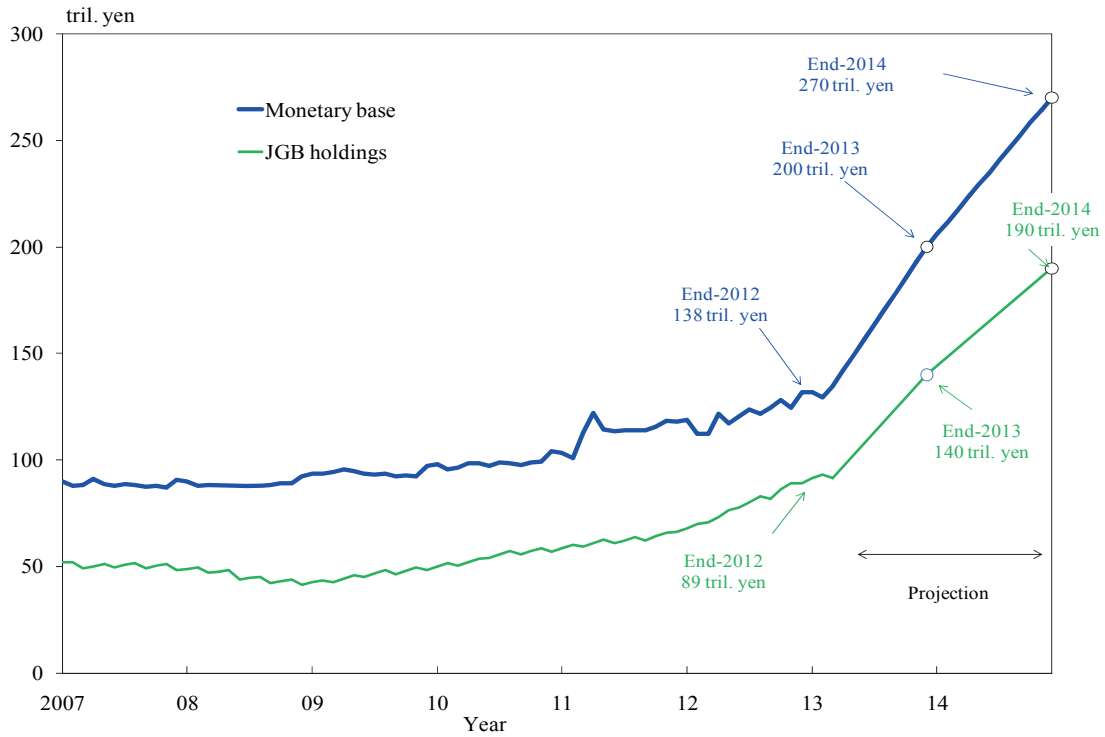


Chart 9

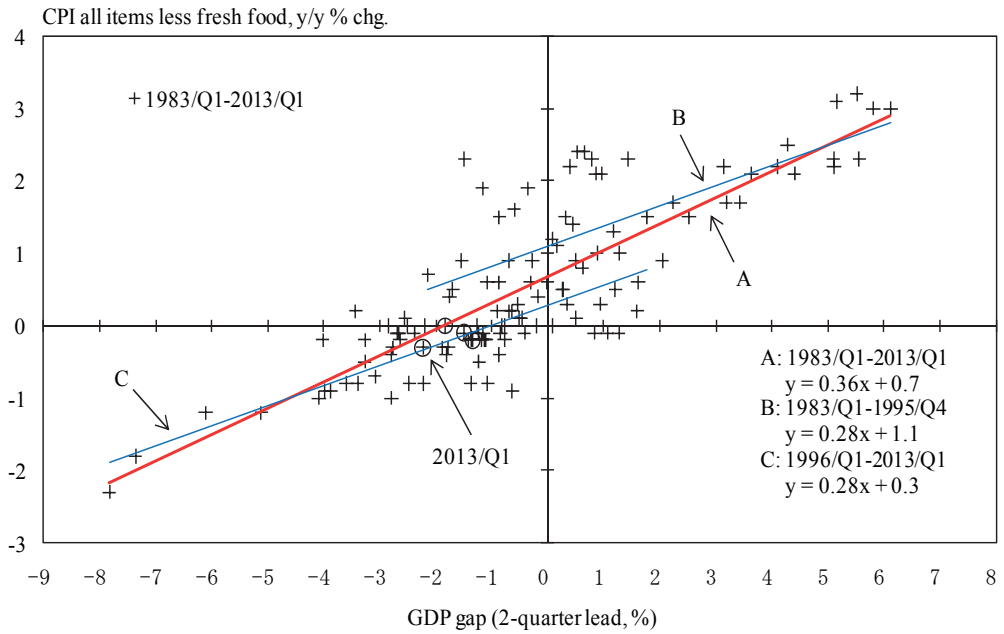
Expansion in the monetary base and JGB purchases



