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Bank of Japan

Virtuous Cycle between Wages and Prices and the Bank of Japan's Monetary Policy

Speech at a Meeting Held by
the Yomiuri International Economic Society in Tokyo

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(English translation based on the Japanese original)

Introduction

Thank you for the opportunity to speak today at this meeting hosted by the Yomiuri International Economic Society.

At the Monetary Policy Meeting (MPM) held on March 18 and 19, 2024, the Bank of Japan changed its monetary policy framework, judging that it was now within sight that the price stability target would be achieved in a sustainable and stable manner. The Bank considers that the large-scale monetary easing that lasted for 11 years since the introduction of Quantitative and Qualitative Monetary Easing (QQE) in April 2013 had fulfilled its role.

Today, I would like to provide an overview of the Bank's assessment of the developments in economic activity and prices underlying this decision, including the contents of the *Outlook for Economic Activity and Prices* (Outlook Report) released at the end of April, and then talk about the details of the Bank's new monetary policy framework and its thinking on the future conduct of monetary policy.

I. Economic Activity

Let me begin with developments in economic activity. Japan's economy has recovered moderately, although some weakness has been seen in part. Looking at the corporate sector, production has been flat as a trend, although it has declined recently, partly due to the effects of a suspension of production and shipments at some automakers (Chart 1). The March *Tankan* (Short-Term Economic Survey of Enterprises in Japan) showed that business sentiment has stayed at a favorable level on the whole, although there were some industries in which sentiment was subdued due to the impact of the aforementioned developments in the automobile industry. Corporate profits have improved as firms have made progress in the pass-through of cost increases to selling prices, and business fixed investment has been on a moderate increasing trend. In the household sector, as regards private consumption, consumption of nondurable goods such as food has been affected by the downward pressure on real income due to price rises seen so far, and automobile sales have declined due to the same factors affecting production. However, indicators of household sentiment have shown a clear improvement recently, mainly due to expectations for wage increases. Therefore, despite some temporary weakness in both the corporate and household sectors, the virtuous cycle from income to spending has been maintained.

As for the outlook, the Bank expects Japan's economy to continue growing firmly as overseas economies grow moderately and the aforementioned temporary factors dissipate. In the April Outlook Report, the Bank projects that the economy is likely to keep growing at a pace above its potential growth rate through fiscal 2026 (Chart 2). This is because the Bank expects the virtuous cycle from income to spending to gradually intensify in both the corporate and household sectors. In the corporate sector, production is expected to return to an uptrend, due to a moderate increase in domestic and external demand as well as progress in global adjustments for IT-related products. Against this backdrop, corporate profits are expected to follow an improving trend and business fixed investment is likely to continue on an increasing trend. Business fixed investment plans in the March *Tankan* show that investment is expected to continue rising clearly in fiscal 2024, partly in response to the digitalization and decarbonization of the economy, providing further evidence of firms' positive fixed investment stance. Turning to the household sector, with wages expected to grow firmly, which will be explained in more detail later, and with the effects of the government's cuts in income tax and inhabitant tax, household income is expected to improve even on a real basis. Under these circumstances, private consumption is expected to gradually return to an increasing trend.

II. Price Developments

Current Situation of and Outlook for Prices

Next, let me look at prices. The year-on-year rate of increase in the consumer price index (CPI) for all items less fresh food for March 2024 -- the latest figure available -- was at around 2.5 percent (Chart 3). While inflation has now been above 2 percent for two years, the nature of this inflation has changed.

In several of my speeches, I have explained developments in prices since 2021 by distinguishing between the "first component" and the "second component" (Chart 4). The first component refers to the force that pushes up prices due to cost-push pressure led by the rise in import prices. In contrast, the second component refers to the force that leads to further price rises through the linkage between wages and prices, mainly against the backdrop of tightening labor market conditions while the economy improves; in other words, the virtuous cycle between wages and prices. Needless to say, the first component is a temporary force, and its effects will gradually dissipate once the upward pressure on import prices, which was the driver of the first component, ceases. In contrast, the second component is expected to raise inflation in a more sustainable manner, accompanied by changes in firms' wage- and price-setting behavior.

Keeping this distinction in mind, let us have a look at recent price developments (Chart 3). Recently, the rate of increase in the prices of goods, especially food products, has clearly been falling, which shows that the effects of the first component are easing. On the other hand, in services, for which labor costs account for a large share of total costs, prices have continued to rise moderately. This suggests that the effects of the second component are increasing.

Looking ahead, I expect the first component to ease off but the second component to continue increasing. In the April Outlook Report, the Bank projects that the rate of increase in the CPI for all items less fresh food and energy will fall from 3.9 percent in fiscal 2023 to 1.9 percent in fiscal 2024, be at 1.9 percent in fiscal 2025, and increase to 2.1 percent in fiscal 2026. While the rate of increase in the CPI less fresh food will show somewhat larger fluctuations due to the impact of the phasing out of government energy subsidies, it is expected to be in the range of 2.5-3.0 percent for fiscal 2024 and then be at around 2 percent from fiscal 2025 onward.

As such, it is fairly clear from these forecasts in the Outlook Report that the Bank expects the momentum to shift from the first component to the second component. When making an assessment of price developments, it is important to capture the trend in prices brought about by the second component -- in other words, underlying inflation. Next, I will talk about underlying inflation in more detail.

An assessment of underlying inflation cannot be made based on developments in a single indicator. It should be made by carefully examining a range of information on economic activity and price developments, including not only a variety of price indicators, but also that lying behind price changes, such as the output gap, inflation expectations, and the wage growth rate. Therefore, capturing underlying inflation is not necessarily easy. It is an especially difficult challenge in the current phase, in which price fluctuations attributable to the first component are large. The Bank has been compiling various measures considered useful in determining developments in the underlying trend in prices. However, the sharp rise in import prices, as seen in the current phase, was not factored into the calculation of these measures. To give an example, the trimmed mean is calculated by excluding items that belong to the upper and lower 10 percent of the price change distribution. Thus, when prices temporarily rise across a wide range of items, the underlying trend in prices cannot be captured by the trimmed mean. To capture underlying inflation in the current phase, it is necessary to take a new approach.

