MONETARY POLICY STRATEGY AND INFLATION IN JAPAN

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Abstract

Faced with a very prolonged period of low inflation, the Bank of Japan has been modifying its monetary policy strategy over the last two decades, pioneering the use of non-standard measures: it reduced policy interest rates to zero and, more recently, to negative levels, and has implemented several asset purchase programmes, forward guidance and, in September 2016, a yield curve control policy. Despite all these efforts, Japan has continued to experience persistently low inflation, with rates well below the central bank's target in recent decades. This document analyses the changes in the Bank of Japan's strategy in its struggle against low inflation, focusing in particular on the reasons that led it to adopt the interest rate control policy, describes how this policy works and its main features, and assesses the results obtained. This new strategy has allowed the Bank of Japan to control the yield curve more effectively and sustainably, reducing the volume of asset purchases and mitigating the potential adverse financial stability effects. However, empirical analysis shows that it has still not succeeded in modifying the adaptive and persistent nature of the process of formation of prices and inflation expectations in Japan.

Keywords: monetary policy, inflation, inflation expectations, interest rates.

JEL classification: E31, E43, E52.

Resumen

Ante un período muy prolongado de baja inflación, el Banco de Japón ha ido modificando su estrategia de política monetaria en las dos últimas décadas y ha sido pionero en la introducción de medidas no convencionales: desde reducir los tipos de interés oficiales a cero y, más recientemente, situarlos en niveles negativos, pasando por varios programas de compra de activos y *forward guidance,* hasta la política de control de la curva de tipos de interés *(Yield Curve Control)* que implantó en septiembre de 2016. Pese a todos estos esfuerzos, Japón ha continuado registrando un período muy persistente de baja inflación, con tasas bastante alejadas del objetivo del banco central en las últimas décadas. En este documento se analizan los cambios en la estrategia del Banco de Japón en su lucha contra la baja inflación, con un foco especial en las razones que lo llevaron a adoptar la política de control de tipos de interés, se describen su funcionamiento y sus principales características, y se evalúan los resultados obtenidos bajo esta. Si bien esta nueva estrategia ha permitido al Banco de Japón controlar la curva de rendimientos de una manera más eficaz y sostenible, reducir el volumen de compras de activos y atenuar los potenciales efectos adversos para la estabilidad financiera, el análisis empírico muestra que aún no ha conseguido modificar la naturaleza adaptativa y persistente del proceso de formación de precios y de las expectativas de inflación en Japón.

Palabras clave: política monetaria, inflación, expectativas de inflación, tipos de interés.

Códigos JEL: E31, E43, E52.

Contents

1 Introduction

Since the onset of the housing and stock market bubble in the early 1990s, Japan's inflation rate has been persistently low and even posted deflationary figures in some periods. Inflation expectations have also been very low, with long-term ones trending downwards to below 1% from 2000, where they have since remained stable (see Charts 1.1, 1.2 and 1.3). In an attempt to counter this situation, the Bank of Japan has resorted to innovative monetary policy strategies and been a pioneer in using various non-standard measures which have since been applied in other countries (see Chart 1.4 and Annex 1). The measures initially carried out included reducing policy interest rates to 0% in 1999-2001 (and to negative values in more recent years), using forward guidance for the monetary policy stance, and adopting various quantitative easing (QE) programmes, at first for relatively moderate amounts (in the period 2001-2006) and, later, for much larger amounts (after the 2008 global financial crisis).
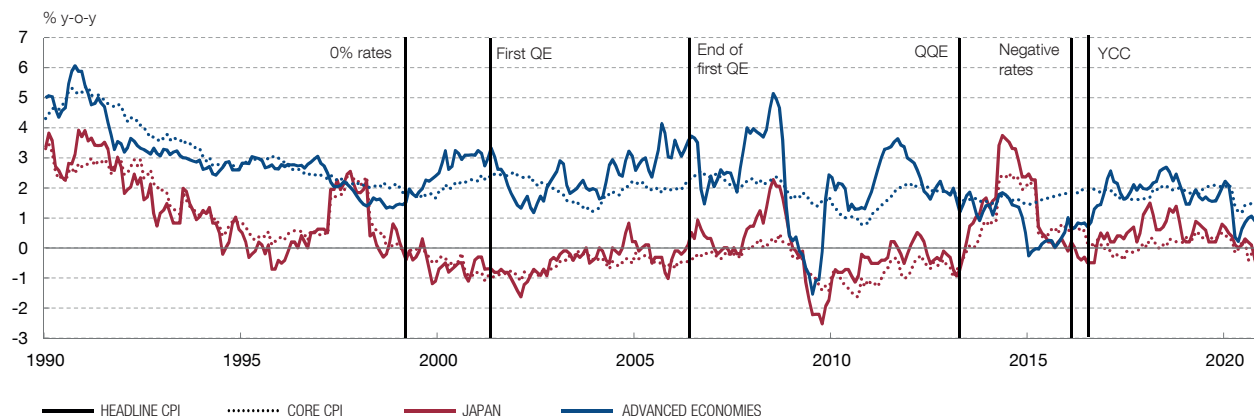
When Prime Minister Abe took office in 2012, a new set of economic policies were deployed. Nicknamed "Abenomics", they were characterised by the combination of three policies (or "arrows") aimed at pushing up Japan's growth and inflation: a substantial easing of monetary conditions, a short-term fiscal expansion (as part of a medium-term consolidation plan to ensure public debt sustainability), and a series of structural reforms to raise Japan's potential economic growth. In this setting, and with the intention of reaching the new 2% inflation target within two years, the Bank of Japan introduced a new Quantitative and Qualitative Monetary Easing (QQE) programme in April 2013. This programme entailed a very high volume of public and private asset purchases that have continued to date, pushing the size of the central bank's balance sheet to above 100% of GDP. Despite this sizeable monetary easing, inflation rates and inflation expectations did not achieve a lasting increase and remained extremely low, prompting the Bank of Japan to try new strategies. In January 2016, the Bank introduced a negative interest rate policy for a part of banks' reserves at the central bank and, in September 2016, it adopted a yield curve control (YCC) strategy in an attempt to mitigate the possible adverse effects of low interest rates on the financial sector. Indeed, in addition to negative short-term interest rates, a 0% target was set for 10-year Japanese Government Bond (JGB) yields, complemented by the commitment to allow inflation to increase above the 2% target and stay above this target in a stable manner for some time (known as "inflation overshooting") with the aim of anchoring inflation expectations at this level.

This document describes the Bank of Japan's experience with different monetary policy measures (in particular with the YCC strategy) and analyses their effectiveness in terms of achieving the Bank's goals. The paper comprises five sections. Section 2 analyses developments in the Bank of Japan's monetary policy strategy over the last 20 years and discusses the reasons for the decision to adopt YCC in September 2016. Section 3 reviews the aspects of YCC and its effects on achieving the Bank's goals. Section 4 contains an empirical analysis of the factors driving inflation in Japan and, in particular, the adaptive nature of the formation of prices and inflation expectations. Section 5 sets out the main conclusions and lessons learnt from the Japanese experience.

