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Bank of Japan

Monetary Policies in a Diversifying Global Economy: Japan, the United States, and the Asia-Pacific Region

*Remarks at the Panel Discussion
at the 2015 Asia Economic Policy Conference
Organized by the Federal Reserve Bank of San Francisco
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I. Introduction

Thank you very much for inviting me as a panelist to the discussion on monetary policy at the 2015 Asia Economic Policy Conference organized by the Federal Reserve Bank of San Francisco. My presentation today will highlight two topics. First, as one of the policymakers at the Bank of Japan (BOJ), I would like to talk about Japan's price developments and monetary policy by making a comparison with the case of the United States. I will then focus on the Asia-Pacific region by summarizing the recent features of price developments and its challenges related to monetary policy, covering nine countries (Australia, China, Indonesia, Malaysia, New Zealand, the Philippines, Singapore, South Korea, and Thailand). Let me stress that the views expressed here are entirely my own and do not necessarily represent those of the BOJ.

II. Japan's Price Developments and Monetary Policy: Comparison with the United States

As you may know, the BOJ adopted a 2 percent price stability target in January 2013, followed by the implementation of *quantitative and qualitative monetary easing* (QQE) the following April. Partly reflecting the impact of QQE, the year-on-year rate of change in the headline consumer price index (CPI) turned positive in June 2013. It then achieved 1.6 percent in December 2013 and March 2014 -- the highest rate of inflation since the introduction of QQE after excluding the direct impact of the consumption tax hike. From the end of 2014, however, the rate of change in the CPI began to decelerate and since July 2015 has been sitting at around 0 percent, mainly due to drops in crude oil prices and other commodity prices. The sluggish performance of headline price indices is also commonly observed in many other countries. Here, I would like to highlight the features of Japan's price developments in comparison with those of the United States.

A. Headline and Core Price Index Deviations from 2 Percent Inflation

As the first feature, the year-on-year rate of change in the price index excluding energy has been higher than that in the headline price index both in Japan and the United States. In the case of Japan, not only has the rate of change in the headline CPI been recently hovering around 0 percent, but also that of the core CPI (defined as all items less fresh food). However, the CPI (excluding fresh food and energy) has risen to 1.2 percent (Chart 1). Similarly, in the United States, the rate of change in the headline personal consumption expenditures (PCE) deflator has recently been more or less flat, at around 0 percent year-on-year, but that in the core PCE deflator (defined as all items less food and energy) has been around 1.3 percent. The rates of

change in the CPI and PCE deflator have been substantially below the 2 percent target (or the longer-run goal) in the two countries. However, looking ahead, the rates of change in the price indices will likely accelerate as the effect of the crude oil price drop wanes in the near future -- provided that crude oil prices will at least remain unchanged or begin to rise moderately.

Against this backdrop, it is taking longer than initially projected for the BOJ and the Federal Reserve to achieve 2 percent inflation. In particular, for the Federal Reserve, such a prolonged underperformance of prices has not been experienced in recent years, given that inflation in the decade prior to the sharp drop in oil prices in October 2014 averaged around 2 percent, even including the period of the global financial crisis. One encouraging development in the United States is that economists' and market-based long-term inflation expectations currently remain stable, at near 2 percent, which indicates that the recent sluggish price performance is projected to be temporary and will eventually converge to about 2 percent. Meanwhile, Japan's corresponding long-term inflation expectations rose rapidly in 2013, but have since generally remained more or less flat at a little over 1 percent and distant from the 2 percent target (Chart 2). *This suggests a need to generate a further increase in inflation expectations in Japan with a view to achieving a steady inflation rate of around 2 percent.*

B. Labor Market Approaching Full Employment with Sluggish Wage Growth

Regarding the second feature, both Japan and the United States continue to enjoy a sustained recovery in employment. As a result, the rate of unemployment has reached around 3.0-3.5 percent in Japan and 5 percent in the United States -- approaching the structural rate of unemployment (longer-run normal rate of unemployment for the United States). Considering the favorable pace of job creation, however, the rate of wage growth appears to be limited in both countries.

Let me elaborate on this point. In Japan, the number of job applicants exhibits a declining trend due to a decline in the working age population. A growing number of firms report a persistent labor shortage, and thus economic opportunities appear to be constrained at some firms in labor-intensive industries. Firms enjoy historically high profits, but so far those profits have not generated sufficiently high wage growth. The mediocre wage growth reflects a *shift effect* -- or a rising share of part-time (mostly voluntary part-time) workers in total employment -- caused

mainly by the increased labor market participation of older adults and housewives, as well as by firms' high demand for flexible low-cost part-time workers. The rate of change in per worker wages turned positive from fiscal 2014 onward, but presently remains roughly at around 0.5 percent (or slightly below 1 percent on an hourly basis). To achieve the 2 percent price stability target, it is clear that wages must further increase. To do so, firms must review their business strategies fostered during the persistently stagnant wage environment, and improve labor productivity. Meanwhile, in the United States, there are still some discouraged workers and involuntary part-time workers. Partially because of this slack and moderate labor productivity growth, the hourly rate of wage growth remains at 2-2.5 percent, which is about half of the level prior to the global financial crisis.

Moreover, the output gap, a broader concept of the economic slack, reports a demand shortage of about negative 1.5 percent in 2015 in both countries, according to International Monetary Fund (IMF) estimates. The slack is larger than the one based on the unemployment rate, suggesting extra room for further improvement in the labor force participation rate and the capital stock utilization rate. That said, it is becoming increasingly difficult across countries to estimate the output gap partly due to the declining trend in potential GDP after the global financial crisis -- leading to widely dispersed output gap estimates. For example, the BOJ's estimate on the output gap for the recent April-June period is negative 0.7 percent and is smaller than that of the Cabinet Office of negative 1.6 percent. This implies that the output gap estimates must be interpreted with wide margins. In any case, the trends indicate that both Japan and the United States have been achieving steady improvement in the employment and output gap, and thus their downward pressures on prices have weakened. Large swings in commodity prices and foreign exchange rates, however, have blurred the positive price effects driven by the domestic demand-supply balance.

C. Households' Upward Bias in Inflation Expectations and Its Relation to Income

As the third feature, short- and long-term inflation expectations (median) have been fluctuating at around 2-3 percent in Japan and the United States (Chart 3). From the BOJ's *Opinion Survey on the General Public's Views and Behavior* and Michigan University's *Surveys of Consumers*, short-term inflation expectations -- one year ahead in Japan and over the next year in the United States -- have remained stable, at a similar level of around 3 percent over the past two years.

Long-term inflation expectations -- five years ahead in Japan and over the next five to ten years in the United States -- have been stable for a longer period, at about 2 percent in Japan and around 3 percent in the United States. Furthermore, it is not widely known that households in Japan kept positive inflation expectations even when mild deflation prevailed from 2009 to mid-2013. *Similarly, Japanese households' present perceived inflation (defined as present perceived price changes relative to one year ago) has never turned into the negative territory over the same mild deflationary period (Chart 4).*

Another commonly observed trend that should be highlighted is that households' inflation expectations tend to be higher than the actual price developments captured in official price statistics in both countries -- suggesting the presence of an upward bias in inflation expectations. This may reflect that households' responses in the survey are often affected by the recent price movements of everyday goods and services, such as food, daily necessities, and gasoline. However, there is a difference in the scale of upward bias; it appears to be generally greater in Japan than in the United States. Let me assume that a gap between the average rate of long-term inflation expectations and the average rate of change in the headline price index roughly reflects an upward bias. The scale of the bias over about the decade before the sharp drop in oil prices in October 2014, averaged at around 2 percent in Japan and around 1 percent in the United States. This implies that the seemingly stable long-term inflation expectations of around 2 percent held by Japan's households may simply be a result of the upward bias, rather than representing their true inflation expectations. *Under the presence of such a bias, households in Japan may perceive that a rate of actual inflation is much higher than 2 percent in the process of approaching the 2 percent price stability target, and regard such a price rise as unacceptable.*

One factor contributing to Japan's larger upward bias may be a difference in future income prospects. To see this, a comparison can be made between the two countries by focusing on the diffusion index (DI) for expected income (one year ahead in Japan and over the next year in the United States) -- calculated by subtracting the percentage share of households responding that prices will "decrease" from that of "increase." Japan's expected income DI always remains negative and currently records about negative 30 percent. This suggests that Japan's households always expect a decline in future income, leading to anticipated tighter budgets as a sign of a strong defensive action, and resulting in a larger upward bias in their inflation expectations. *If so,*

it will be important for the BOJ to promote public understanding that its objective is to achieve a moderate price rise associated with a wage hike and a sustainable increase in household spending, to improve households' tolerance to price rises.