In the April Outlook Report, the Bank presented three approaches to capturing underlying inflation in the current phase: (1) extracting underlying factors from price statistics through a new method; (2) focusing on indicators of inflation expectations; and (3) estimating indicators of trend inflation from economic models (Chart 5).[1] Although indicators estimated using these approaches show different developments and their levels vary, a few things can be noted when taking a comprehensive look.

First, although the levels of these indicators vary, all of them are below the price stability target of 2 percent. Second, however, all of the indicators have been rising gradually, meaning that underlying inflation is almost certainly rising. Thus, at this point, underlying inflation seems to be on a rising path toward 2 percent.

Of course, all of these estimated results are based on certain premises and assumptions, and they should be interpreted with considerable latitude. To give an example, indicators of trend inflation calculated from economic models are affected by how the model is specified. Furthermore, I would like to reiterate that developments in underlying inflation should not be assessed solely based on such analyses. It is important for the Bank to comprehensively assess underlying inflation by taking a variety of perspectives into account while carefully examining the mechanism that lies behind price changes by also using anecdotal information from firms.

[1] For details of each approach, see Box 4 of the April 2024 Outlook Report.

Firms' Wage- and Price-Setting Behavior and Virtuous Cycle between Wages and Prices

In the April 2024 Outlook Report, the Bank projects that, in the second half of the projection period, underlying inflation is likely to be at a level that is generally consistent with the price stability target of 2 percent. This is because changes in firms' wage- and price-setting behavior have become more evident recently. The linkage between the two has strengthened in both directions, from prices to wages and from wages to prices.

On the wage side, against the backdrop of favorable corporate profits and tightening labor market conditions, moves to reflect price rises in wages have become evident. Currently, the increase in wages agreed in this year's annual spring labor-management wage negotiations is above 5 percent, while that in base pay is around 3.5 percent, both being the highest levels since 1991 (Chart 6). The trend toward higher wages has been particularly pronounced at larger firms, suggesting that their wage-setting behavior has changed considerably.

At the moment, wage negotiations of small and medium-sized firms are in progress, following those of large firms. I am aware that the business conditions of such small and medium-sized firms vary across industries and depend on individual firms, and that some have said that it is not easy to raise wages. However, through regular dialogue between a wide range of firms and the Bank, including its Head Office and branches across Japan, the Bank has heard from many firms, including regional small and medium-sized firms, that there is a pronounced labor shortage and that they -- even those facing severe business conditions -- are considering raising wages in order to recruit and retain employees. The government's efforts to ensure an appropriate pass-through of labor costs in business-to-business transactions also seem to be encouraging these firms to make the decision to raise wages. Moreover, looking back at the past, in Japan, the results of wage agreements reached at large firms have tended to form the so-called prevailing wage and to spill over to wages at small and medium-sized firms, and a similar tendency was seen last year. Based on these developments taken together, I believe that the average rate of increase in wages this year is highly likely to exceed that of last year.

In terms of prices, we are also seeing a change in firms' price-setting behavior. Looking at firms' outlook for output prices in the *Tankan*, while the short-term outlook has declined somewhat with the easing of the impact of the rise in import prices, the long-term outlook has increased further. I think that this may indicate a change in firms' price-setting behavior, in that they plan to gradually raise their selling prices as they factor in their expectation that labor costs will continue to rise.

Changes in Firms' Wage- and Price-Setting Behavior: Comparison with the Past

Looking back, after Japan fell into deflation in the late 1990s, the mindset and behavior based on the assumption that wages and prices will not increase easily had taken hold among the public and firms. Meanwhile, there were several phases when prices rose triggered by a rise in import prices (Chart 7). However, there was no substantial change in firms' wage- and price-setting behavior. For example, in the late 2000s, wages hardly increased at all, even when prices rose.

One of the reasons for this difference between these past phases and the current phase is that import prices rose quite significantly this time. Another important factor is that during the current phase, labor market conditions have been tightening notably, causing a change in the wage and price formation mechanisms. The number of employed persons in Japan had been more or less flat, albeit with fluctuations, since the late 1990s. It then turned to a clear increase from the mid-2010s as, for a long period, the economy remained on an improving trend and labor demand increased. Against this background, together with changes on the labor supply side such as the baby boomer generation's exit from the labor market, labor market conditions have tightened notably of late. I believe that the Bank's patient conduct of large-scale monetary easing was also effective in this tightening by strongly stimulating aggregate demand.

Changes in Firms' Wage- and Price-Setting Behavior: Outlook

Thus, the current phase is characterized by changes in firms' wage- and price-setting behavior that were not seen in the past. The fact that a substantial rise in wages has been achieved for two consecutive years and that firms' outlook for selling prices has increased steadily is an indication of change in the mindset and behavior based on the assumption that wages and prices will not increase easily, which had taken hold in society during deflation.

Looking ahead, taking into account that labor market conditions are expected to remain tight, changes in firms' wage- and price-setting behavior will gradually take root.

Under these circumstances, I expect firms to change their behavior in a broader sense. In the *Survey regarding Corporate Behavior since the Mid-1990s* that was conducted as part of the review of monetary policy from a broad perspective, the Bank asked a wide range of firms which was preferable in terms of their business activities: a state in which both prices and wages rise moderately, or one in which both prices and wages hardly change (Chart 8).[2] Approximately 70 percent of firms responded that a moderate rise in both prices and wages was preferable. As a reason for this response, some of the firms added that this moderate rise would make it unnecessary to cut costs in order to curb price rises, enabling them to make active business fixed investment and raise wages. Needless to say, for the economy to grow sustainably, enhancing productivity is essential. While changes in the mindset and behavior based on the assumption that wages and prices will not increase easily have been seen, I hope that firms in Japan will make the most of this environment, and that they will strengthen their proactive efforts to enhance productivity.

Risks regarding Prices

So far, I have talked about the outlook for prices based on the baseline scenario. However, the risks regarding the outlook are high, both to the upside and downside. Let me point out two risks in particular. The first is risks regarding firms' wage- and price-setting behavior. As I have said, firms' behavior has recently shifted more toward raising wages and prices, and thus the linkage between wages and prices could strengthen further than expected, causing prices to deviate upward from the baseline scenario. On the other hand, based on the assumption that cost-push pressure led by the rise in import prices will subside, it is necessary to pay close attention to whether moves to pass on increases in wages and other costs to selling prices will weaken, together with the developments in cost-push pressure. The second risk is future developments in foreign exchange rates and international commodity prices, as well as the extent to which such developments will spread to import prices and domestic prices. A rise in crude oil prices and depreciation of the yen could

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[2] The results of the survey will be released soon.

weaken the premise of the outlook that cost-push pressure led by the rise in import prices will subside. Especially, with firms' behavior shifting more toward raising wages and prices recently, it is necessary to be aware that, compared to the past, exchange rate developments are more likely to affect prices.