Chart 1

INFLATION, INFLATION EXPECTATIONS AND MONETARY POLICY MEASURES IN JAPAN

1 INFLATION

HEADLINE CPI   CORE CPI   JAPAN   ADVANCED ECONOMIES

2 SHORT-TERM INFLATION EXPECTATIONS

CONSENSUS FORECAST ONE YEAR AHEAD   1-YEAR SWAP

3 LONG-TERM INFLATION EXPECTATIONS

CONSENSUS FORECAST FIVE YEARS AHEAD   5Y-5Y BREAK-EVEN
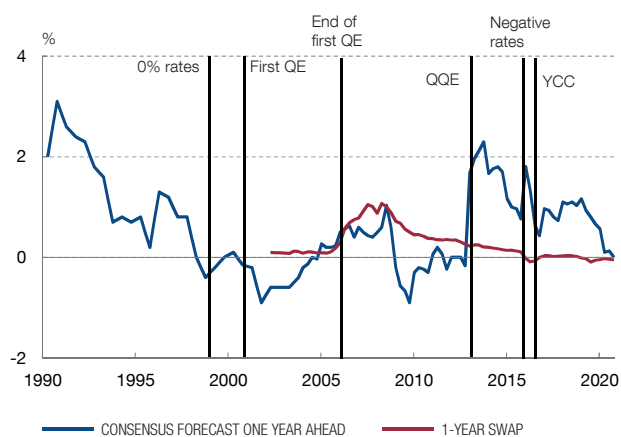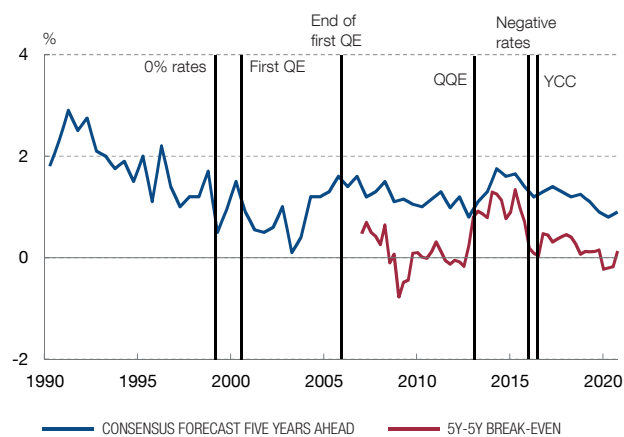
4 BANK OF JAPAN MONETARY POLICY

10-YEAR BOND YIELDS   POLICY INTEREST RATE   BANK OF JAPAN BALANCE SHEET (right-hand scale)
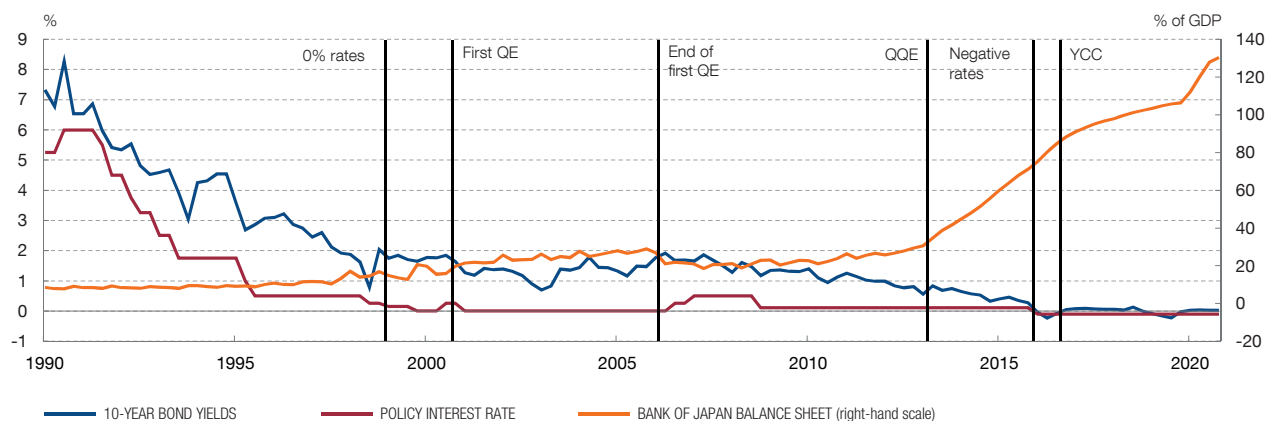
SOURCES: Statistics Bureau of Japan, Bank of Japan, Consensus and Refinitiv.

2 Monetary policy strategy developments in Japan

Inflation rates in Japan have remained at very low levels since the mid-1990s, following the effects of the asset price bubble correction at the start of the decade and the subsequent banking crisis. Barring some periods of substantial increases in commodity prices (e.g. in 2008) and hikes in consumption taxes (e.g. in 2014), this prolonged period has seen headline and core inflation in Japan move into negative territory (see Chart 1.1) and has also been marked by low economic growth, a declining natural rate of interest[1] and major structural changes such as gradual population ageing.[2] At the same time, long-term inflation expectations declined to around 1%, remaining flat for the last two decades. In turn, developments in short-term inflation expectations have been very much in line with actual inflation (see Chart 1.2).

Following a few initial years of very gradual cuts to the policy interest rate,[3] the Bank of Japan has progressively adopted various measures since the late 1990s to attempt to find a way out of deflation. Having reduced interest rates to 0% in 1999, the Bank tried new non-standard tools, such as various QE programmes, negative interest rates and, lastly, yield curve control (see Chart 1.4). The following paragraphs briefly summarise the different strategies that the Bank of Japan undertook during that period, as well as their main effects on inflation.

Having made very gradual cuts to the policy interest rate over several years,[4] in February 1999 the Bank of Japan resolved to adopt a zero interest rate policy (considered the "lowest possible" rate at the time), until the deflationary fears dissipated. However, this first experiment was short-lived, as in August 2000 the Bank considered that the economic conditions had improved enough to raise the interest rate, even though inflation was still in negative territory. Indeed, on account of the worsening economic outlook in early 2001 and the continued deflationary pressures, the Bank was forced to reintroduce the zero interest rate policy in February 2001 and, ultimately, to undertake a quantitative easing strategy.[5]

Thus, in March 2001 the Bank of Japan launched a QE programme with the intermediate aim of expanding the monetary base, primarily through JGB purchases and the consequent increase in banks' reserves at the central bank. Purchase volumes were gradually increased during the term of the programme, and the central bank's balance sheet reached 30% of GDP. Besides asset purchases, the Bank sought to strengthen its monetary policy through communication and forward guidance measures. It initially undertook to

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1 For evidence of this decline in the natural rate of interest, see Sudo, Okazaki and Takizuka (2018).

2 For an analysis of the various global disinflationary factors that may have had a greater impact on Japan, such as demography, see, for example, Banco de España (2019).

3 The absence of a sufficiently firm reaction from the Bank of Japan during these years has been repeatedly highlighted and criticised as one of the reasons contributing to the setting-in of deflationary pressures. See, for example, Bernanke (1999 and 2002), Ito and Mishkin (2005) or Krugman (2015).

4 The Bank of Japan's policy interest rate is the uncollateralised overnight call rate.

5 According to some analysts and even former members of the Bank of Japan's Monetary Policy Board, the indecision and policy reversals of those years contributed to undermining the central bank's credibility in its struggle against deflation and making it more persistent. See, for example, Shirai (2018).

maintain these quantitative measures until the inflation rate held above 0% in a stable manner. This forward guidance was further clarified in October 2003 through the introduction of two exit conditions: (i) core inflation should register 0% or above for several months; and (ii) prospective core inflation should not register below 0%. This state-contingent forward guidance contained necessary but insufficient conditions, as the central bank could judge it appropriate to continue with quantitative easing even if these two conditions were fulfilled.