In sharp contrast, the corresponding expected income DI in the United States always remains positive and has recently risen to around 40 percent (Chart 5). Moreover, in the United States, the year-on-year rate of change in (household) expected income over the next year (median) has started to improve since around 2013 and since early 2015 has risen to around 1.5 percent -- after having dropped from around 2.5 percent before the global financial crisis to a low of around 0.5 percent in 2009-2012 (Chart 6). Let me also illustrate that the upward bias appears to be different across income groups in the United States, by comparing expected income growth over the next year and corresponding expected inflation by high- and low-income groups. Specifically, expected income growth for low-income (bottom third of the income distribution) households tends to be lower than that of high-income (top third of the income distribution) ones, while inflation expectations of low-income households tend to exceed those of high-income ones (Chart 7). *This suggests that in the United States there is a similar positive correlation between lower income prospects and higher expected prices as in Japan.*

Next, we look at income prospects in real terms. We can do so by paying attention to *expected price DI* (one year ahead in Japan and over the next year in the United States) and corresponding *expected income DI*. Expected price DI has always been positive in both countries with each currently recording around 50 percent in Japan and over 80 percent in the United States. Moreover, the expected price DI continues to exceed expected income DI in both countries (Chart 5). The comparison between Japan and the United States suggests that a large number of households in Japan project a decline in real income, as many households expect lower incomes and more expect higher prices. In the United States, households are less likely to perceive tighter budgets than in Japan because households expect a rise in nominal income, although many households probably project lower real income. In fact, *the probability expectations on real income gains over the next five years* -- available from the U.S. survey -- have risen from 2013 onward and have now fully recovered to the level before the global financial crisis of around 40 percent, having dropped temporarily to a low of around 30 percent

after the crisis (Chart 8). *These data support the view that U.S. households' recent income conditions are relatively favorable both in nominal and real terms.*

D. Japan's Mild Deflationary Experience and Monetary Policy

Based on the aforementioned observations, I will now summarize my views on Japan's mild deflationary experience and the effectiveness of QQE. Japan's deflationary experience could be characterized with the following two features.

First, the expression the "prevalence of deflation-oriented mindsets" seems to have been very applicable to the state of the corporate sector. It refers to firms' deflationary expectations and associated cautious price-setting behavior. As for the household sector, on the contrary, they tended to form high inflation expectations reflecting long-standing stagnant income growth and anticipated tighter budgets. As a result, whenever the households' *present perceived inflation* rose, their *tolerance to price rises* dropped, fostering a negative correlation between them (Chart 9). Based on this perception, firms appear to have found it difficult to raise sales prices, contributing to a wide spread of discount-based marketing strategies.

Since the introduction of QQE, firms' price-setting behavior has been gradually changing -- some firms have raised their sales prices by providing innovative goods and services that stimulate potential demand, and maintaining sales volumes. Nevertheless, many households continue to perceive that current prices are much higher than the official price statistics and expect a rise in prices. This could be one reason why many firms still generally maintain cautious price-setting behavior. Indeed, this seems to be reflected in the recent developments in firms' *sales price expectation DI* for three months ahead in the BOJ *Tankan* (Short-Term Economic Survey of Enterprises in Japan), which has shown significant improvement from the low level in 2013 but currently hovers around 0 percent (Chart 10). In addition, *the average inflation outlook on sales prices* for one year ahead (relative to the current level) dropped moderately to somewhat below 1 percent year-on-year. In detail, looking at the percentage share of the number of respondents, 60 percent of firms answered "around 0 percent," reaching about 80 percent if those that answered "will decline" and "don't know" are included. *Looking ahead, favorable corporate profits and an increase in wage growth, if sustained, may improve households' tolerance to price rises, thereby helping to correct households' upward bias. Once*

that happens, firms may be gradually more willing to change their cautious price-setting behavior.

Against this backdrop, I feel that a policy to raise average inflation is relatively more challenging than to lower inflation. On this front, a lesson can be learned from the U.S. experiences of an anti-inflationary policy through bold monetary tightening adopted by then Federal Reserve Chairman Paul Volcker in the late 1970s to the early 1980s. At that time, until around 1983 economic recession caused a continuous decline in households' expected income DI over the next year. At the same time, however, both actual inflation and inflation expectations dropped sharply, and thus real income and its outlook improved instead and partially contributed to an improvement in consumption. For example, during that period, the aforementioned U.S. survey responses showed that there was an increase in the share of households that considered low prices as a good reason to purchase durable goods and automobiles. In other words, while a tight monetary policy to reduce inflation in a sustainable manner could be accompanied by a serious challenge of potentially increasing unemployment, it may obtain more support from the public compared with the opposite inflationary policy -- as it could bring about improvement in real income as long as a decline in inflation moves ahead of a decline in income growth. *Turning to Japan, wage growth per worker in real terms turned positive in July this year, but still remains at around 0.5 percent. To achieve around 2 percent inflation, a further improvement in real wage growth is necessary.*

Regarding the second feature of Japan's deflationary experience, a lack of healthy risk-taking practices should be mentioned. Households have accumulated their assets largely in the form of deposits. Assessing in real terms, they have benefitted from relatively high interest rates and an increase in value of outstanding deposits, owing to the zero lower bound on nominal interest rates and mild deflation. Setting aside whether households actually perceived this to be true, their risk-averse behavior has turned out to be rational. In the corporate sector, on the other hand, the expected returns on investment were so low that actions to improve profitability and to efficiently utilize their assets were limited. Meanwhile, financial institutions concentrated their assets on government bonds and their supply of risk money necessary to support startup firms and business was limited. Since the introduction of QQE, this situation has been gradually changing together with the government's economic policies. Households and financial

institutions increasingly express interest in riskier assets and diversification of risks. Banks are more eager to extend credits with innovative financial services. The number of initial public offerings has increased and firms are more active in business investment, mergers and acquisitions, and organizational rationalization both domestically and globally. *It is important that the BOJ continue to support these positive developments by maintaining an accommodative monetary environment.*

III. Price Developments and Monetary Policy in the Asia-Pacific Region

Next, I would like to focus on the Asia-Pacific region, covering nine countries. Among these nine, six (Australia, Indonesia, New Zealand, the Philippines, South Korea, and Thailand) have officially adopted an *inflation-targeting framework* (Chart 11). Regarding the monetary policy frameworks of the region, I had an opportunity to speak in Singapore in July 2014.¹ Since then, economic and financial conditions have changed dramatically globally as well as in the region. Thus, today I will briefly review recent developments.

A. Growing Divergence in Monetary Policy in the Asia-Pacific Region

Since the East Asian economic crisis in the 1990s, central banks in the region have placed a greater emphasis on price stability than on exchange rate stability. Specifically, six central banks took the lead on this by adopting an inflation-targeting framework with a clear numerical inflation target. Under the framework, the realized inflation and inflation expectations of these six countries gradually showed a downward trend in line with their targets. The inflation-targeting framework in the region is more *flexible* than that in other inflation-targeting countries with the following features: (1) an adoption of an *inflation target range* rather than an *inflation target point*; (2) the acceptance of relatively large deviations from the inflation target; and (3) the use of relatively *frequently reviewed* inflation targets -- rather than *fixed* inflation targets -- in South Korea, Indonesia, Thailand, and the Philippines. Inflation developments showed a tendency to converge, albeit with temporary deviations, to the long-term inflation expectation level, which has remained stable within target ranges (Chart 12). One difference observed between inflation-targeting countries and other countries until the first half of 2014

¹ See Sayuri Shirai, "Recent Monetary Policy Trends in Advanced Economies and the Asia-Pacific Region," Keynote Address delivered at the National Asset-Liability Management Conference held in Singapore (July 2014).

was that the policy interest rates were more frequently adjusted to actual price developments in the former.

I would like to highlight two new developments that have occurred since the second half of 2014. First, inflation in all six inflation-targeting countries has now deviated from the inflation target range (Chart 12). Among them, only in Indonesia has inflation been above the upper bound of the target range again since late 2014. This is due to a cut in the fuel subsidy in 2014 and a sharp depreciation of the rupiah. In contrast, inflation in the remaining five countries has been below the lower bound of the target range, mainly due to declining crude oil prices. Looking ahead, depending on future global economic and financial conditions, it may take some time for these six countries to achieve their respective inflation targets. *That said, as their long-term inflation expectations have remained more or less within the target range, inflation is projected to reach the target levels in the future.*

Second, since the adoption of their inflation-targeting frameworks, these countries have regarded short-term policy interest rates as their major operational tool for monetary policy and these policy rates tended to be frequently adjusted to price developments. Meanwhile, in China and Malaysia, the two non-inflation-targeting countries, such rates remained largely flat because they also used other tools including reserve requirements. *Since the second half of 2014, however, this differentiation no longer seems valid.* Namely, China has been lowering policy interest rates more flexibly in response to a declining trend in the inflation rate since November 2014 -- to contain an increase in real interest rates. Together with a cut in the reserve requirement, moreover, China has dealt with a shortage in market liquidity caused by a drop in foreign reserves by expanding the volume and frequency of funds-supplying operations (including term facilities). As a result, the annual growth rate of M2 has exceeded the annual target of 12 percent. Meanwhile, inflation in both Indonesia, an inflation-targeting country, and Malaysia, a non-inflation-targeting country, has risen significantly, mainly owing to a large depreciation of their currencies.² However, because their policy rates were barely adjusted perhaps in an attempt to avoid capital outflows, their inflation rates have been approaching their policy rates, leading to a recent decline in their real interest rates to nearly 0 percent.

² In Malaysia, the inflation rate has also been affected by the introduction of the 6 percent Goods and Services Tax in April 2015.