Source: Bank of Japan.

Chart 10

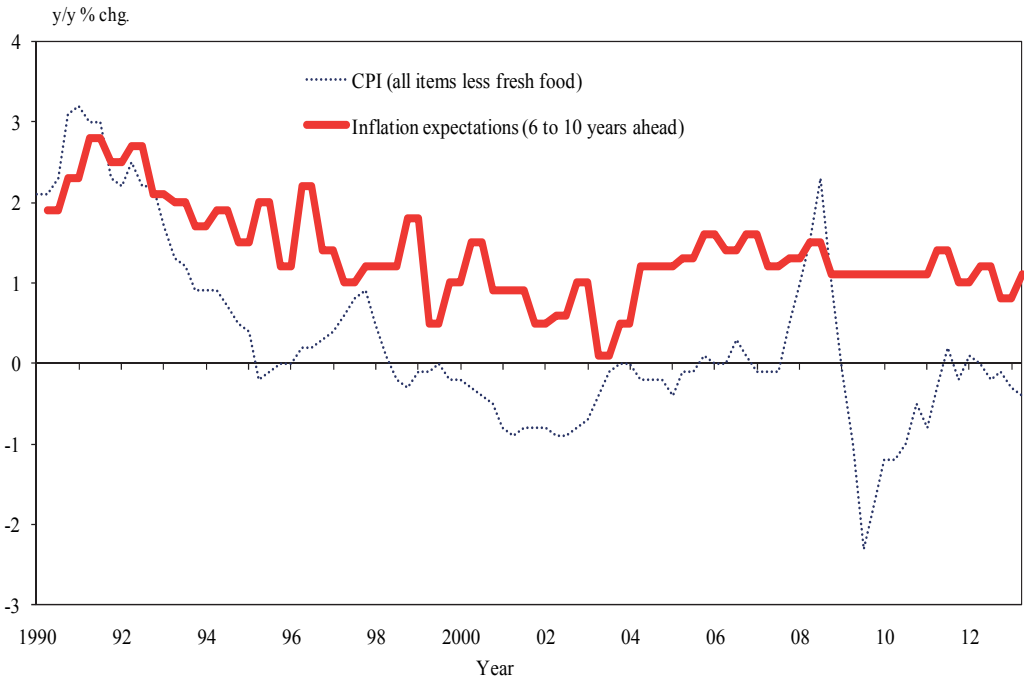
Phillips Curve



Note: The output gap is estimated by the Bank of Japan.
Sources: Bank of Japan; Ministry of Internal Affairs and Communications; Cabinet Office.