In the period 2001-2006, when this first QE programme was underway, the Japanese economy recovered slightly (see Chart 2.1). This recovery was underpinned by favourable financial conditions, which helped the pick-up in domestic demand, and by the sound performance of exports, which benefited from the growth in external demand during those years and from the depreciation of the yen (see Chart 2.3). Having been in negative territory during that period, inflation edged towards zero in late 2005, and core inflation posted positive rates in some months (see Chart 1). In this setting, and with the improvement expected to take hold, the Bank of Japan decided to terminate QE in March 2006 and return to a monetary policy framework based on the short-term policy rate, which rose from 0% to 0.25% in July 2006 and to 0.5% in February 2007, where it would remain until October 2008. However, core inflation slid back into negative territory for the rest of 2006, and long-term inflation expectations, which had declined from 2% to 1% in the 1990s, remained at these levels, with no sign of any significant rally.
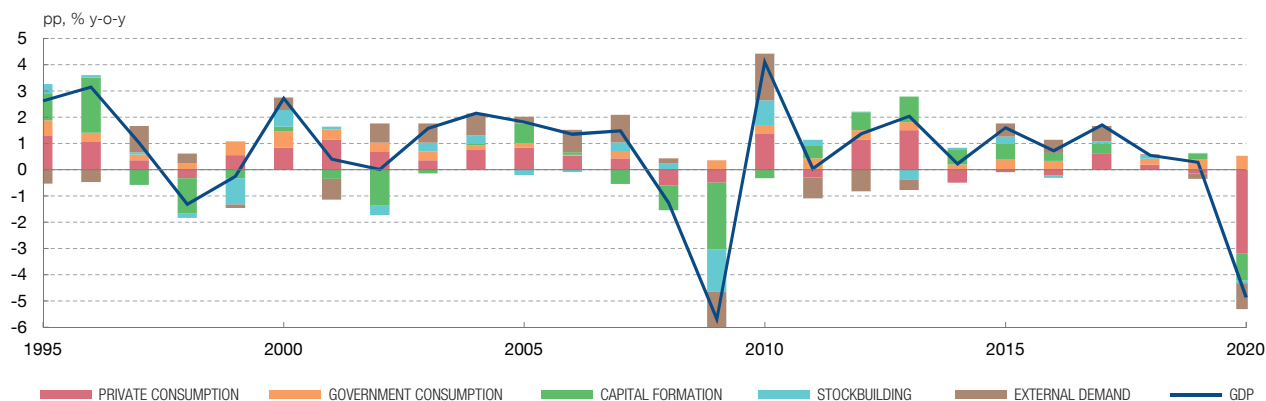
Following the 2008 global financial crisis, the Bank of Japan once again applied non-standard monetary policy measures, albeit on a relatively limited basis. With the slump in economic activity and the decline of inflation into negative rates, the Bank reduced the policy interest rate back to 0% in late 2008 and adopted a series of measures to support the financial system. In October 2010, a new quantitative easing programme (termed Comprehensive Monetary Easing, or CME) was launched. This programme, which would be in place until April 2013, entailed purchases of different assets, comprising not just JGBs,[6] but also various types of private securities, including corporate bonds, commercial paper, Exchange-Traded Funds (ETFs) and Real Estate Investment Trusts (REITs). The programme aimed to maintain accommodative financial conditions by reducing yields and risk premia on a wide range of assets. The volume of the purchases was gradually increased during that period, although the amount on the Bank of Japan's balance sheet did not exceed that of the first programme of 2001-06 (around 30% of GDP). In terms of the programme's effectiveness in achieving the Bank's targets, the cuts to long-term interest rates gave some support to domestic demand, but inflation remained at negative rates throughout the period and long-term inflation expectations continued to be very low. The poor performance of inflation may have been partly attributable to the yen's strong appreciation during those years, as a safe-haven currency (see Chart 2), in addition to various external factors.

Faced with this situation, and with the launch of the new Abenomics policies by Prime Minister Abe in late 2012, the Bank of Japan (by then under Governor Kuroda) undertook a new quantitative easing programme (termed Quantitative and Qualitative Monetary Easing,
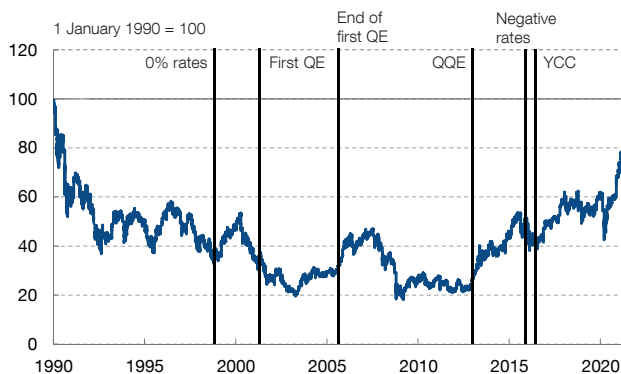
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6 Under the CME programme, the Bank of Japan's JGB purchases were focused on the short end of the curve, with maturities of up to three years.
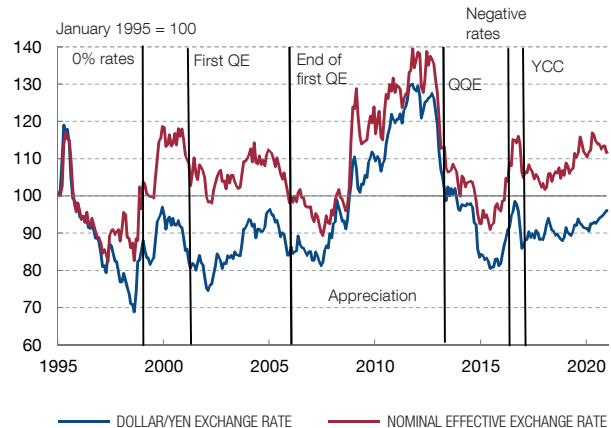
Chart 2

GDP, STOCK MARKETS AND EXCHANGE RATE

1 CONTRIBUTIONS TO GDP GROWTH

pp, % y-o-y

PRIVATE CONSUMPTION   GOVERNMENT CONSUMPTION   CAPITAL FORMATION   STOCKBUILDING   EXTERNAL DEMAND   — GDP

2 NIKKEI 225

1 January 1990 = 100

3 EXCHANGE RATE: NOMINAL RATE AND AGAINST THE DOLLAR

January 1995 = 100

— DOLLAR/YEN EXCHANGE RATE   — NOMINAL EFFECTIVE EXCHANGE RATE

SOURCES: Cabinet Office and Refinitiv.

or QQE) in April 2013 with the aim of reaching, within two years, the 2% inflation target set in January 2013. This new QQE programme represented a most significant upscaling of the quantitative easing, as it entailed a substantial increase in public and private asset purchases[7] and has pushed the size of the Bank of Japan's balance sheet to over 120% of GDP (according to the latest data), a much higher volume than that reached by other central banks (see Chart 3). This new strategy initially seemed successful, as economic growth surged and financial conditions eased, with decreases in long-term interest rates, a substantial depreciation of the yen, and rising stock market prices. Headline inflation peaked at 3.7% in May 2014 and core inflation rose to 3.4% (1.6% and 1.4%, respectively, after discounting the effect of the consumption tax hike in April of that year). Even long-term

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7 In the QQE, the Bank of Japan extended the JGB purchases across the entire curve (up to 40 years), initially increasing their average maturity to around seven years. As a result of the October 2014 extension to the purchase programme, the average maturity rose to 7-10 years. Under this programme, private asset purchases were limited to ETFs and REITs, and purchases of commercial paper and corporate bonds ceased.
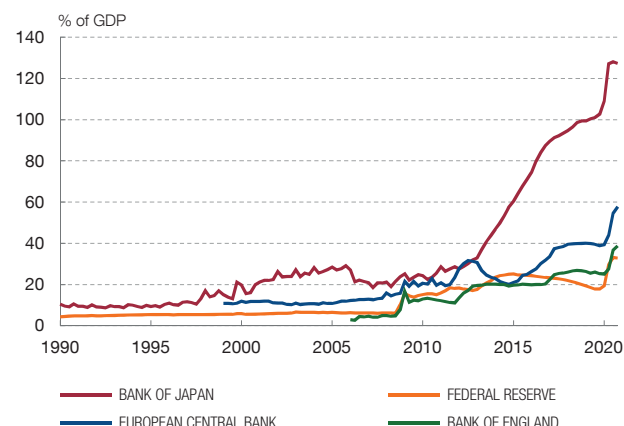
Chart 3
BALANCE SHEET OF THE BANK OF JAPAN

1 BALANCE SHEET OF THE BANK OF JAPAN

% of GDP
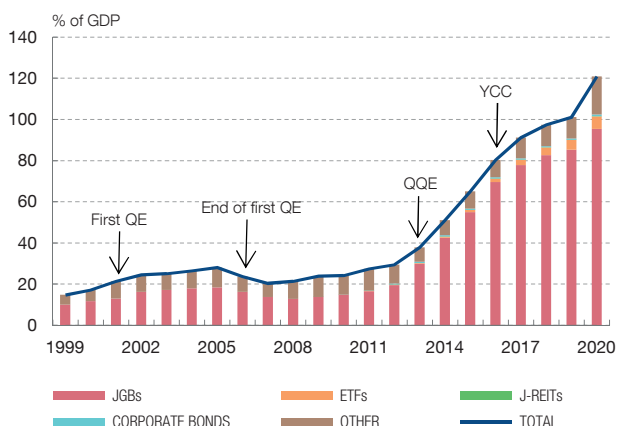
2 COMPARISON WITH OTHER CENTRAL BANKS

% of GDP

SOURCES: Balance sheet statistics of the Bank of Japan, the Federal Reserve, the European Central Bank and the Bank of England, and national statistics.

inflation expectations finally seemed to respond and neared their target level, reaching 1.5% (see Chart 1).