III. The Bank's Monetary Policy

Changes in the Monetary Policy Framework

Next, I would like to turn to the Bank's conduct of monetary policy. As I have mentioned so far, it is within sight that the price stability target of 2 percent will be achieved in a sustainable and stable manner, as it has been confirmed that the virtuous cycle between wages and prices has become more solid. In these circumstances, the Bank decided at the March MPM to change the large-scale monetary easing that it had carried out for the past 11 years, as I noted at the beginning of this speech (Chart 9).

Specifically, the Bank decided upon the following. First, with regard to short-term interest rates, it decided to encourage the uncollateralized overnight call rate to remain at around 0 to 0.1 percent. Given that the interest rate under the negative interest rate policy was in the range of minus 0.1 to 0 percent, this policy change means an interest rate hike of around 0.1 percentage points. Second, the Bank decided to terminate the yield curve control framework by discarding the target level of 10-year JGB yields and the upper bound for these yields as a reference. Third, it decided to discontinue purchases of exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs). It also decided to gradually reduce the amount of purchases of CP and corporate bonds and aim to discontinue the purchases.

In short, the new policy framework can be expressed as a conventional monetary policy framework in which the Bank guides the short-term interest rate as a primary policy tool, with the price stability target of 2 percent. With regard to JGB purchases, the Bank has decided to continue for now its purchases at broadly the same amount as before to avoid discontinuous changes before and after the change in policy framework, with possible adjustment of the actual amount of JGB purchases in each market operation, mainly taking into account market developments. Under such circumstances, long-term interest rates will be determined basically by the financial markets. Therefore, it can be said that it is natural for these rates to fluctuate in response to developments in overseas interest rates and changes in the outlook for economic activity and prices. In addition, while the Bank is currently examining the situation in financial markets under the framework of JGB purchases revised in March, it is appropriate for the Bank to reduce the amount of its JGB purchases as it proceeds with its exit from large-scale monetary easing.

Assessing the Degree of Monetary Accommodation: the Real Interest Rate and r* (r-star)

Assessing the degree of monetary accommodation is one of the challenges the Bank faces as it seeks to ensure the most appropriate financial conditions by guiding the short-term interest rate with the price stability target.[3] The Bank makes a comprehensive assessment of financial conditions, taking into account factors such as developments in interest rates, financial institutions' lending attitudes, and the financial market environment. Among these, it is the real interest rate, that is, the nominal interest rate minus the expected rate of inflation, which serves as the basis for this assessment. Recently, both short- and long-term real interest rates have been significantly negative (Chart 10).

Furthermore, in assessing the degree of monetary accommodation based on the level of the real interest rate, it is necessary to compare that rate with the real interest rate that is neutral to economic activity and prices -- the so-called natural rate of interest or r* (r-star). Roughly speaking, if the real interest rate is lower than r-star, households' and firms' spending behavior will be more active, and this will push up economic activity and prices. On the contrary, if the real interest rate is higher than r-star, their spending behavior will be restrained, and economic activity and prices will be suppressed.

The difficulty with r-star is that it cannot be directly observed; rather, it must be estimated using statistical methodologies. A variety of estimation methodologies have been devised and the Bank staff has made various calculations. The reality is, however, that the estimated values of r-star vary quite considerably, depending on the methodologies used (Chart 11).

Uncertainties with r-star have been extensively discussed not only in Japan but also in the

[3] For details, see Box 5 of the April 2024 Outlook Report.

United States and Europe, since, in addition to the fact that estimating r-star is itself very difficult, recent changes in the global situation have made it even more difficult to estimate r-star. In principle, the value of r-star varies depending on the balance between savings and investment. There may have been significant changes in this balance globally as firms' investment behavior and cross-border capital flows respond to various factors, including heightened geopolitical risks, changing globalization, and progress in decarbonization. There are in addition some developments that are specific to Japan. The population in Japan is aging more rapidly than in the United States and Europe. This population aging might also change the balance between savings and investment in the national economy, thereby affecting r-star. Another issue is the difficulty in estimating the effects of interest rate hikes on economic activity and prices, given that it is a long time since the short-term interest rate was raised in Japan.

It is therefore difficult at this point to specify the level of r-star in Japan and show the degree of monetary accommodation in a clear manner. However, the real interest rate is currently below various estimated values of r-star to a substantial degree, and there is therefore no doubt that financial conditions are accommodative. I believe that this situation will continue to firmly support the economy. As regards the uncertainties of r-star, the Bank will examine in its future conduct of policy how the interest rate change will affect economic activity and prices through changes in financial conditions.

Future Conduct of Monetary Policy

With the price stability target of 2 percent, the Bank will conduct monetary policy as appropriate from the perspective of sustainable and stable achievement of the target, while examining at every MPM the risks and the outlook for economic activity and prices.

Based on what I have said so far, I want to add that, if underlying inflation rises in line with the Bank's outlook, the appropriate degree of monetary accommodation from the perspective of achieving the price stability target will change, and the Bank will adjust the degree of monetary accommodation. Additionally, if there is a change in the outlook for economic activity and prices, or a change in the risks regarding the outlook, that is without doubt an appropriate reason to adjust the policy interest rate accordingly. In this regard, as I mentioned earlier, it is necessary to keep in mind that risks surrounding the price outlook have continued to be high, both to the upside and downside. If the outlook for prices is revised upward or if upside risks become high, it will be appropriate for the Bank to make an earlier adjustment of the policy interest rate. On the other hand, if the outlook is revised downward or downside risks increase, it will be necessary for the Bank to maintain the current accommodative financial conditions for a longer period. In addition, if economic activity and prices face large downward shocks, the Bank will consider taking the necessary action, without ruling out any options in advance, including the implementation of the various unconventional measures that have been taken so far.

Concluding Remarks

Today, I have talked about the Bank's assessment of price developments and its monetary policy under the new framework.