The region has been subject to various domestic and external shocks ranging from commodity price drops, a reversal of capital inflows centered on securities investment, a depreciation of currencies, a decline in trade with China, and unstable global financial markets. Depending on the type and extent of those shocks received, price developments in each country are diverse and are not necessarily consistent with the business cycle. This makes the direction of their monetary policy stances diverse. *While it is likely that these shocks will eventually fade away, until then the region's monetary policy conduct will remain divergent -- regardless of whether a country has an inflation-targeting framework.*

B. Future Possible Direction of Monetary Policy Conduct and Challenges

To conclude, let me summarize the implications for monetary policy conduct in the Asia-Pacific region based on recent developments.

- In the region, a growing number of countries are conducting more flexible exchange rate arrangements. This is confirmed by the fact exchange rates have become more volatile than before. One example is China, which has gradually enhanced the flexibility of exchange rate movements. As a result, the IMF concluded in the recent Article IV consultation report that the renminbi is no longer undervalued. The report also recommended that China adopt a flexible exchange rate regime over the next two to three years.
- Nonetheless, a sharp depreciation of the exchange rate, while contributing to improving international price competitiveness, may generate a further depreciation expectation and thereby accelerate capital outflows. This may amplify the risk of overshooting the exchange rate far beyond the equilibrium (depreciated) level, thus leading to the risk of a surge in domestic interest rates and economic recession. For this reason, the region could utilize the accumulated foreign reserves to mitigate abrupt exchange rate volatility. Depending on the type of shocks, the scale of changes in foreign exchange rates, and the size of foreign reserves, policy responses vary widely across the region.
- In the case of drawing down foreign reserves, a country may need to deal with possible slower growth in the monetary base. To offset the resultant shortage in liquidity supply to the market, a central bank may find it necessary to expand funds-supplying operations to a greater extent than before. To enable smooth operations, monetary policy conduct must be

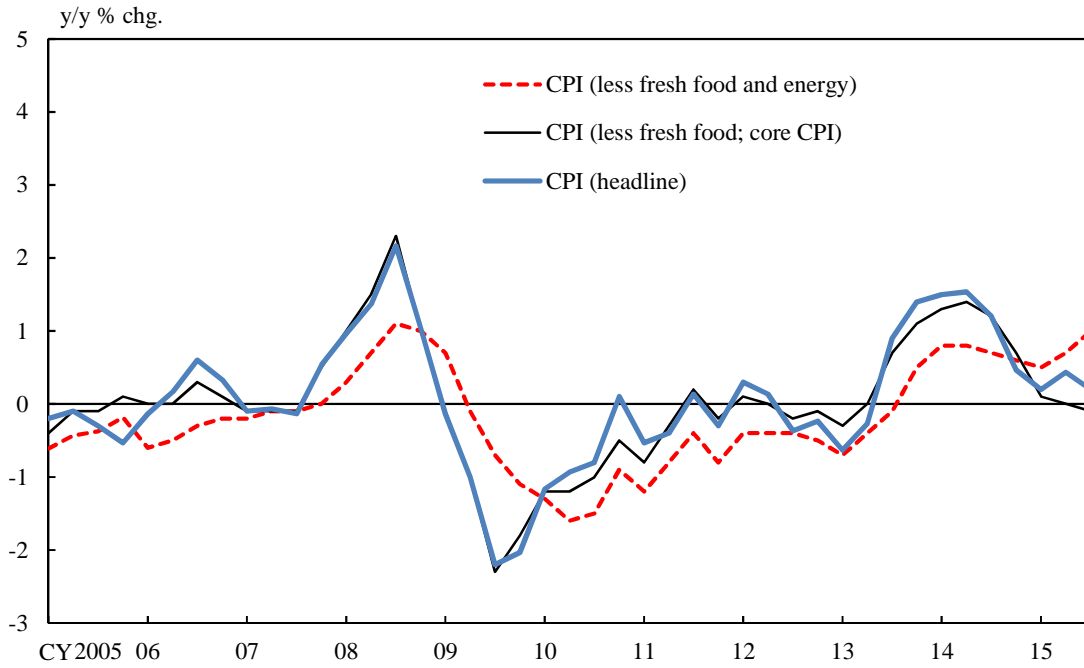
more centered toward a policy interest rate adjustment -- together with measures to foster collateral asset markets, to develop yield curves with long maturities and sufficient liquidity, and to promote the monetary policy transmission mechanism based on the policy interest rate.

- In this sense, this may be an opportunity for a country that once relied on liquidity supply through foreign reserve accumulation as a monetary easing tool to shift toward a more market-based monetary policy tool. Such a practice may promote convergence of monetary policies to ones that are more consistent with the flexible inflation-targeting framework within the region, regardless of whether a country has an inflation-targeting framework.

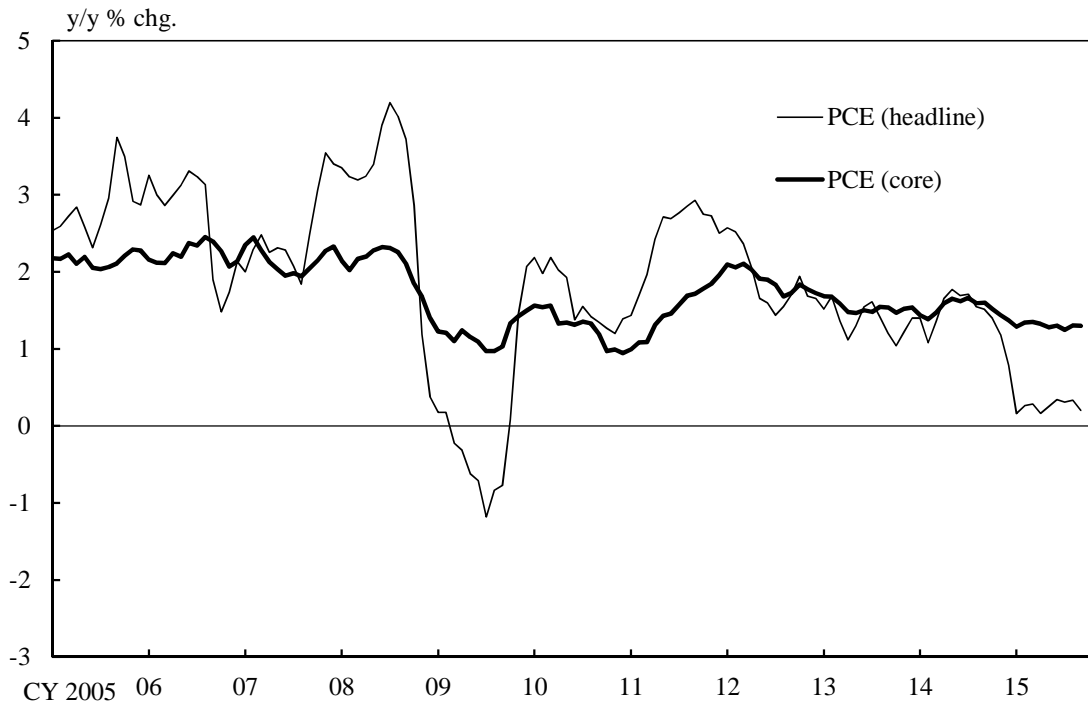
This concludes my presentation. Thank you very much for your attention.

Japan and the United States: Price Developments

(1) Japan



(2) United States

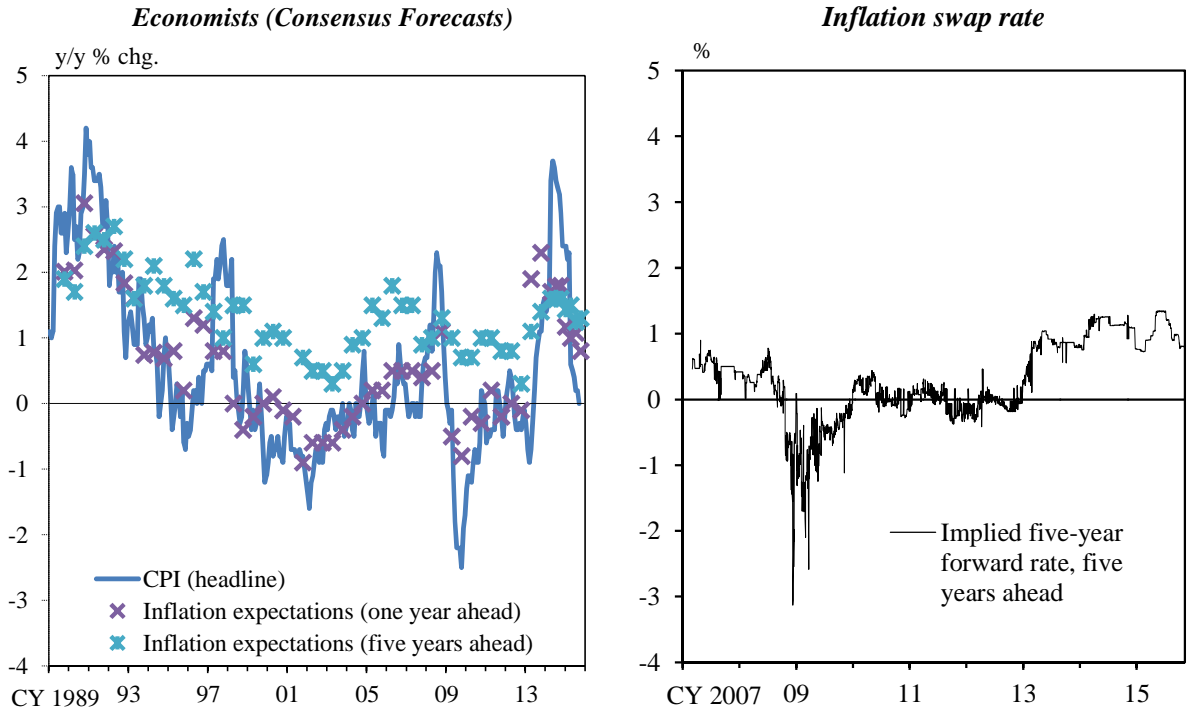


Note: Figures for Japan exclude the direct effects of the consumption tax hike after April 2014.