However, the economic conditions once again began to deteriorate from mid-2014, owing chiefly to the adverse effects on domestic demand of the consumption tax hike imposed by the Japanese Government, and to the slowdown of emerging economies. Inflation decreased substantially, nearing 0% in 2015 (owing also to the slump in oil prices in 2014), and long-term inflation expectations slid back to close to 1%, where they have since remained.[8] In response, the Bank of Japan accelerated the pace of asset purchases, from ¥50 trillion per annum to around ¥80 trillion, from October 2014.[9] However, this exacerbated another problem, namely the Bank's growing monopoly of the Treasury bonds market. Commercial banks' holdings had declined substantially and they began to have problems in obtaining collateral assets. Consequently, the Bank of Japan began to also purchase from pension funds and insurance companies, taking advantage of the extension of maturities under the programme and the regulatory changes enabling these institutional investors to invest in other riskier assets. The Bank of Japan held 40% of total Treasury bonds (see Chart 4.1) and market liquidity suffered another bout of stress (with trading volumes declining and the bid-ask spreads rising). These problems were expected to be exacerbated as the Bank of Japan's purchases increased.

Given this situation, in January 2016 the Bank of Japan decided to alter its strategy for stimulating the economy and introduced a negative interest rate policy for a part of banks'
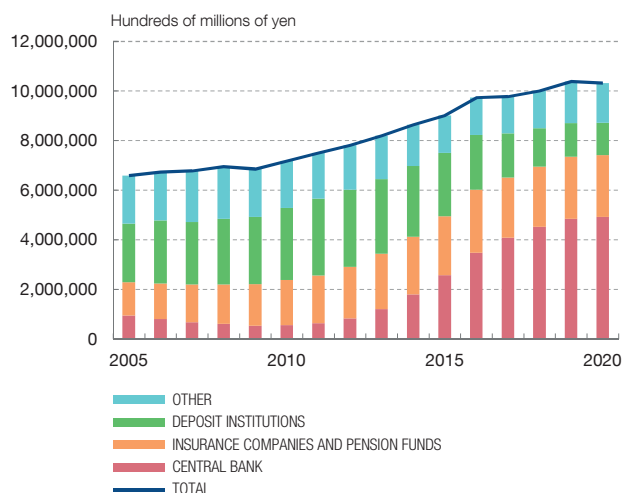
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8 For an analysis of the behaviour of inflation expectations in Japan, see, for example, Hogen and Okuma (2018) or Nishino et al. (2016).

9 Annual purchases were increased for Treasury bonds (from ¥50 trillion to ¥80 trillion), ETFs (from ¥1 trillion to ¥3 trillion, subsequently rising to ¥6 trillion in July 2016) and REITs (from ¥30 billion to ¥90 billion).
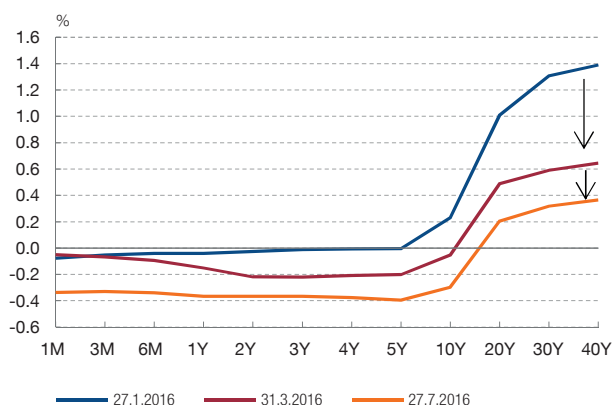
Chart 4
JGB HOLDERS AND YIELDS

1 JGB HOLDERS

Hundreds of millions of yen

OTHER
DEPOSIT INSTITUTIONS
INSURANCE COMPANIES AND PENSION FUNDS
CENTRAL BANK
TOTAL

2 YIELD CURVE: JANUARY-JULY 2016

27.1.2016   31.3.2016   27.7.2016

SOURCES: Bank of Japan (financial statements) and Refinitiv.
Note: M = month; Y = year.

reserves at the central bank.[10] The stated intention was to further reduce short-term interest rates and push up inflation expectations by strengthening the commitment to achieve the inflation target. However, the impact on interest rates was felt across the yield curve, which flattened most substantially. Yields at the short end of the curve (up to ten years) stood at -0.4%, while those on 30-year and 40-year bonds barely exceeded 0.3% (see Chart 4.2). This heightened the perception of this policy's collateral costs in terms of financial stability risks, stemming from potential greater risk-taking and a smaller return of financial intermediaries.[11]

As a result of the foregoing, in the spring of 2016 the Bank of Japan decided to identify the problems facing its monetary policy strategy and the obstacles to achieving the inflation targets. To this end, a comprehensive assessment was conducted of the results of the QQE with negative interest rates and of the possible solutions for improving them. This report was discussed at the Monetary Policy Meeting in September 2016.[12] Its main conclusions were that the reduction in interest rates along the entire yield curve had proved an effective means for stimulating the economy and that it provided a path out of deflation, but that

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10 The negative interest rate policy comprised a three-tier system. First, an interest rate of 0.1% was applied to the Basic Balance of banks' accounts at the central bank, i.e. the average balance in the current account at the central bank, less minimum reserves in 2015; consequently, this amount is fixed. Second, a rate of 0% was applied to the Macro Add-on Balance, comprising required reserves and the reserves for the outstanding balance of different liquidity facilities. Lastly, a rate of -0.1% was applied to the Policy-Rate balance, defined as the current account balance in excess of the amounts of the other two components. When the policy was launched, the Policy-Rate balance accounted for only 4% of banks' balances at the Bank of Japan, although the amount grew as the reserves increased. The aim of this policy was to attempt to protect banks' profitability. At the same time, asset purchases by the Bank of Japan were held at a pace of ¥80 trillion per annum.

11 For an exhaustive analysis of the financial stability risks derived from low interest rates in Japan, see Kuroda (2016) or Shirai (2018).

12 See Bank of Japan (2016a) and Kuroda (2016).

inflation expectations in Japan were more "backward-looking" or adaptive than previously thought, hampering the achievement of the inflation targets and making the disinflationary shocks more persistent. The report also acknowledged that the excessive flattening of the yield curve was affecting the return of financial intermediaries and that the JGB market could face some liquidity problems, given the expected increase in the Bank of Japan's holdings. To resolve these problems, at that September 2016 meeting, the Bank adopted a new YCC strategy in order to reach its targets more efficiently and sustainably, prevent an excessive flattening of the yield curve and reduce asset purchases. The characteristics of this new monetary policy arrangement and its results to date are analysed in the following section.

2.1　The Bank of Japan's inflation targets

Before analysing the Bank of Japan's experience with YCC, one final aspect that merits highlighting is how the Bank gradually changed its definition of the price stability target over the years, until it set an inflation target in 2013. After the 1990s financial crisis, the Bank of Japan Act was revised in 1998 to grant the central bank greater independence from the Ministry of Finance and to clarify its objectives, which became achieving price stability and contributing to maintaining financial stability. Previously, under the Bank of Japan Act of 1942, its main objective was to help maximise potential economic growth. The new Act also allowed the Bank of Japan to weigh up the two objectives and to set its own inflation goals. In the early 2000s, the two objectives enjoyed similar importance but, as the financial situation improved, the Bank shifted its priority towards price stability. However, in terms of transparency in its inflation targeting, the definition of price stability, as a situation leading to neither a deflationary nor an inflationary outcome, was at first relatively vague, as it was feared that a numerical target could limit monetary policy flexibility.