Underlying inflation in Japan is firmly moving toward 2 percent, and it has been confirmed that the virtuous cycle between wages and prices has become more solid. With the price stability target of 2 percent, the Bank will conduct monetary policy as appropriate, in response to developments in economic activity and prices as well as financial conditions, from the perspective of sustainable and stable achievement of the target.

Lastly, I would like to say a few words about the review of monetary policy from a broad perspective. The Bank launched the review in April last year and, among other things, it has exchanged views with various related parties, held workshops, and conducted surveys. Last October, the Bank also started to discuss the findings of the review at the MPMs.

In the review, the Bank will look back on developments in economic activity and prices over the past 25 years and identify the positive and side effects of the various unconventional measures that it has introduced so far by taking into account the environment in which the Bank found itself at each point in time. No other central bank has implemented unconventional measures over such a long period and in such a variety of ways. The Bank will analyze its extensive experience from a broad perspective with the help of the expertise of professionals in each field. We hope the results will provide valuable material that should be useful for the conduct of monetary policy going forward, not only in Japan but also in other economies.

Thank you very much for your attention.

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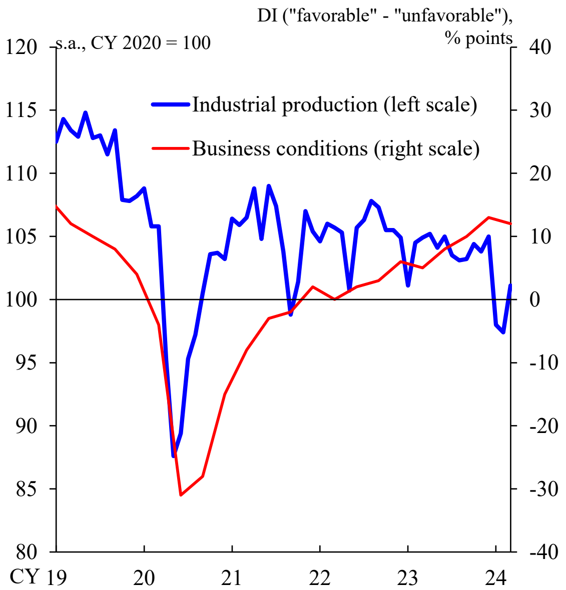
May 8, 2024

UEDA Kazuo

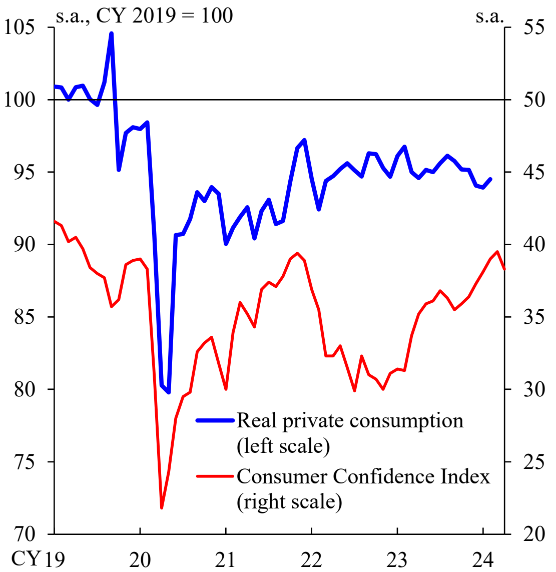
Governor of the Bank of Japan

Current Situation of Economic Activity in Japan

Corporate Sector



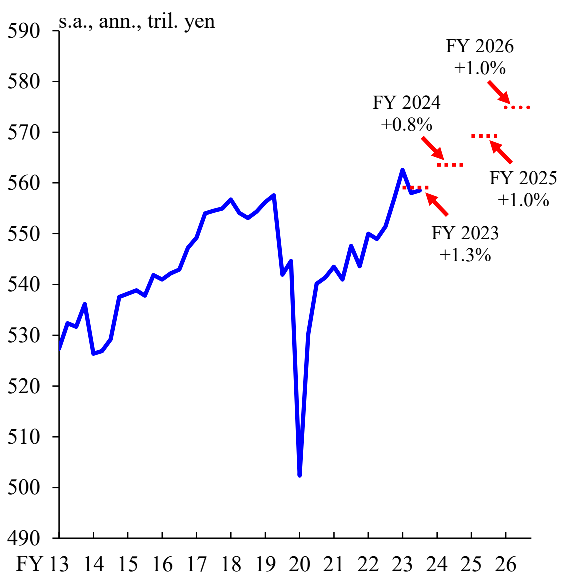
Household Sector



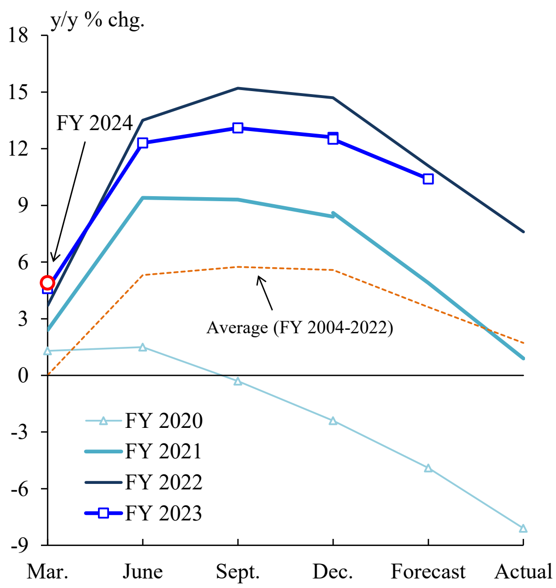
Notes: 1. In the left-hand chart, figures for business conditions are based on the *Tankan*.
2. In the right-hand chart, figures for real private consumption are the real Consumption Activity Index (travel balance adjusted) based on staff calculations, which exclude inbound tourism consumption and include outbound tourism consumption.
Sources: Ministry of Economy, Trade and Industry; Bank of Japan; Cabinet Office.