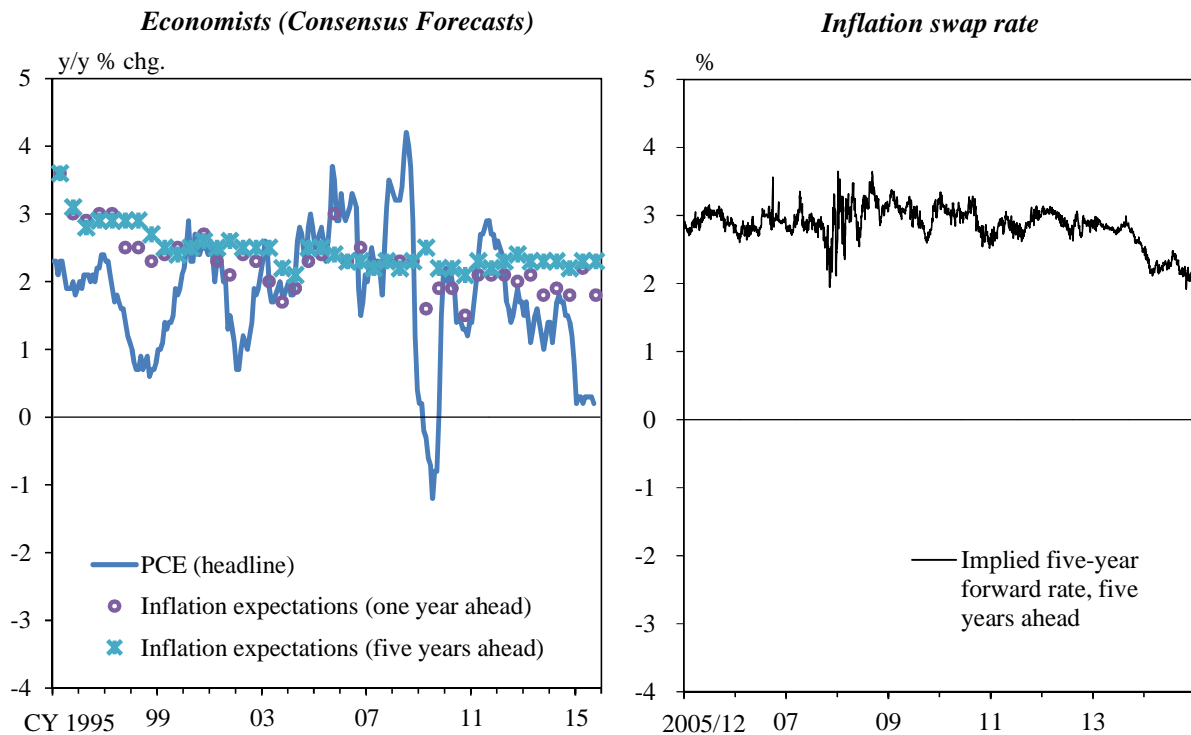
Sources: Ministry of Internal Affairs and Communications; Bank of Japan; U.S. Bureau of Economic Analysis.

Japan and the United States: Long-Term Inflation Expectations

(1) Japan

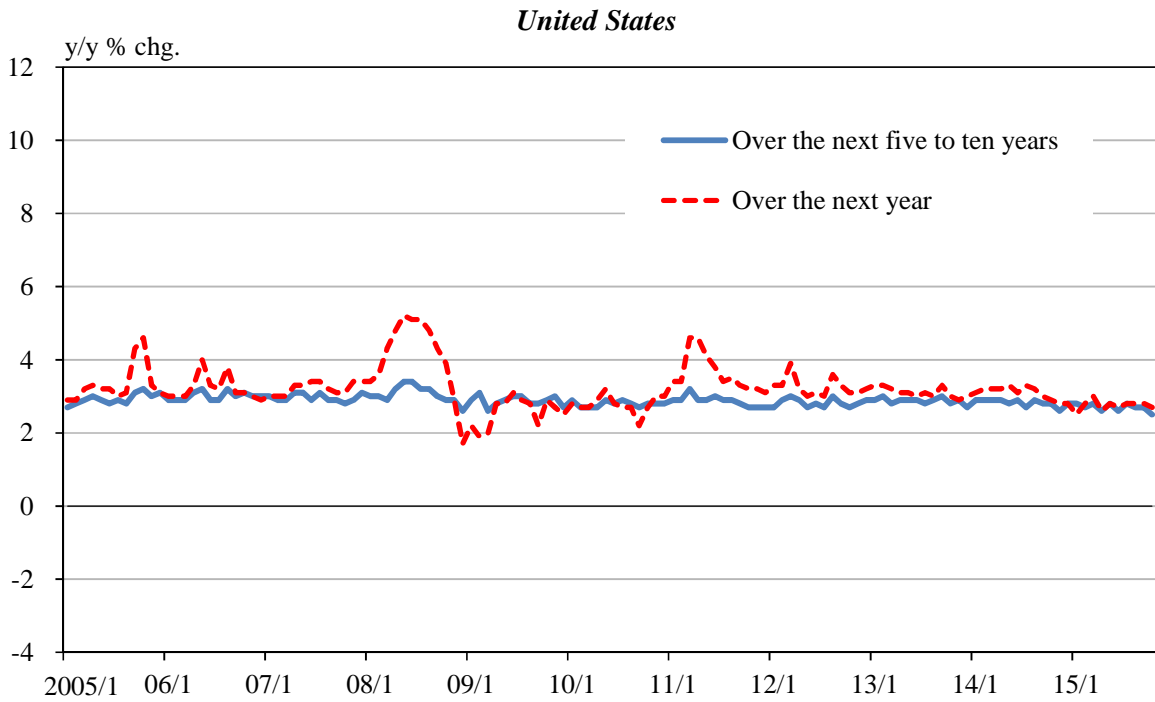
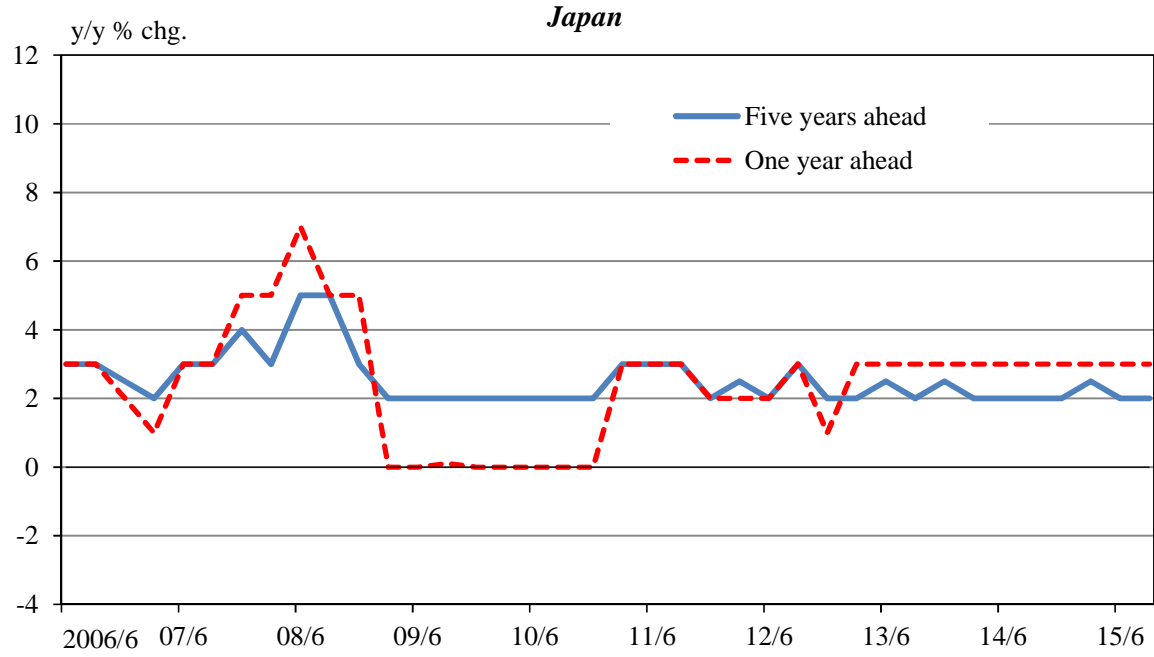