Chart 11

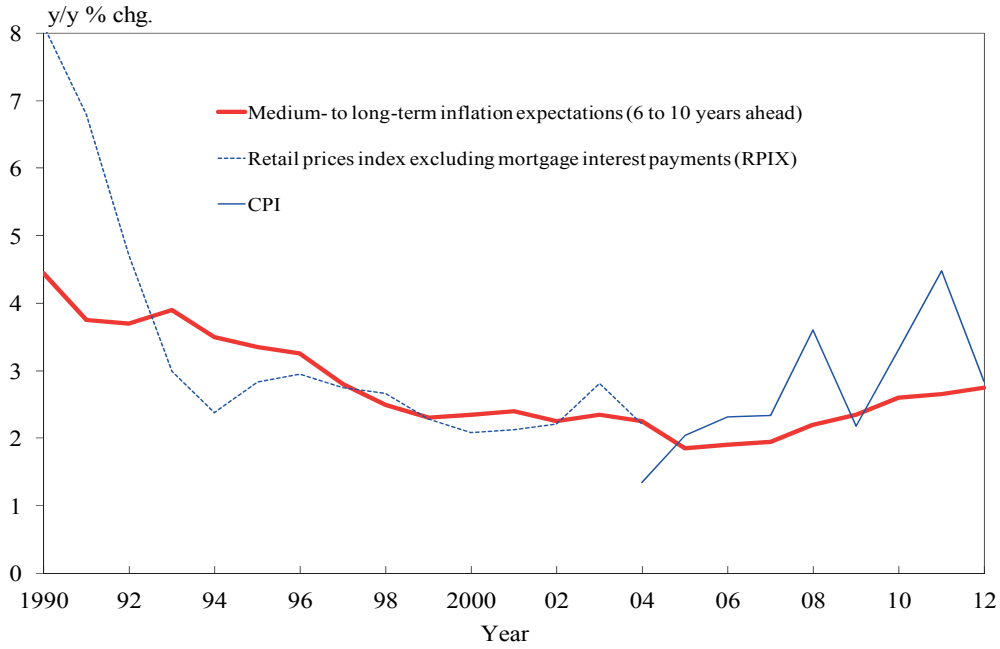
Medium- to long-term inflation expectations and the core CPI in Japan



Sources: Ministry of Internal Affairs and Communications; Consensus Economics Inc., "Consensus Forecasts."

Chart 12

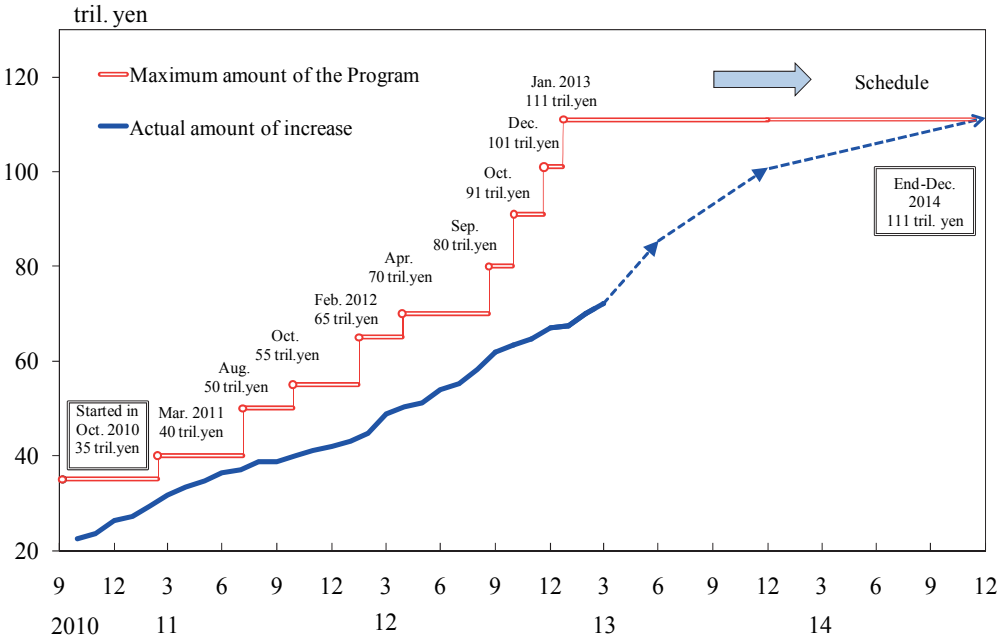
Medium- to long-term inflation expectations and the CPI in the United Kingdom



Sources: Office for National Statistics; Consensus Economics Inc., "Consensus Forecasts."