In March 2006, with the termination of the first QE programme, the Bank of Japan sought to further clarify its inflation target. To this end, it decided to explicitly set out what the various Policy Board members understood as price stability over the medium to long term, which comprised a range between 0% and 2%, centring around 1%. It was also decided that this "understanding" would be revisited each year and that it did not constitute a formal inflation target. In any event, the range specified was lower than that of other central banks, as the Bank considered it important to take into account the past developments in inflation in Japan (where it was well below that of other economies) and the different points of view of the Policy Board members.

Six years later, in February 2012, coinciding with the setting of a numerical inflation target of 2% by the Federal Reserve, the Bank of Japan adopted an inflation goal of 1%, within a range of 0%-2%. Notably, this was not related to the opinion of the Policy Board members, but rather to that of the Bank itself. Lastly, coinciding with the introduction of Abenomics, in January 2013 the Bank of Japan, together with the Japanese Government, decided to set an inflation target of 2% (in line with those of other central banks), with the intention of convincing the public of its firm resolve and commitment to achieving this target rate in a sustainable manner and thus anchor its inflation expectations. This has enabled

Chart 5
RELATIVE KNOWLEDGE OF THE PRICE STABILITY TARGET

KNOWLEDGE OF THE PRICE STABILITY TARGET RELATIVE TO KNOWLEDGE OF THE FINANCIAL STABILITY TARGET (a)
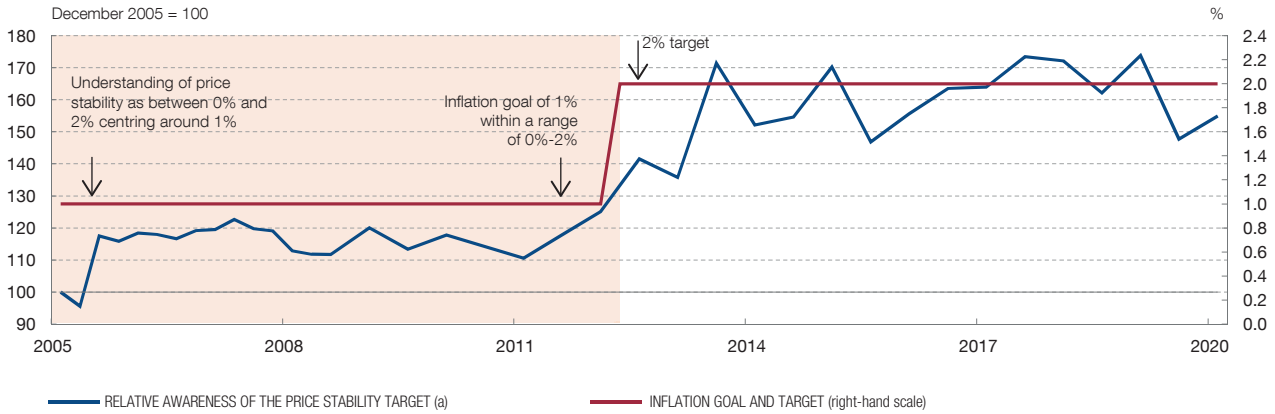
SOURCES: Bank of Japan's Opinion Survey and IMF (2020).

a The index measures the ratio of the percentage of responses in the Bank of Japan's Opinion Survey that indicate knowledge of the price stability target compared with knowledge of the financial stability target.

the public to gain a better understanding of the Bank of Japan's inflation target, as can be seen in Chart 5, which shows that the public's knowledge of the inflation target, relative to their knowledge of the financial stability targets, increased notably after this change. All things considered, the Japanese case illustrates the difficulties of establishing an ambitious inflation target when inflation rates and inflation expectations have been substantially below that target for a prolonged period (see, for example, Ehrmann (2015) or Shirai (2018)).

3 Yield curve control strategy in Japan

In September 2016, the Bank of Japan introduced YCC through which, in addition to setting the short-term policy interest rate applicable to some accounts at the central bank, a target of 0% was established for 10-year JGB yields.[13] Future changes in the monetary policy stance would be made by modifying these interest rates. To control the yield curve, the Bank would continue to purchase Treasury bonds at different maturities,[14] even though the YCC policy would mean abandoning the previous quantitative target (to change the monetary base) in favour of a price target (to control interest rates). In this respect, the volume of assets to be purchased became endogenous, and the Bank of Japan would purchase/sell securities as needed in order to stabilise the yield around the target, depending on whether it were above or below, respectively, the target. If the target set were credible, the Bank of Japan was confident that it would be able to reduce the pace of asset purchases. However, in an attempt to prevent this change of strategy (i.e. the possible reduction of the Bank of Japan's purchases and the effective increase in long-term interest rates from very low levels) being interpreted as a tightening of the monetary policy stance, the guidance that JGB purchases would amount to around ¥80 trillion per annum was initially maintained.[15]

The other component of the Bank of Japan's new strategy was the commitment to maintain the increase in the monetary base until inflation exceeded the target of 2% and stayed above this target in a stable manner, i.e. for a considerable period of time. This inflation-overshooting commitment (a form of state-contingent forward guidance) was intended to underscore the Bank's determination and help anchor inflation expectations at the 2% target. Subsequently, in July 2018, the Bank strengthened its forward guidance by committing to maintain short and long-term interest rates at their current levels, at least until after the consumption tax hike scheduled for October 2019. State-contingent forward guidance for interest rates (based on reaching the inflation target on a lasting basis) was introduced in the autumn of 2019.[16] Since then, market expectations have factored in a prolonged period of low interest rates, as the channel of interest rate expectations is another means, in addition to asset purchases, through which the Bank of Japan can control the yield curve.

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13   See Bank of Japan (2016b). Annex 2 shows other central banks' experiences with YCC strategies, both in the past and at present.

14   The references to the average maturities of Treasury bond purchases were removed. YCC is conducted through two types of operations. In regular operations, the Bank of Japan purchases Treasury bonds across all maturities through competitive auctions, in which it establishes a reference rate which is used by financial institution counterparties when submitting their bids. In turn, irregular operations (fixed-rate purchase operations) are executed rapidly when the 10-year JGB yield exceeds the target, with the Bank of Japan setting the target yield and offering unlimited purchases.

15   The guidance regarding ETF and REIT purchases remained unchanged. Subsequently, in the April 2020 meeting, the Bank of Japan removed the reference to the purchase of Treasury bonds for ¥80 trillion per annum. In March 2021, the reference to the annual targets for ETF and REIT purchases was removed, and purchases were capped at ¥12 trillion and ¥180 billion, respectively. This cap (which was higher than the annual targets set) was temporarily introduced at the onset of the COVID-19 pandemic to ensure financial market stability. Among the adverse effects of these purchases, Bank of Japan (2021) cites the potential losses on the central bank's balance sheet that could stem from these assets and, in the case of ETF purchases, the possible corporate governance problems that could arise at listed firms, especially if they track the Nikkei index. To address this, the Bank of Japan has increased its purchases of ETFs tracking the TOPIX.

16   Under the new YCC strategy, the Bank of Japan placed less emphasis on the time expected to achieve the inflation target, in view of its previous experience of the continued delays in its outlook.