(2) United States



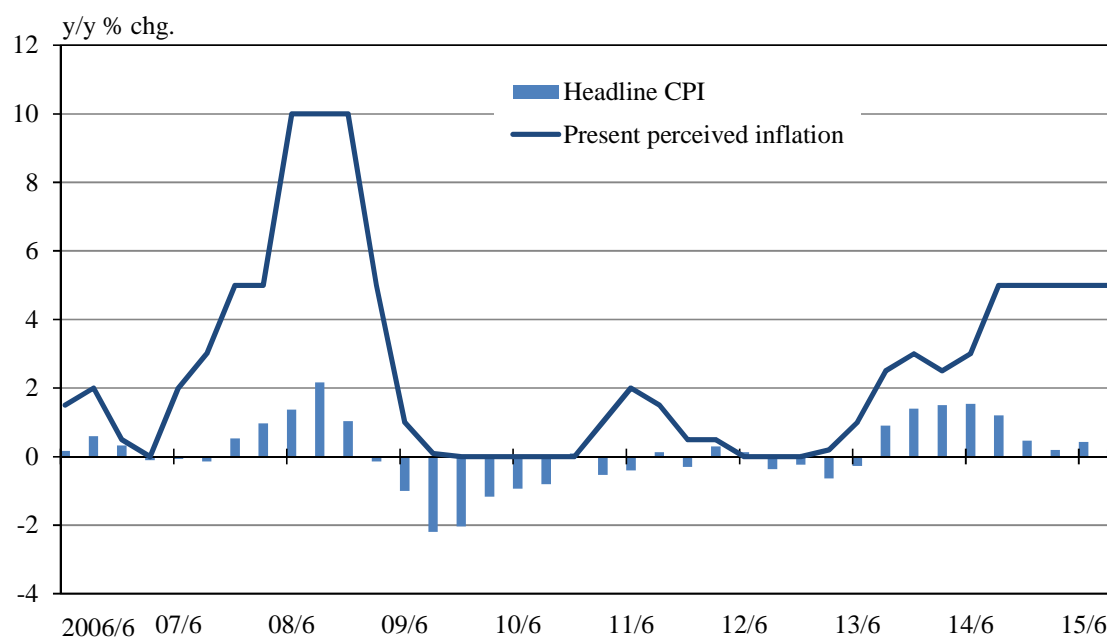
Sources: Consensus Economics Inc., "Consensus Forecasts"; Ministry of Internal Affairs and Communications; Bloomberg.

Japan and the United States: Households' Short- and Long-Term Inflation Expectations (Median)



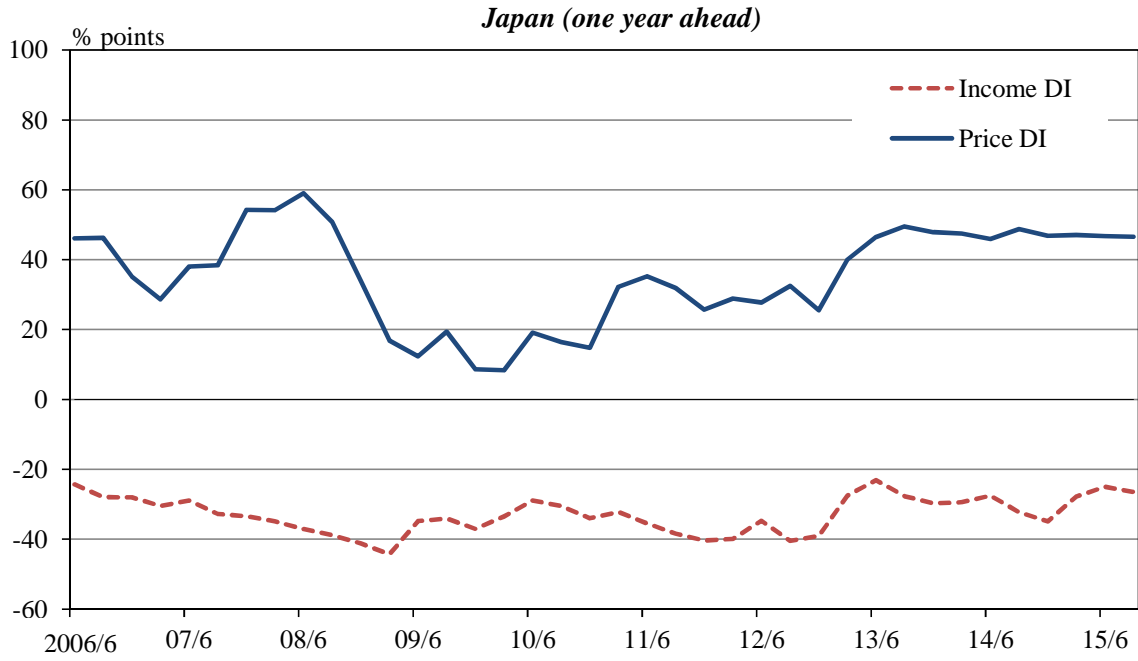
Sources: Bank of Japan; University of Michigan, "Surveys of Consumers."

Japan: Households' Present Perceived Inflation (Median)

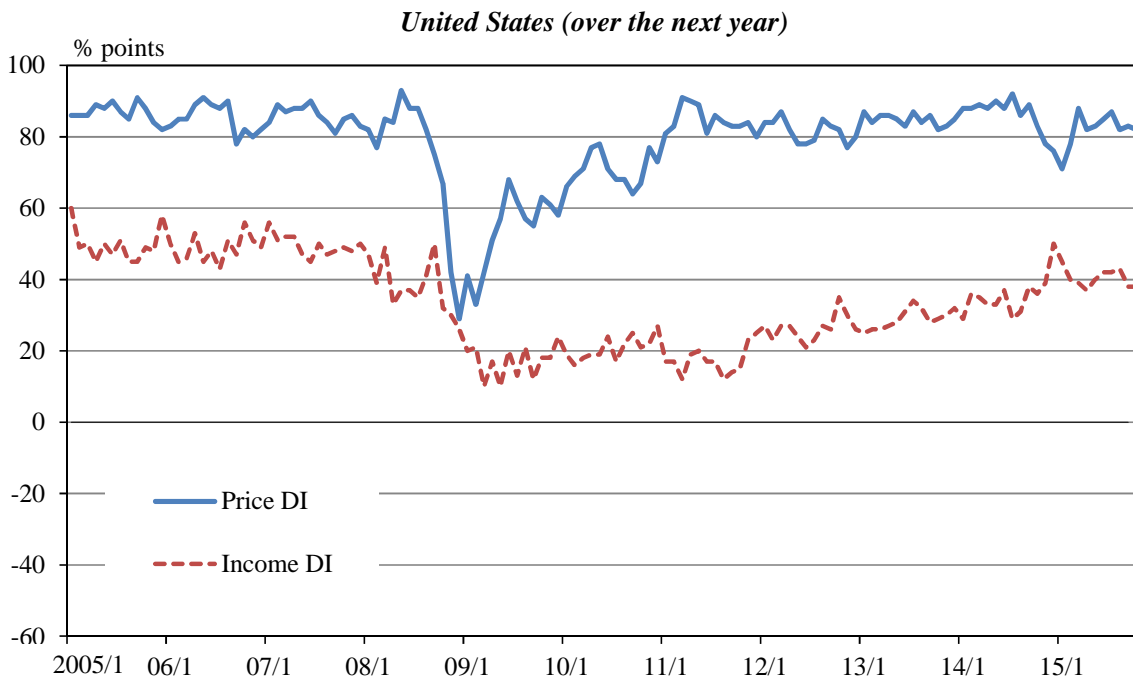


Notes: 1. Present perceived inflation is defined as present perceived price changes relative to one year ago.
 2. Figures for the headline CPI exclude the direct effects of the consumption tax hike after April 2014.
 Sources: Ministry of Internal Affairs and Communications; Bank of Japan.

Japan and the United States: Households' DIs on Income and Prices



Notes: 1. Income DI = "will increase" - "will decrease."
 2. Price DI = "will increase" - "will decrease."

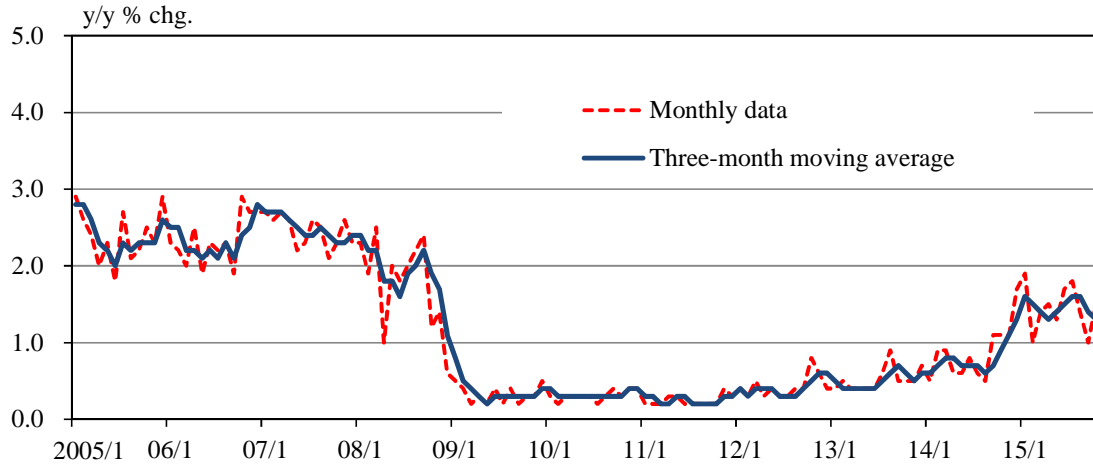


Notes: 1. Income DI = "expect increase" - "expect down."
 2. Price DI = "will go up" - "down."