Chart 13

Size of the asset purchase program

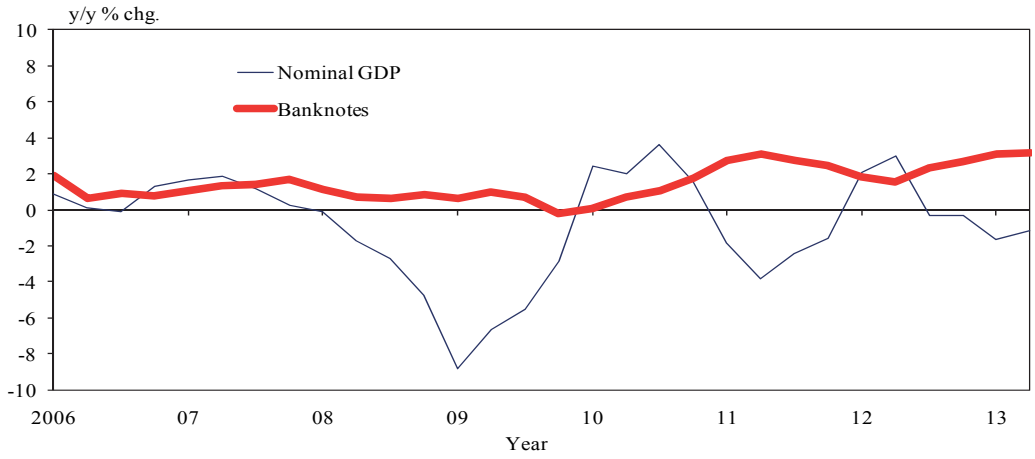


Note: Dates indicate the intended timescale for completing the increase.