How effective has YCC been in achieving the Bank of Japan's targets? As regards the functioning of the YCC strategy and financial stability matters, the volume of Treasury bond purchases by the Bank of Japan declined substantially, from the previous amount of ¥80 trillion to around ¥20 trillion in 2019.[17] However, purchases rose again during 2020 in the context of the COVID-19 pandemic and the increase in public debt issued by the Japanese Government (see Chart 6.1). After the new strategy was launched, 10-year JGB yields increased to the 0% target, where they have held on a relatively stable basis in recent years, even in 2020 against the backdrop of the COVID-19 pandemic.[18] While no fluctuation or tolerance bands around the 0% target were initially established, the markets implicitly presumed that interest rates could move between -0.1% and 0.1% (based on when the Bank of Japan made the purchases). In July 2018, the Bank of Japan adjusted its strategy and clarified the tolerance bands for the long-term interest rate targets, extending them from the previous implicit bands to +/-0.2% so as to have some greater flexibility when managing interest rate movements in response to economic and market conditions. Finally, in a further review of its strategy in March 2021, the Bank of Japan once again widened the fluctuation band for long-term interest rates, by five basis points, to +/-0.25%, thereby creating even greater headroom for altering interest rates based on short-term conditions and allowing for interest rate increases in the longer-term segments.[19]

At the same time, the slowdown in the pace of asset purchases helped raise the slope of the yield curve, especially at longer-dated terms (30 and 40 years), which returned to around 1%, alleviating the pressure on the return of financial intermediaries (see Chart 6.2). Indeed, the percentage of Treasury bond purchases at short maturities (between one and three years) has gradually increased over recent years, helping to contain the Bank of Japan's share of 10-year bond holdings and push up the slope of the yield curve (see Charts 6.3 and 6.4). The Bank of Japan has chiefly purchased bonds from the Government Pension Investment Fund and from banks. Insurance companies and private pension funds have not been as inclined to dispose of their bonds, owing to the need to have safe long-term assets in their portfolio.

Consequently, the Bank of Japan's YCC strategy has succeeded in maintaining loose financial conditions and limiting the adverse effects of an excessive flattening of the yield curve, albeit starting from excessively low interest rates across the entire maturity curve, which meant reducing government debt purchases. In other words, there was a de facto tightening of the monetary policy stance. All things considered, the Bank of Japan deems this strategy to be a more effective, controllable and sustainable framework for achieving its targets.

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17 One of the most frequent criticisms of the Bank of Japan has been the inconsistency in having two targets (the quantitative asset purchases target and the yield target) at the same time. See, for example, Shirai (2018).

18 The media talked about this reduction in purchases and increase in long-term interest rates as an implicit tightening of monetary policy (stealth tapering). The scant bouts of volatility in the 10-year interest rate were successfully resolved through interventions by the Bank of Japan (see Hattori (2017)). Interest rates slid back into negative territory for a large part of 2019 as a result of foreign capital inflows.

19 In addition, with a view to improving banks' profitability, in March 2021 the Bank of Japan introduced an interest incentive scheme applicable to institutions' current account balances at the Bank of Japan, depending on their usage of the liquidity facilities aimed at promoting lending.

Chart 6

THE BANK OF JAPAN'S JGB PURCHASES AFTER YCC

1 VOLUME OF ANNUAL JGB PURCHASES

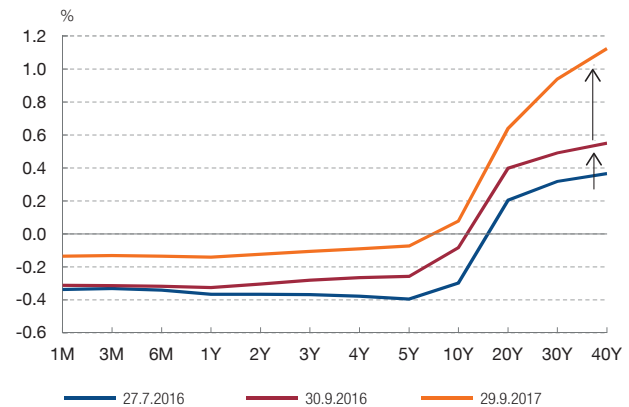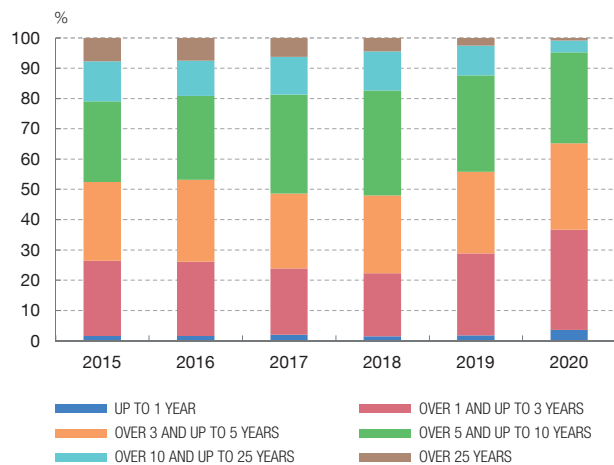Annualised purchases in trillions of yen

QQE
YCC

2 YIELD CURVE AFTER YCC

%

— 27.7.2016   — 30.9.2016   — 29.9.2017
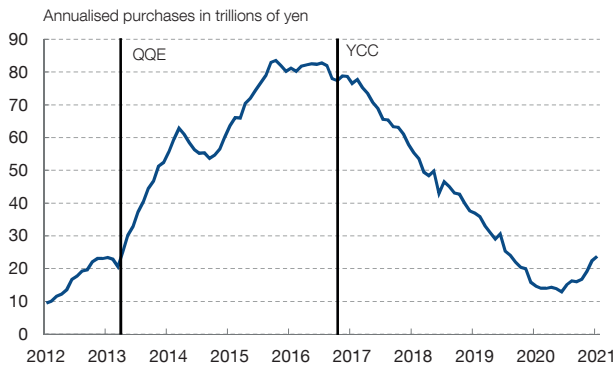
3 JGB PURCHASES BY MATURITY

%

■ UP TO 1 YEAR
■ OVER 3 AND UP TO 5 YEARS
■ OVER 10 AND UP TO 25 YEARS
■ OVER 1 AND UP TO 3 YEARS
■ OVER 5 AND UP TO 10 YEARS
■ OVER 25 YEARS

4 JGBs HELD BY THE BANK OF JAPAN, AS A % OF THE TOTAL

%
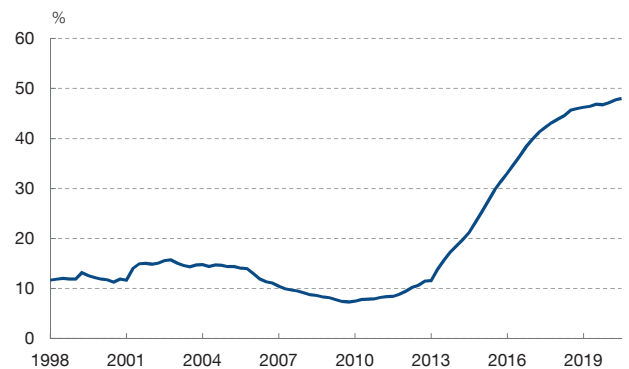
SOURCES: Bank of Japan and Refinitiv.
NOTE: M = month; Y = year.

Nevertheless, it should be underscored that it is easier to control long-term interest rates when the central bank has a strong presence in the market, as is the case in Japan.[20] In addition, the smooth operation of this strategy mainly hinges on the central bank's credibility as regards achieving its yield target levels across the curve, which largely depends on market agents' yield expectations.[21] If these expectations are not aligned, a much greater balance sheet expansion could be needed to achieve the desired levels. And this is contingent on agents' expectations of the economic conditions being consistent with this path of interest rates, which is more complicated in the case of long-term maturities, as such conditions are

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20 See Kuroda (2019).
21 See Hattori and Yoshida (2020).

more susceptible to considerable change.[22] An added difficulty stems from being able to determine the optimal yield curve, given the problems in measuring a natural yield curve[23] and the absence of a widely-accepted theoretical monetary policy rule for linking it to the real yield curve.

However, this YCC strategy has not yet succeeded in achieving the 2% inflation target or raising inflation expectations in Japan. While the interest rate control strategy has admittedly helped maintain loose financial conditions (with low interest rates and increases in stock market prices) and support economic activity, inflation rates remained below 0.5% in 2019, and long-term inflation expectations have held at around 1%. As a result of the impact of the COVID-19 pandemic and the measures adopted in response, including certain price subsidies, inflation rates have slipped back into negative territory, standing at -1.2% in December 2020. Given the little progress made on the inflation front, some analysts have questioned whether the Bank of Japan's strategy is sufficient to reach the targets and whether greater adverse collateral effects will have to be addressed further down the line, such as possible fiscal dominance or the interference in the smooth functioning of the long-term bonds market. In its monetary policy strategy review in March 2021,[24] the Bank of Japan maintained that, on the estimates of its macroeconomic models, the measures adopted since the introduction of the QQE and YCC had helped push up GDP by around one percentage point and inflation rates by 0.6 percentage points. However, it acknowledged that the largely adaptive nature of inflation expectations appeared to be the main obstacle to fully achieving its targets. The following section contains an empirical analysis of the causes preventing a more sustainable increase in inflation in Japan, despite the continued efforts in the realm of monetary policy.