Sources: Bank of Japan; University of Michigan, "Surveys of Consumers."

Chart 6

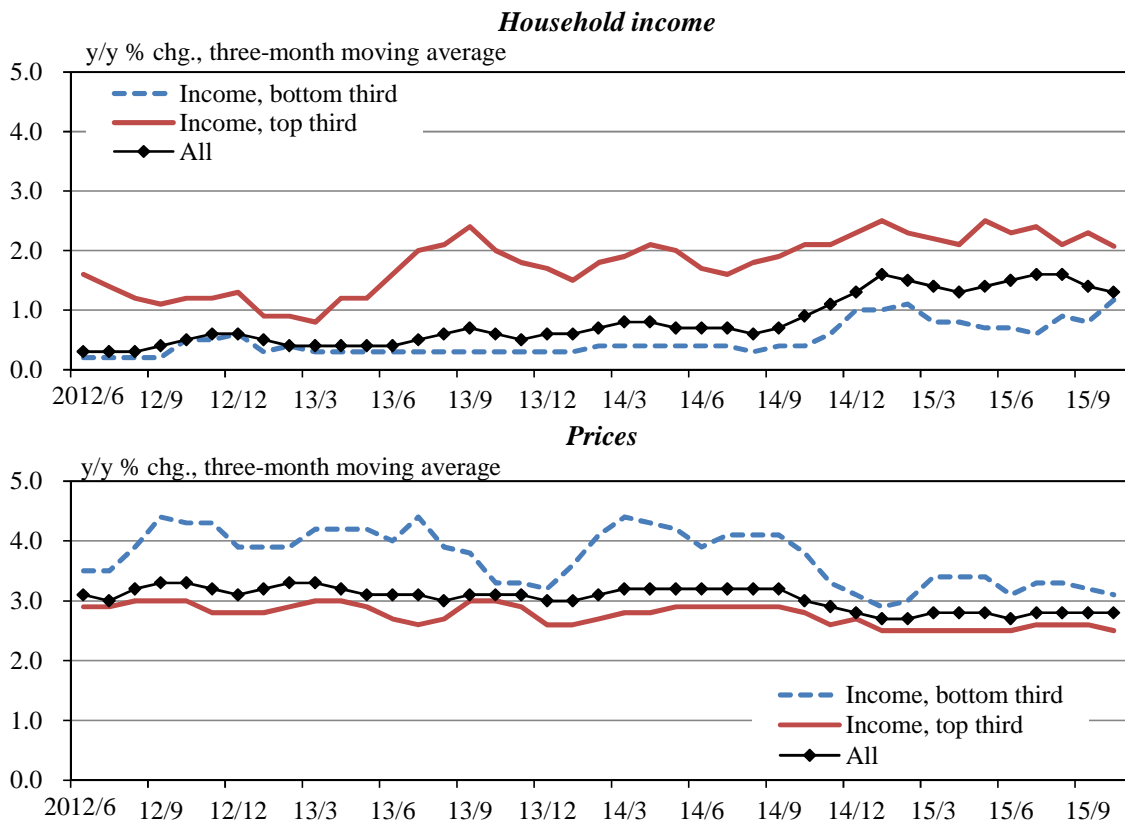
United States: Households' Expected Changes in Income over the Next Year (Median)



Source: University of Michigan, "Surveys of Consumers."

Chart 7

United States: Households' Expected Changes in Income and Prices by Income Group over the Next Year (Median)



Source: University of Michigan, "Surveys of Consumers."

Chart 8

United States: Households' Probability Expectations
on Real Income Gains over the Next Five Years

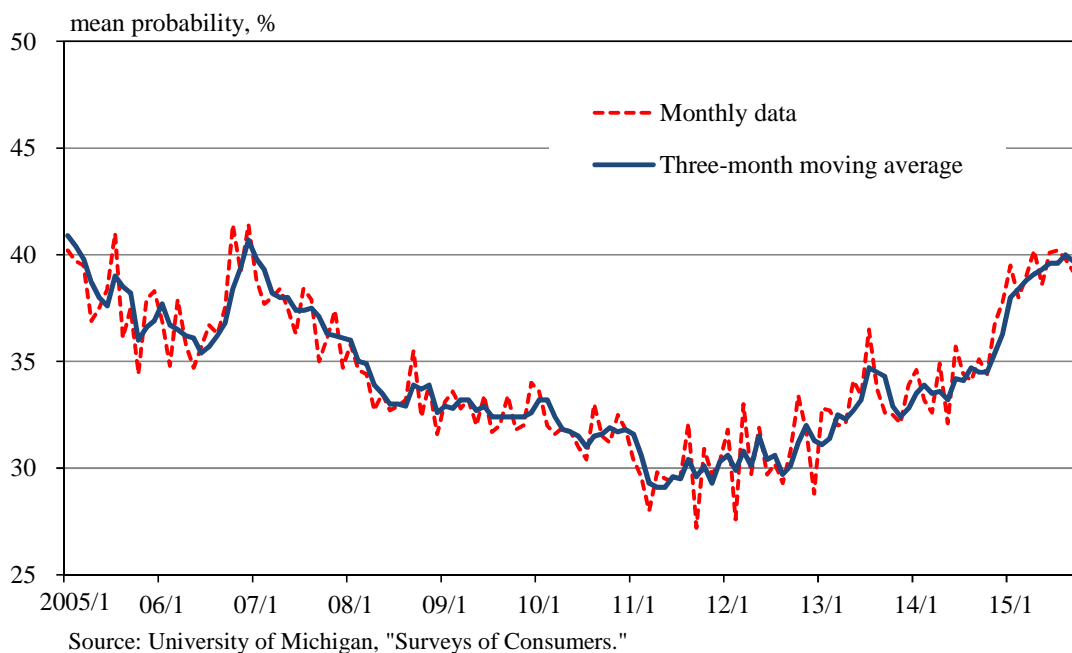
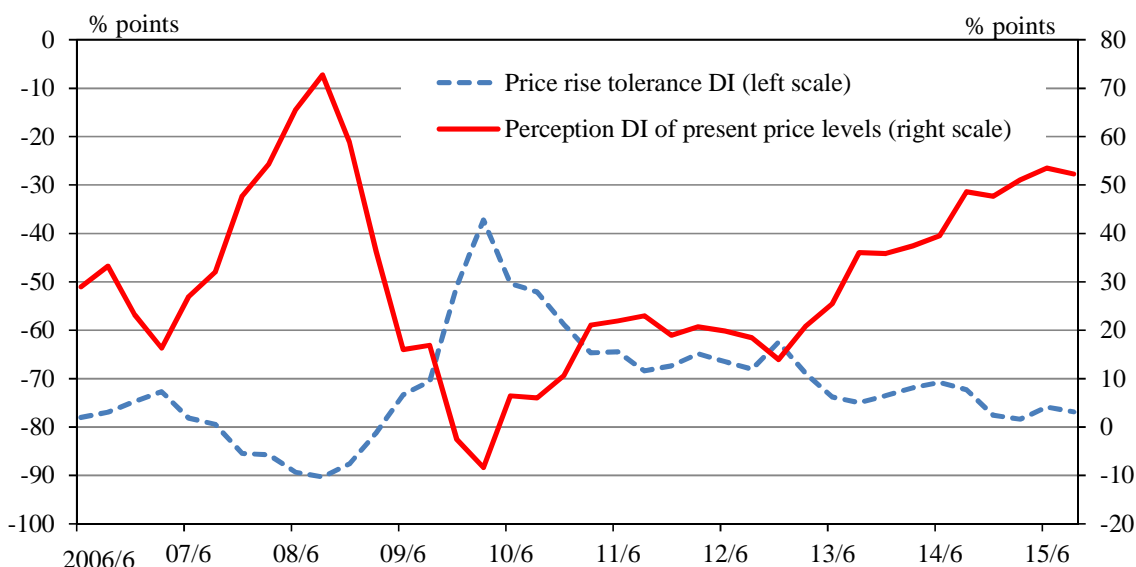