Outlook for Economic Activity in Japan

The Bank's Forecasts for Real GDP



Developments in Business Fixed Investment Plans

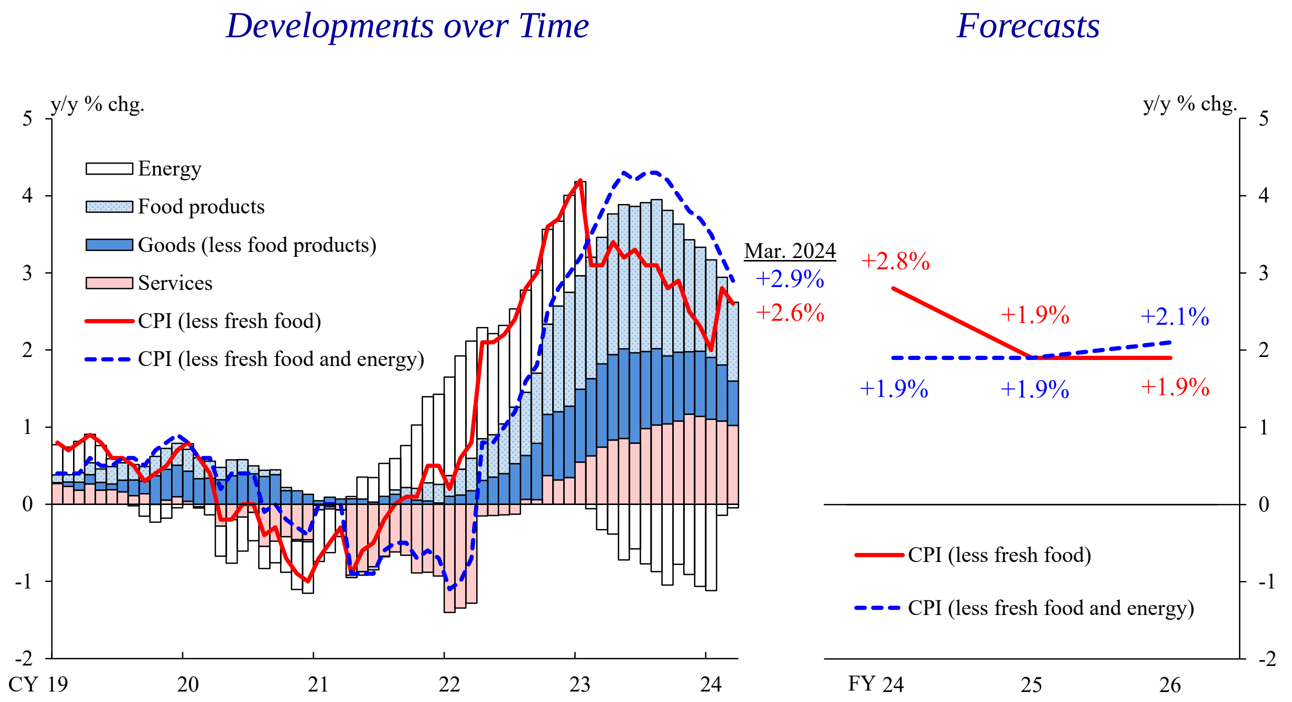


Notes: 1. In the left-hand chart, the forecasts presented are the medians of the Policy Board members' forecasts in the April 2024 Outlook Report. The values of real GDP for fiscal 2023 onward are calculated by multiplying the actual figure for fiscal 2022 by all successive projected growth rates for each year.
2. In the right-hand chart, figures are based on the *Tankan*. All industries including financial institutions. Including software and R&D investments and excluding land purchasing expenses. R&D investment is not included before the March 2017 survey. There are discontinuities in the data for December 2021 and December 2023 due to changes in the survey sample.
Sources: Cabinet Office; Bank of Japan.

II. Price Developments

Chart 3

Developments in Consumer Prices



Note: In the right-hand chart, the forecasts presented are the medians of the Policy Board members' forecasts in the April 2024 Outlook Report.
Sources: Ministry of Internal Affairs and Communications; Bank of Japan.

II. Price Developments

Chart 4

Japan's Recent Inflation Dynamics: An Illustration

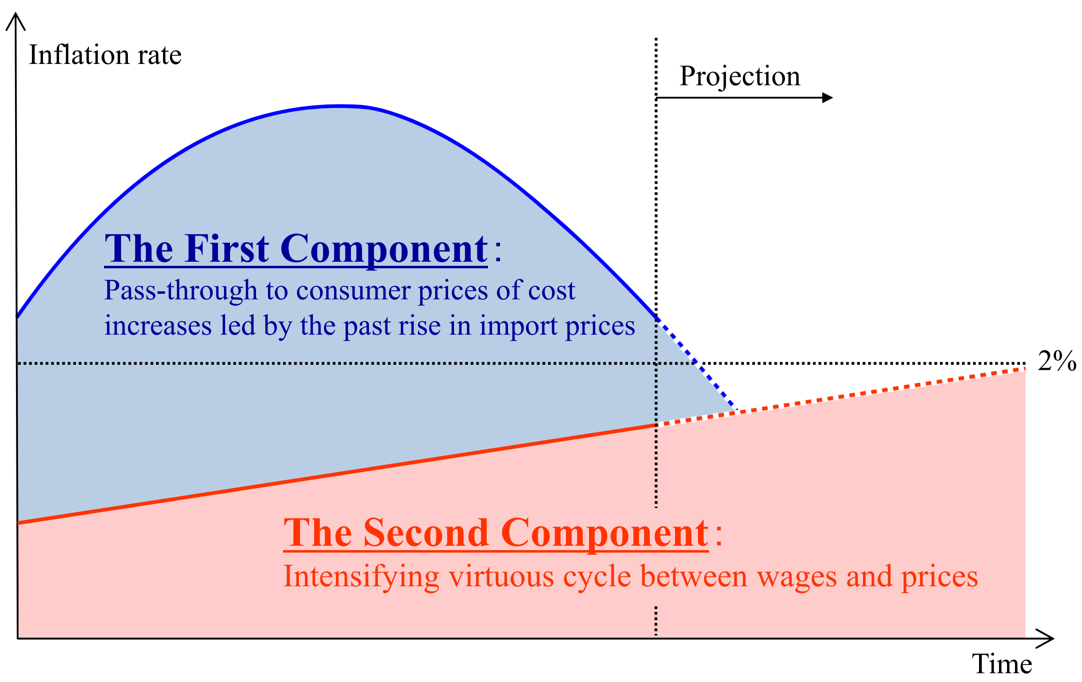
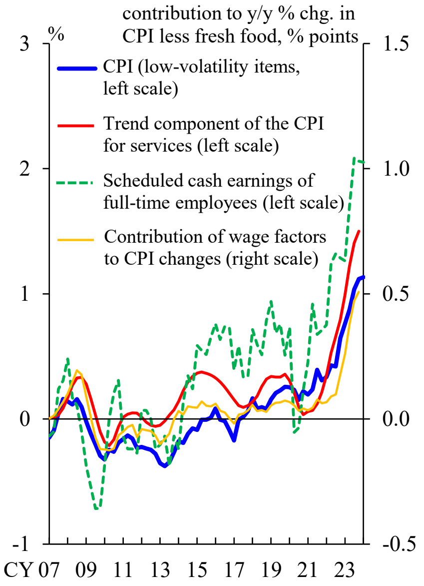