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22 For these reasons, some analysts and monetary policy authorities in other countries, such as the United States (e.g. the Board of Governors of the Federal Reserve Systems (2010), Bernanke (2016) and Brainard (2019)), suggest that it is more feasible to control the short end of the yield curve (for example, up to three years) than 10-year rates.

23 Methods for calculating the natural yield curve have been devised in recent years. See, for example, Imakubo, Kojima and Nakajima (2017) or Brzoza-Brzezina and Kotłowski (2014).

24 See Bank of Japan (2021).

4 Factors driving inflation in Japan

What are the causes of this low rate of inflation in Japan over so many years, despite the amount of the monetary stimulus measures applied? The changes in the Bank of Japan's monetary policy strategies in recent years, especially since the QQE was introduced in 2013, have ultimately managed to overcome the deflationary period of the previous decades and had a positive effect on economic activity and employment: the output gap turned positive as of 2014 (until the COVID-19 crisis), and unemployment has remained at very low levels (see Charts 7.1 and 7.2). However, both inflation rates and inflation expectations have stood far from the 2% target throughout this period. Among the factors most cited in the literature that can help explain Japan's persistently low inflation rate are certain structural characteristics of its economy that hamper the transmission of monetary policy to prices. For example, population ageing[25] and the consequent decline in potential growth (owing not only to the lower labour-market participation, but also to the deceleration in productivity) contribute to reducing the natural rate of interest[26] (see Chart 7.3), thereby bringing monetary policy towards the effective lower bound and impeding its effectiveness.

Another aspect particular to Japan is the functioning of its labour market and, specifically, the scant wage response to changes in activity.[27] Wage growth in Japan has been weak for many years, despite the increase in employment and the very low unemployment rate (see Chart 7.4). This behaviour is partially explained by the distinctive characteristics of the country's dual labour market. In Japan, most workers are regular (i.e. full-time employees with a permanent contract), and their trade unions therefore tend to favour long-term job stability over demands for salary increases.[28] Indeed, in the annual wage negotiations in spring *(shunto)*, trade unions tend to take into account the previous year's inflation, rather than target inflation.[29] By contrast, non-regular workers, who have lower wages and less job security, are more sensitive to the degree of slack in the economy.[30]

This wage behaviour in Japan helps explain another aspect specific to the process of formation of prices and inflation expectations, which has historically been characterised by a very substantial weight of past inflation and, in exchange, a much smaller role of inflation targets. This largely adaptive nature of inflation and inflation expectations in Japan

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25 Shirakawa (2012), Katagiri (2012), Anderson, Botman and Hunt (2014), Carvalho and Ferrero (2014) and Banco de España (2019) point out the deflationary effect of population ageing. There are several channels through which population ageing can have deflationary implications, the most obvious being the reduction in the workforce, which, in turn, lowers consumption, investment and productivity. These all suppress both inflation and potential growth. Another factor mentioned in the literature is that, owing to their high savings, the elderly will be more reluctant to support policies that are conducive to boosting inflation.

26 See, for example, Bank of Japan (2016a) or Sudo, Okazaki and Takizuka (2018).

27 In the Bank of Japan's comprehensive assessment report on QQE with negative rates (Bank of Japan (2016a)), which was drawn up in September 2016 before the introduction of YCC, one of the conclusions reached (the estimation of a wage Phillips curve) was that past inflation had a much larger impact on wages in Japan than in other advanced economies. See also Iwasaki, Muto and Shintani (2018).
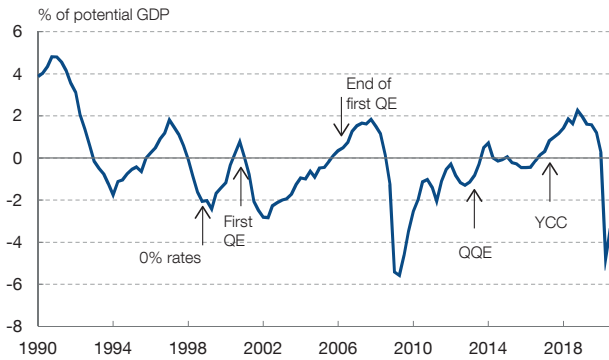
28 See, for example, Shirakawa (2014).

29 In 2018, the Government attempted, unsuccessfully, to instigate wage increases of 3% in the *shunto* negotiations.

30 See Shirakawa (2014), Aoyagi and Ganelli (2013) and Bank of Japan (2017).
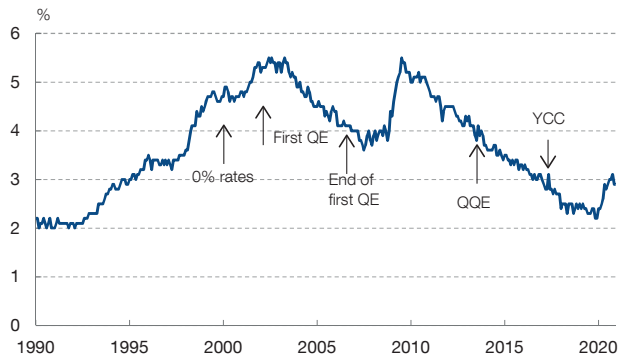
Chart 7

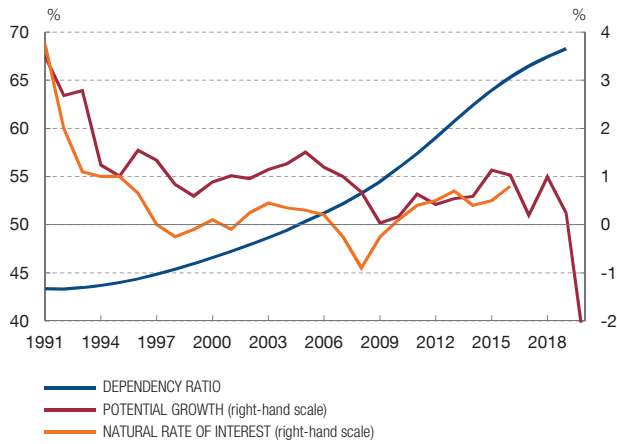**POPULATION AGEING, POTENTIAL GROWTH AND NATURAL RATE OF INTEREST**
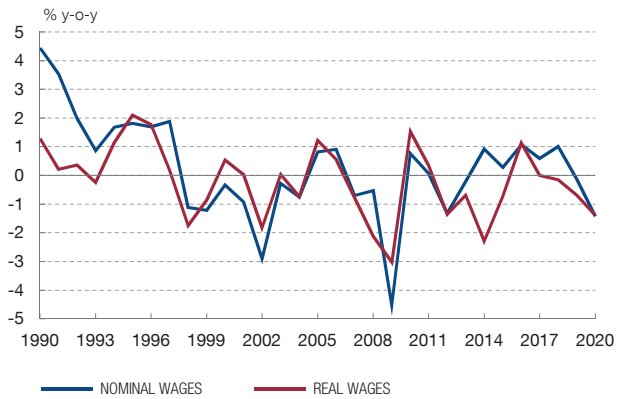
1 OUTPUT GAP

% of potential GDP

2 UNEMPLOYMENT RATE

%

3 POPULATION AGEING AND POTENTIAL GROWTH (a)

4 WAGE GROWTH IN JAPAN

% y-o-y

DEPENDENCY RATIO
POTENTIAL GROWTH (right-hand scale)
NATURAL RATE OF INTEREST (right-hand scale)

NOMINAL WAGES   REAL WAGES

SOURCES: Cabinet Office, World Bank, IMF, Sudo, Okazaki and Takizuka (2018) and Japanese Ministry of Health, Labour and Welfare.

a Potential growth is the year-on-year growth in potential GDP, which is calculated based on the output gap published by the International Monetary Fund (IMF) in its World Economic Outlook. According to Sudo, Okazaki and Takizuka (2018), the natural rate of interest is estimated through a new Keynesian DSGE model and defined as the real interest rate under a scenario in which the actual output coincides with the natural output and nominal rigidities are absent.

distinguishes it from other advanced economies, where inflation expectations are better anchored at the target and inflation tends to be more forward-looking. This was one of the main conclusions reached by the Bank of Japan in its monetary policy strategy assessments in September 2016 (before the YCC strategy was launched) and, more recently, in March 2021.[31] These reports set out evidence that prices and wages in Japan are influenced to a large extent by past inflation in comparison with other economies and that inflation expectations also have very adaptive behaviour, making any inflation shock (such as the decline in oil prices in 2014) highly persistent.