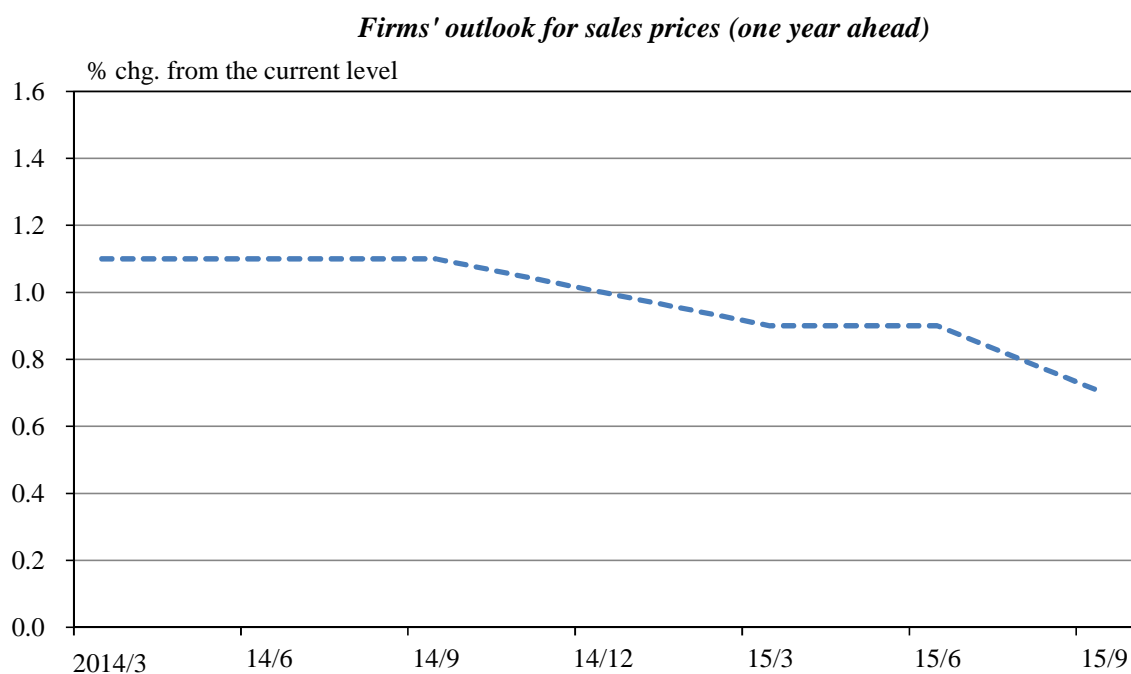
Chart 9

Japan: DIs on Households' Tolerance to Price Rises and Present Perceived Inflation



Notes: 1. Price rise tolerance DI = ("price rise is rather favorable" and "price decline is rather unfavorable" respondent ratio - "price rise is rather unfavorable" and "price decline is rather favorable" respondent ratio) / (valid respondent ratio - "have remained almost unchanged" respondent ratio).
 2. Perception DI of present price levels = ("have gone up significantly" × 1 + "have gone up slightly" × 0.5) - ("have gone down slightly" × 0.5 + "have gone down significantly" × 1).
 Sources: Ministry of Internal Affairs and Communications; Bank of Japan.

Japan: Firms' Sales Price Expectations



Notes: 1. Sales price forecast DI = "will rise" - "will fall."

2. The *Tankan* explicitly asks respondents to disregard the effects of the consumption tax hike.

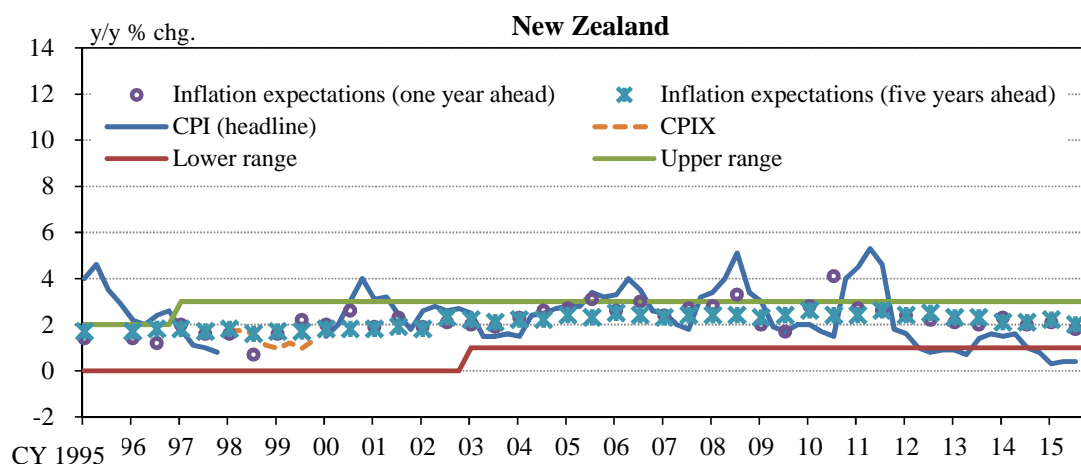
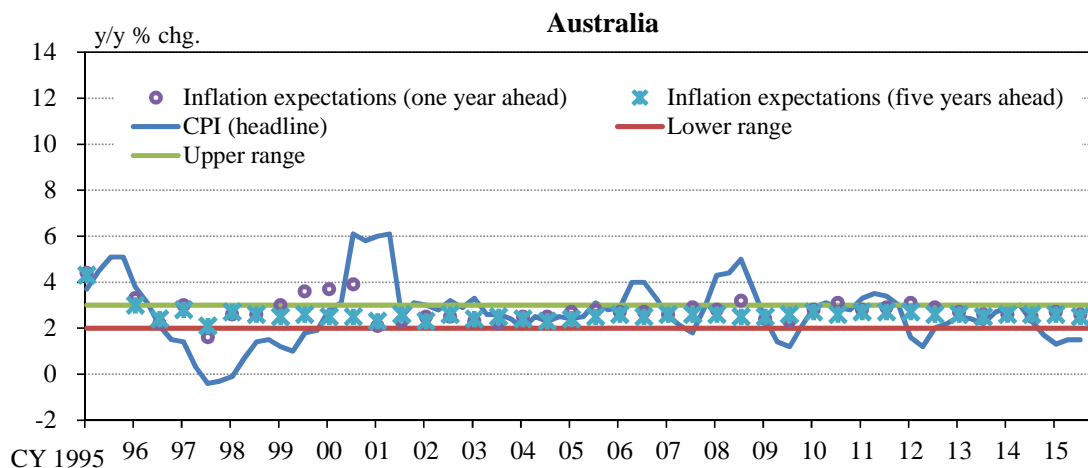
Source: Bank of Japan.

Inflation Targets and Definitions

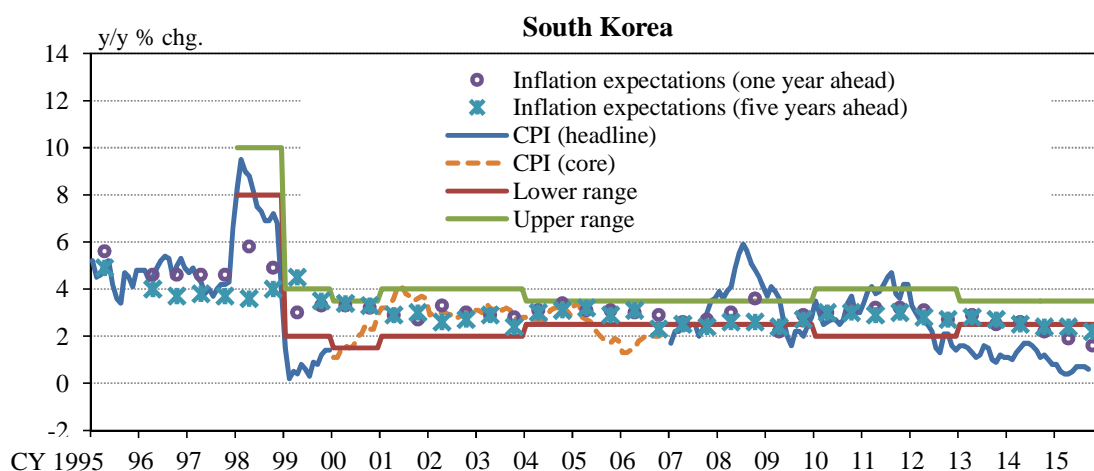
	Inflation target	Introduction year	Reference indicator	Numerical value	Duration to achieve the target	Target variability
United States	Longer-run goal	2012	Headline PCE	2%	Long term	Fixed
Euro area	Definition of price stability	1998	Headline HICP	Below but close to 2%	Medium term	Fixed
Japan	Price stability target	2013	Headline CPI	2%	Medium to long term	Fixed
United Kingdom	Inflation target	1992	Headline CPI	2%	Reasonable time	Fixed
Australia	Inflation target	1993	Headline CPI	2-3%	Medium term	Fixed
New Zealand	Inflation target	1988	Headline CPI	1-3% (with a focus on 2% target midpoint)	Medium term	Fixed
South Korea	Inflation target	1998	Headline CPI	2.5-3.5% for 2013-15	Pre-fixed term	Adjusted every few years
Indonesia	Inflation target	2000	Headline CPI	4.5% ± 1% for 2012-14 and 4% ± 1% for 2015	Pre-fixed term	Adjusted every few years
Thailand	Inflation target	2000	Headline CPI	2.5% ± 1.5%	Annual	Adjusted annually
Philippines	Inflation target	2002	Headline CPI	3% ± 1% for 2015-16 and 3% ± 1% for 2017-18	Pre-fixed term	Adjusted every few years
China	Annual target	n.a.	Headline CPI	Around 3% for 2015	Annual	Adjusted annually

Source: Each central bank.