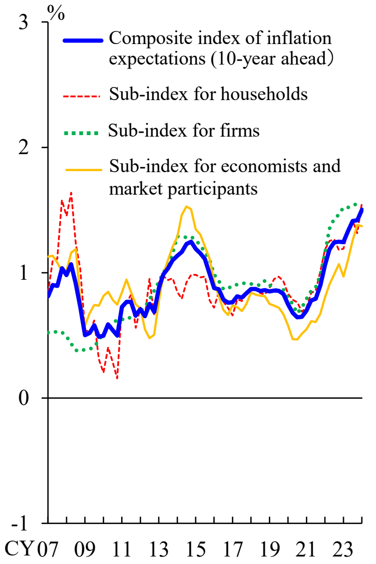
Chart 5

Three Approaches to Capturing Underlying Inflation

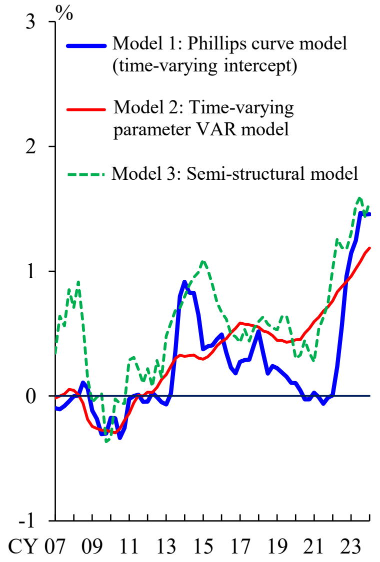
1. Price Statistics



2. Inflation Expectations



3. Economic Models

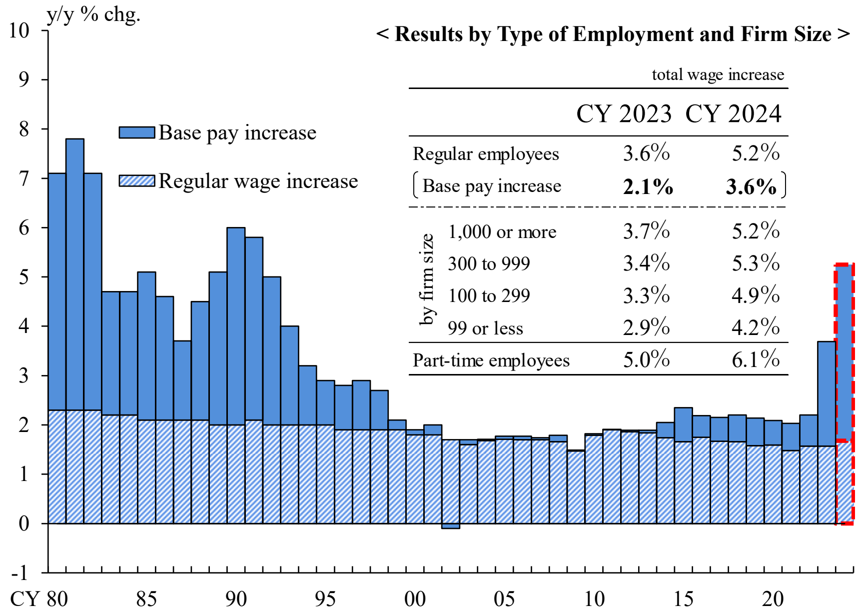


Note: For details of each approach, see Box 4 of the April 2024 Outlook Report.
Sources: Ministry of Internal Affairs and Communications; Ministry of Health, Labour and Welfare; Bank of Japan; QUICK, "QUICK Monthly Market Survey <Bonds>"; Consensus Economics Inc., "Consensus Forecasts"; Bloomberg; Cabinet Office; Google Trends.

Chart 6

Firms' Wage- and Price-Setting Behavior

Results of Spring Wage Negotiations

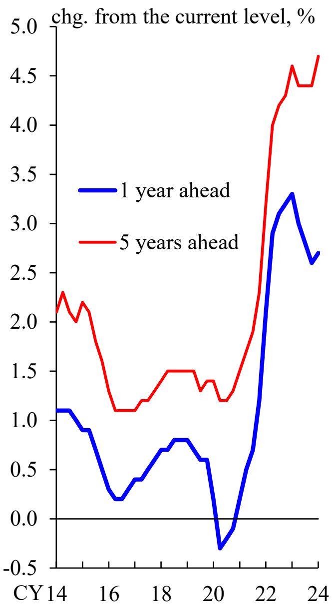


< Results by Type of Employment and Firm Size >

total wage increase

		CY 2023	CY 2024
Regular employees		3.6%	5.2%
(Base pay increase)		**2.1%**	**3.6%**
by firm size	1,000 or more	3.7%	5.2%
	300 to 999	3.4%	5.3%
	100 to 299	3.3%	4.9%
	99 or less	2.9%	4.2%
Part-time employees		5.0%	6.1%