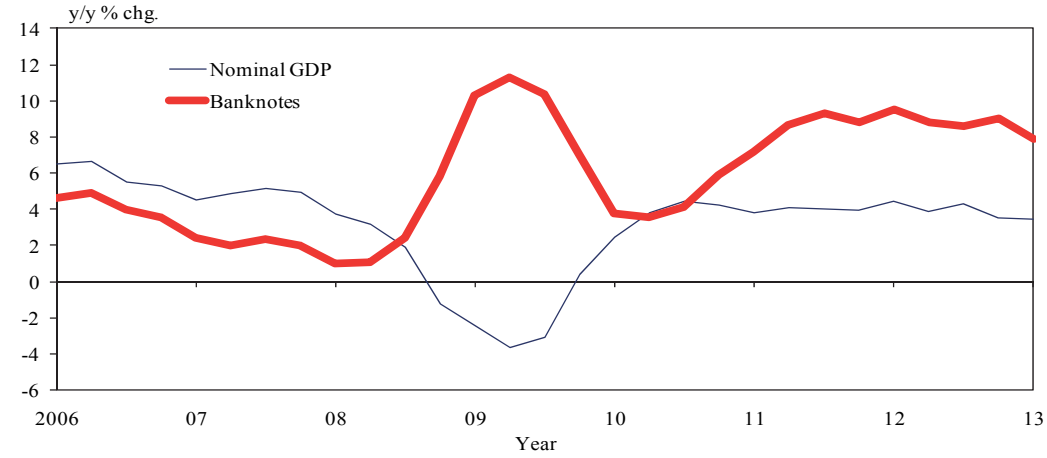
Chart 14

Amount outstanding of banknotes issued and nominal GDP

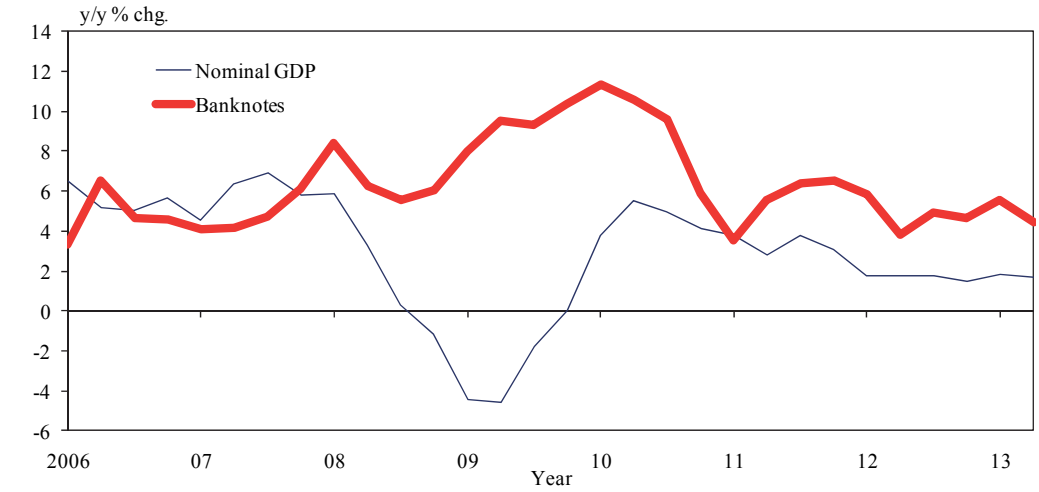
(1) Japan



(2) United States



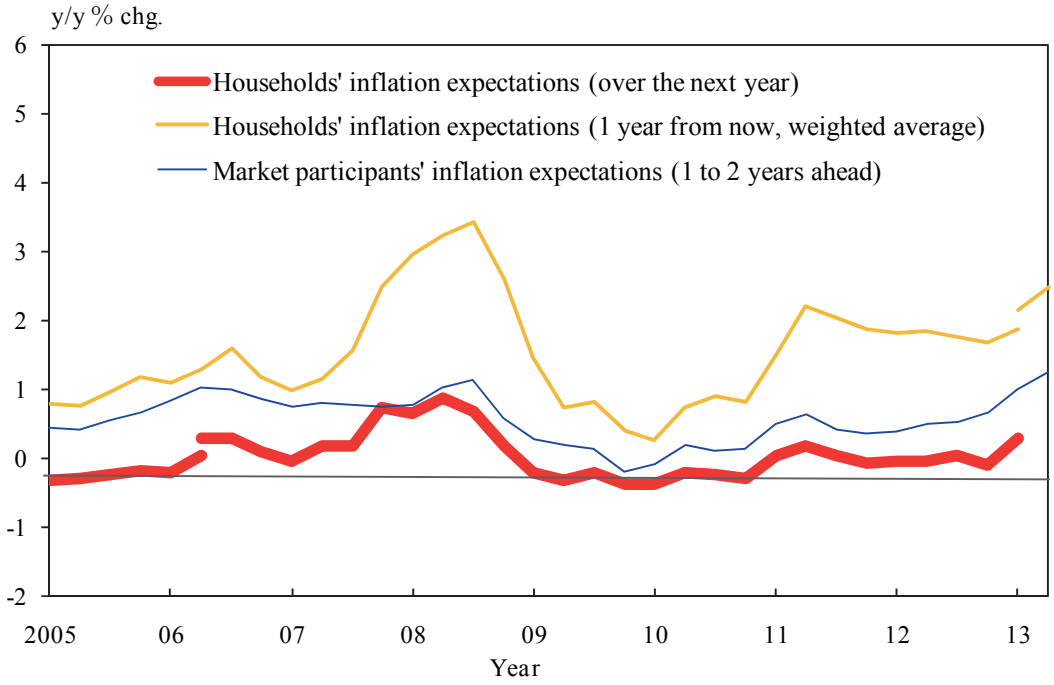
(3) United Kingdom



Sources: Bank of Japan; Federal Reserve; Office for National Statistics.

Chart 15

Short-term inflation expectations



Sources: Bank of Japan; Cabinet Office; QUICK.