Asia-Pacific Region: Realized Inflation and Inflation Expectations (1)



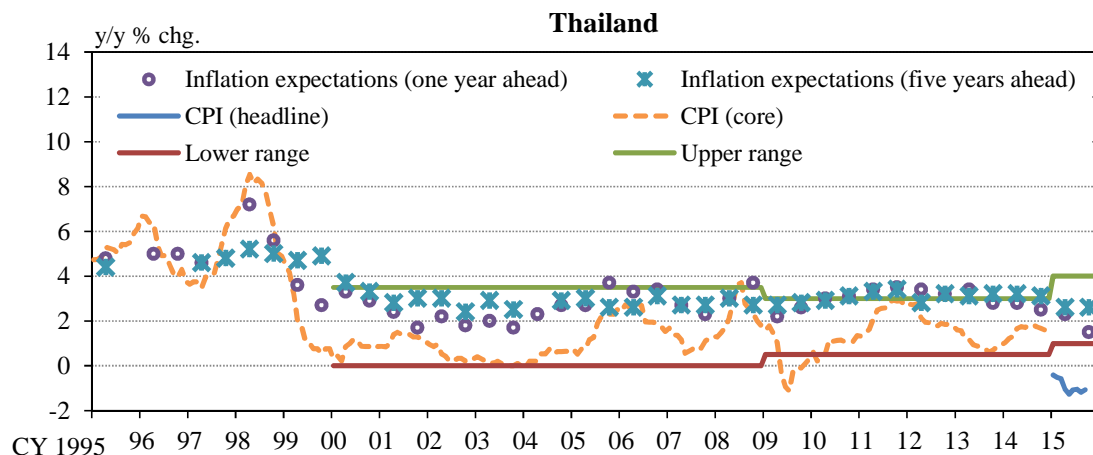
Note: The target index is the headline CPI except for 1998 and 1999, when the CPIX (CPI excluding credit services) was used.



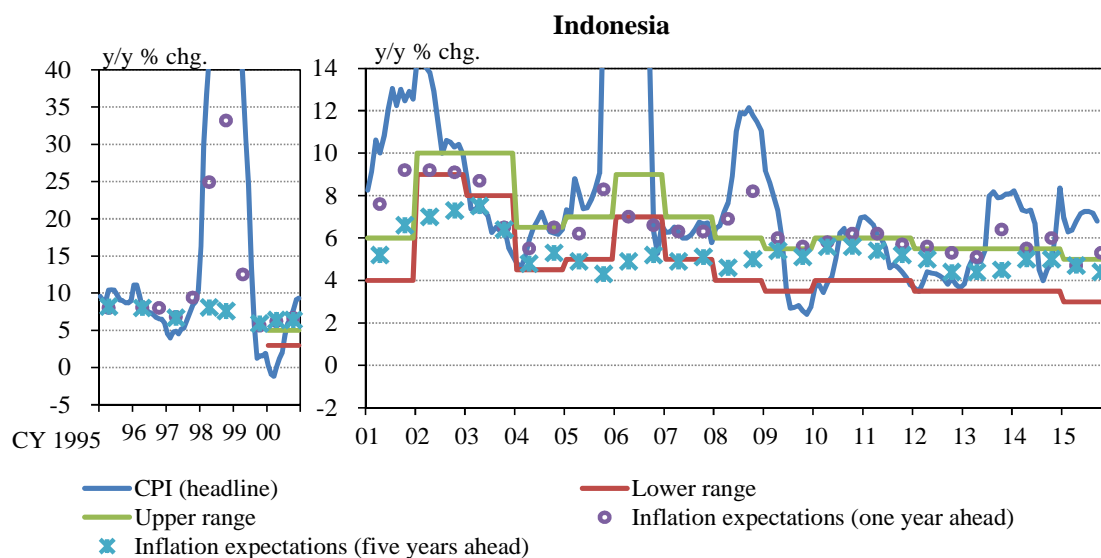
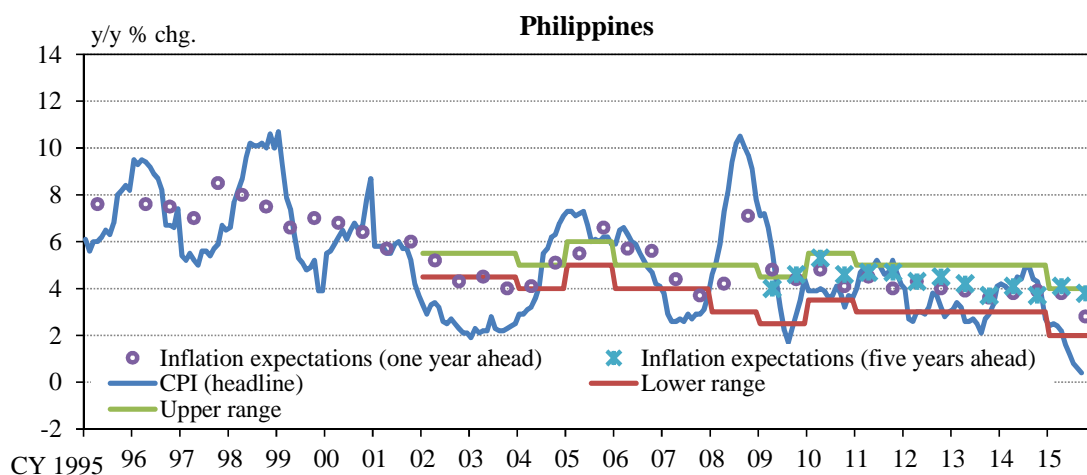
Note: The target index is the headline CPI except for the period from 2000 to 2006, when the core CPI was used.

Sources: Bloomberg; Consensus Economics Inc., "Consensus Forecasts."

Asia-Pacific Region: Realized Inflation and Inflation Expectations (2)

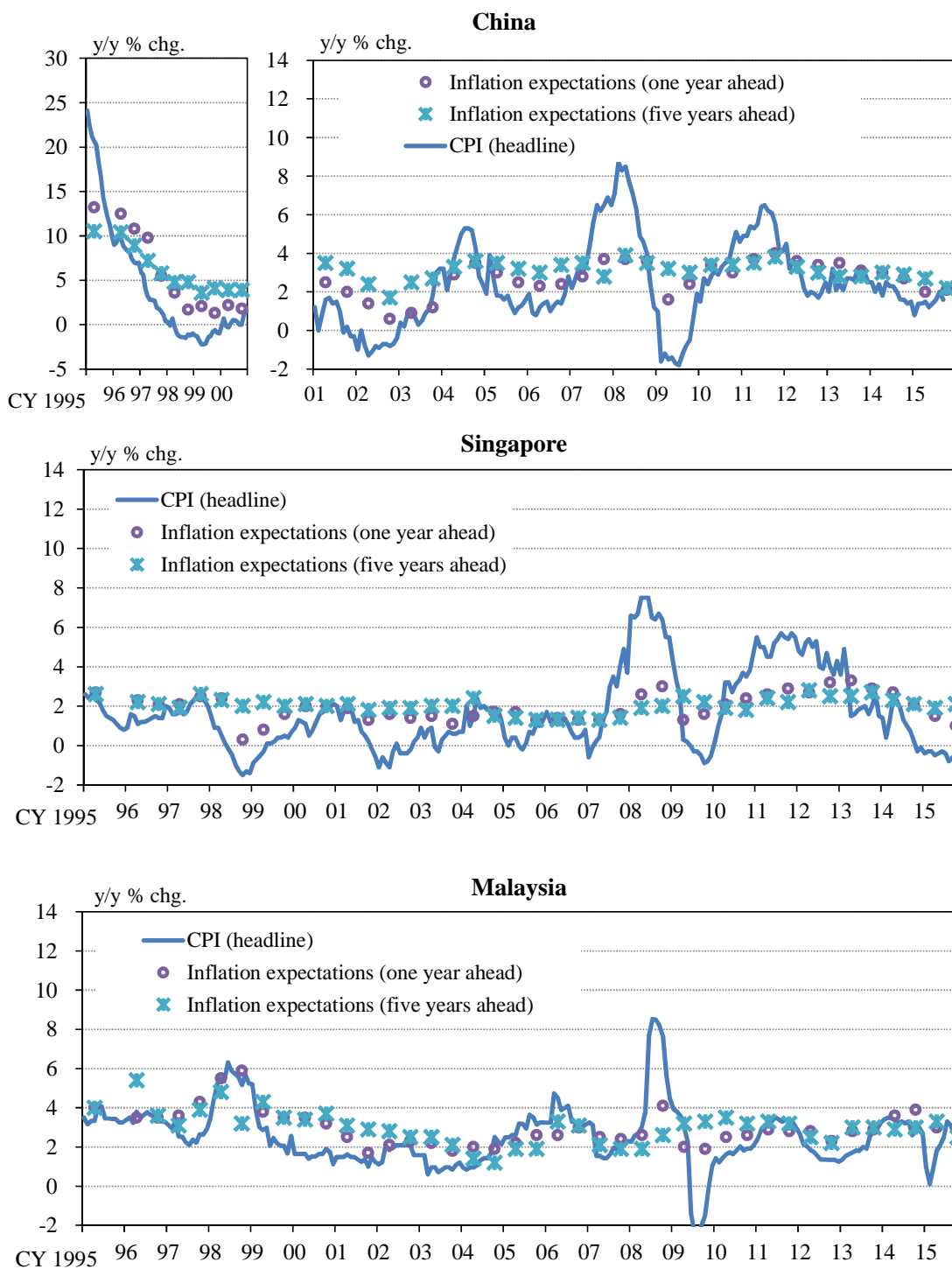


Note: The target index was the core CPI from 2000 to 2014 and was switched to the headline CPI from 2015.



Sources: Bloomberg; Consensus Economics Inc., "Consensus Forecasts."

Asia-Pacific Region: Realized Inflation and Inflation Expectations (3)



Sources: Bloomberg; Consensus Economics Inc., "Consensus Forecasts."