Firms' Outlook for Output Prices

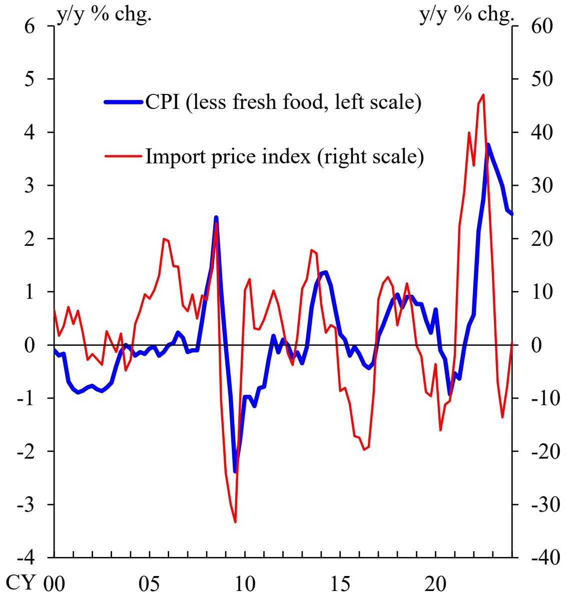


Notes: 1. In the left-hand chart, figures from 1980 to 2014 are those published by the Central Labour Relations Commission, while those from 2015 to 2024 are figures released by Rengo. Figures for base pay increase and regular wage increase are aggregated values of the wage negotiation results of labor unions for which the base pay increase is clear. Figures for part-time employees are increases in hourly wages of fixed-term employees. The figures for 2024 are from Rengo's fourth aggregation.
2. In the right-hand chart, figures are based on the *Tankan*.
Sources: Japanese Trade Union Confederation (Rengo); Central Labour Relations Commission; Bank of Japan.

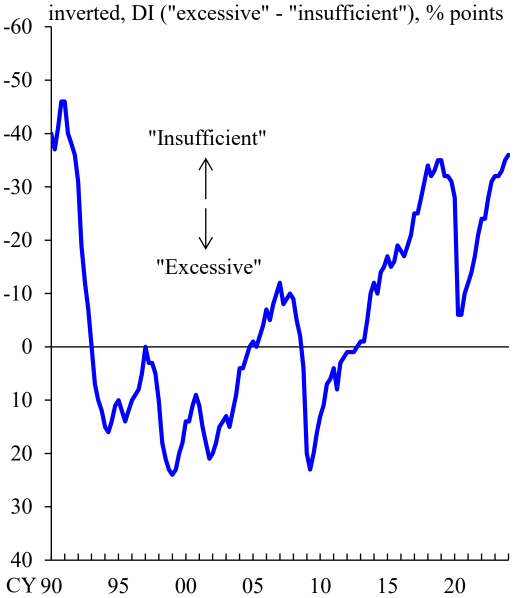
Chart 7

Import Prices and Labor Market Conditions

Import Prices and the CPI



Firms' Perception of Labor Shortage



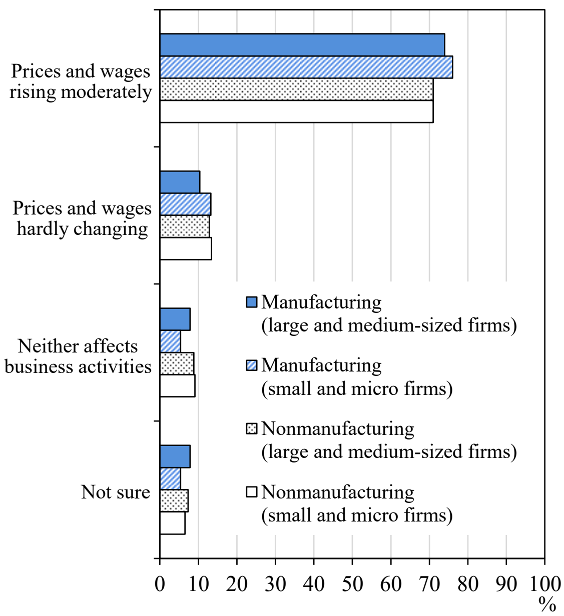
Notes: 1. In the left-hand chart, figures for CPI exclude the effects of the consumption tax hikes. Figures for the import price index are on a yen basis.
2. In the right-hand chart, figures are the employment conditions DI in the *Tankan*.
Sources: Bank of Japan; Ministry of Internal Affairs and Communications.

Chart 8

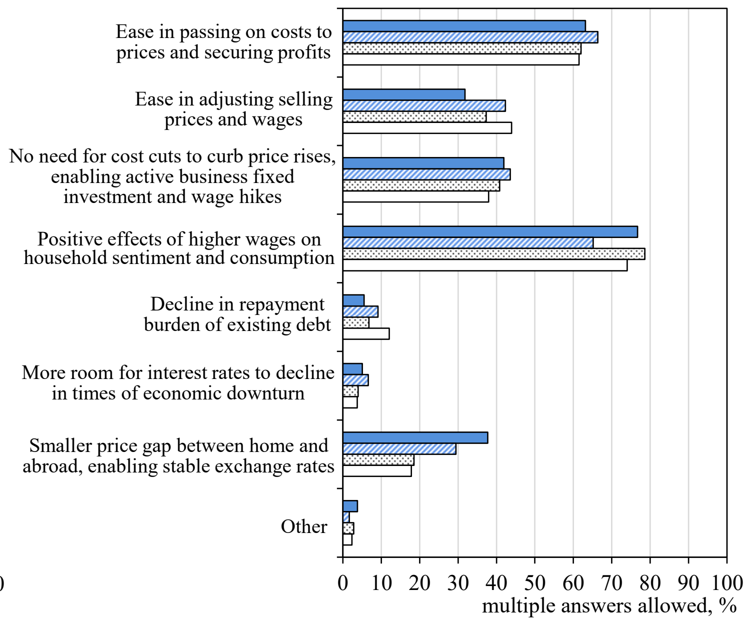
Firms' Views on Rises in Prices and Wages

-- Survey regarding Corporate Behavior since the Mid-1990s --

Preferable State of Prices and Wages for Business Activities



Reasons for Preferring a Moderate Rise in Prices and Wages

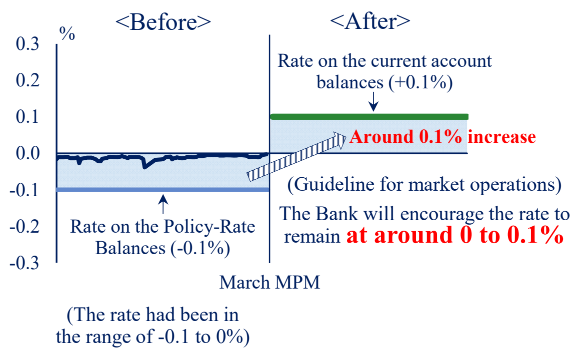


Note: In the right-hand chart, figures are the ratios among firms which responded "prices and wages rising moderately" as a preferable state in the left-hand chart.
Source: Bank of Japan.

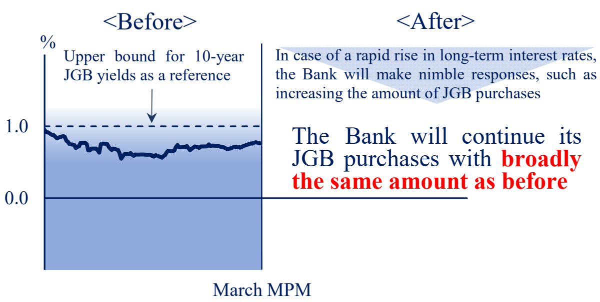
Changes in the Monetary Policy Framework (March 2024)

- As recent data and anecdotal information have gradually shown that the virtuous cycle between wages and prices has become more solid, the Bank judged **it came in sight that the price stability target of 2 percent would be achieved in a sustainable and stable manner**. It considers that **its large-scale monetary easing measures have fulfilled their roles**, including the negative interest rate policy and the yield curve control.
- With the price stability target, the Bank will conduct monetary policy as appropriate, **guiding the short-term interest rate as a primary policy tool**, in response to developments in economic activity and prices as well as financial conditions from the perspective of sustainable and stable achievement of the target. Given the current outlook for economic activity and prices, it anticipates that **accommodative financial conditions will be maintained for the time being**.

Short-term interest rate (uncollateralized overnight call rate)



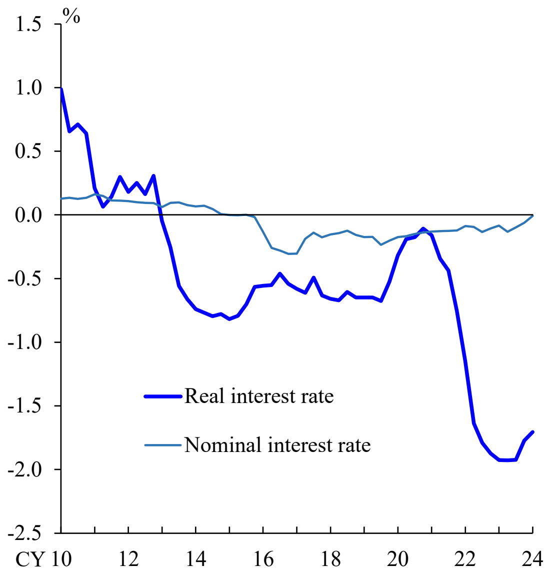
Long-term interest rates



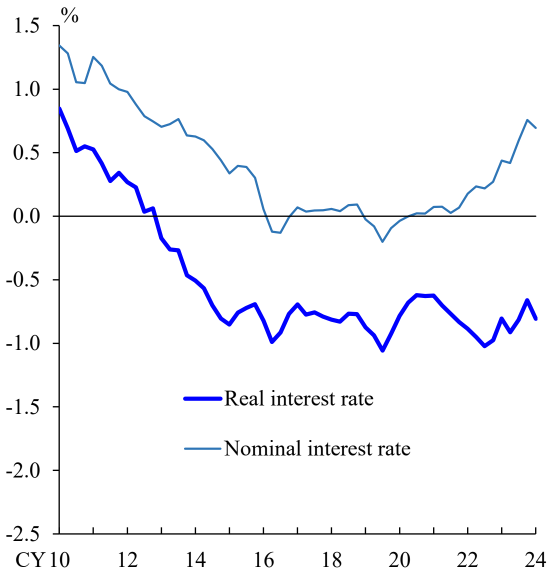
ETFs and J-REITs The Bank will discontinue purchases

Real Interest Rates

1-Year

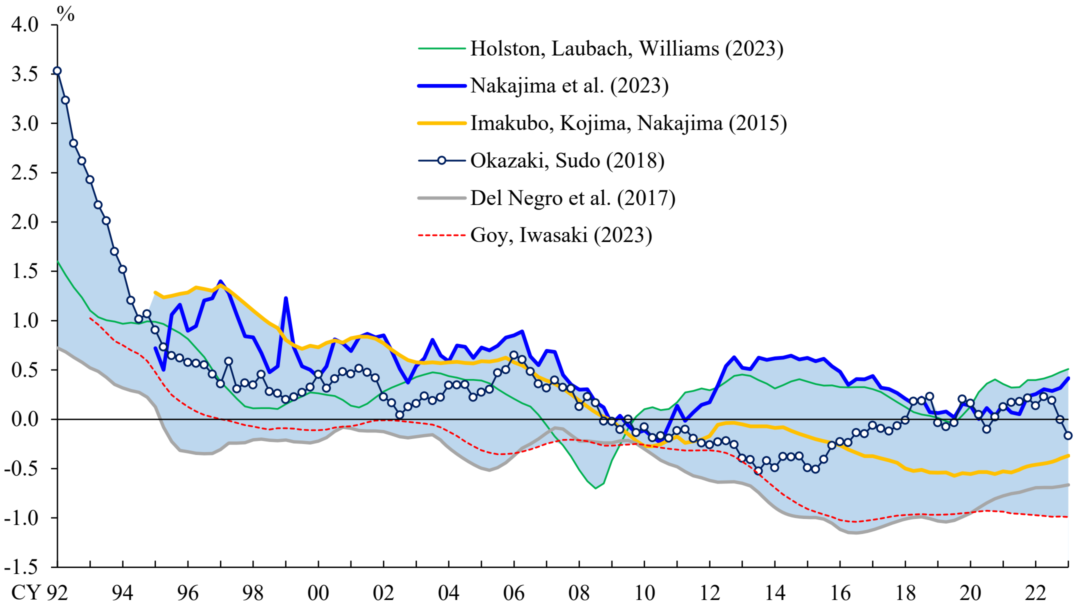


10-Year



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.
Sources: Bank of Japan; QUICK, "QUICK Monthly Market Survey <Bonds>"; Consensus Economics Inc., "Consensus Forecasts"; Bloomberg.

Estimates of the Natural Rate of Interest for Japan



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.
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."