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31 See Bank of Japan (2016a and 2021).

This section contains an empirical analysis of these aspects of the process of inflation expectation and price formation in Japan and seeks to verify whether the monetary policy changes made by the Bank of Japan in recent years have managed to reverse them to any extent. First, to illustrate the particularity of the price formation process in Japan, we estimate a standard Phillips curve, where inflation depends on the degree of slack in the economy (the output gap) in the prior period, import prices, and inflation expectations with a hybrid specification combining an adaptive component which considers past inflation with another component considering medium and long-term inflation expectations. The estimated equation is as follows:

$$\pi_t = 0.88 \times \pi_{t-1} + 0.12 \times \pi_t^{e\,LP} + 0.08 \times (y_{t-1} - y^*) + 0.01 \times \pi_t^m + \varepsilon_t \qquad [1]$$
$$(0.00) \qquad (0.01) \qquad (0.03) \qquad (0.00)$$

p – values within brackets. $R^2 = 0.75$.

Where π_t is headline inflation (CPI) in each quarter, in year-on-year terms, from 1997 Q1[32] to 2019 Q4, excluding the effect of consumption tax hikes. The independent variables used include one-period lagged inflation (π_{t-1});[33] $\pi_t^{e\,LP}$ represents the 6-10 years ahead expectations in the Consensus Forecasts;[34] $(y_{t-1} - y^*)$ is the one-period lagged output gap, as is quite common in the literature; lastly, π_t^m represents import prices, which are added as a control variable and calculated as the year-on-year change in import prices. The results of the estimate show that the price formation process in Japan is marked by a very high weight of the adaptive component of the expectations,[35] a very low slope of the Phillips curve on the output gap[36] and a very low coefficient on import prices.

Second, we analyse the formation of medium and long-term inflation expectations in Japan.[37] To this end, we estimate an expectations equation whose specification includes the influence of past inflation and the Bank of Japan's inflation target. The estimated equation is as follows:

$$\pi_t^{e\,LP} = 0.40 \times \pi_{t-1} + 0.60 \times \pi^* + w_t \qquad [2]$$
$$(0.00) \qquad (0.00)$$

p – values within brackets. $R^2 = 0.18$.

---

32 Chart 1 shows a clear decline in inflation expectations in Japan around 2000. To see the probable effect of this possible structural change on expectations, a test has been carried out with a start date in 2000 for the estimate, with hardly any change in the results.

33 As a robustness test, we used average inflation in the previous year. We also conducted these exercises using core inflation. In general, our conclusions remain the same, with a coefficient on past inflation of around 0.8.

34 Half-yearly data. The quarterly data have been interpolated.

35 Similar estimates of the Phillips curve offer coefficients on past inflation ("adaptive" component) in the range of 0.25-0.29 for the United States and 0.54-0.67 for the euro area, respectively (taking, as a measure of past inflation, that of the preceding quarter or the average for the previous year). These findings are in line with other studies in the literature. See Bank of Japan (2016a and 2021), Berganza, Del Río and Borrallo (2016), Guay and Pelgrin (2004) and Stracca (2007).

36 Other studies attest to the flattening of the Phillips curve in Japan since the 1990s (Nishizaki, Sekine and Ueno (2014), Nakahira (2015) and Okimoto (2019)).

37 In its monetary policy strategy assessment in 2016, the Bank of Japan analysed how past inflation affected short and long-term expectations in Japan compared with the most developed economies. The Bank's findings showed that past inflation had a greater weight in Japan compared with those other economies. See Bank of Japan (2016a) and also Łyziak and Paloviita (2017) or Buono and Formai (2016).

Where $\pi_t^{e_{LP}}$ reflects, as in the previous exercise, 6-10 years ahead expectations in the Consensus Forecasts; we include as independent variables one-period lagged inflation and the inflation target (π^*), set at 2%. The equation is estimated with quarterly data, between 1997 Q1 and 2019 Q4.[38] The results of the estimate show that the process of inflation expectation formation in Japan is also characterised by a relatively significant weight of the adaptive component. As a result, past inflation is given additional prominence through its influence on long-term expectations.[39]

Based on these findings, we can analyse which factors lie behind Japan's low inflation rate. To this end, below we estimate the components of the inflation deviation from the 2% target:

Introducing [2] in [1]:[40]

$$\pi_t = 0.88 \times \pi_{t\text{-}1} + 0.12 \times (0.40 \times \pi_{t\text{-}1} + 0.60 \times \pi^* + \widehat{w}_t) + 0.08 \times (y_{t\text{-}1} - y^*) + 0.01 \times \pi_t^m + \hat{\varepsilon}_t \quad [3]$$

Calculating:

$$\pi_t = 0.93 \times \pi_{t\text{-}1} + 0.07 \times \pi_t^* + 0.12 \times \widehat{w}_t + 0.08 \times (y_{t\text{-}1} - y^*) + 0.01 \times \pi_t^m + \hat{\varepsilon}_t \quad [4]$$

Iterating backwards, and solving for π_t^*, we obtain:

$$\pi_t - \pi_t^* = \text{slack} + \text{imports} + \text{infl.shock} + \text{expect.shock,} \quad [5]$$

Where:

$$\text{slack} = 0.08 \times \sum 0.93^{i-1} \times (y_{t\text{-}1} - y^*) \quad [6]$$

$$\text{imports} = 0.01 \times \sum 0.93^{i-1} \times m_{t-(i-1)} \quad [7]$$

$$\text{infl.shock} = \sum 0.93^{i-1} \times \hat{\varepsilon}_{t-(i-1)} \quad [8]$$

$$\text{expect.shock} = 0.12 \times \sum 0.93^{i-1} \times \widehat{w}_{t-(i-1)} \quad [9]$$

Chart 8 shows the decomposition of the inflation deviations from the 2% target in Japan, drawing on the above estimates of the Phillips curve and the long-term expectations

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38 If we apply this same procedure for headline inflation in the United States and the euro area, we obtain a range of adaptive coefficients of (0.05-0.09) and (0.04-0.05), respectively, using, as a measure of past inflation, that of the preceding period or the average for the previous year.

39 The weight of past inflation is even higher (0.55) for short-term (1-year ahead) inflation expectations, in line with the results of the Bank of Japan itself (see Bank of Japan (2016a)). The adaptive component for inflation expectations in both the short term and the medium and long term is even higher (0.8) if the measures of inflation compensation derived from market instruments (e.g. inflation swaps or the break-even rates of inflation-linked bonds) are used, rather than the Consensus survey.

40 Following the methodology of the Bank of Japan itself (Bank of Japan (2016a)), rather than directly estimating equation [4], a two-stage procedure is used to estimate the components of the inflation deviation from the target so as to thus maintain the shocks to the Phillips curve and to the long-term expectations equation. A one-step estimation would offer one single shock combining both of the foregoing shocks, with the consequent loss of relevant information.

Chart 8
DECOMPOSITION OF INFLATION

DECOMPOSITION OF INFLATION DEVIATIONS FROM THE 2% TARGET (a)

pp, % y-o-y

SLACK   IMPORTS   INFLATION SHOCKS   EXPECTATIONS SHOCKS   DEVIATION FROM TARGET
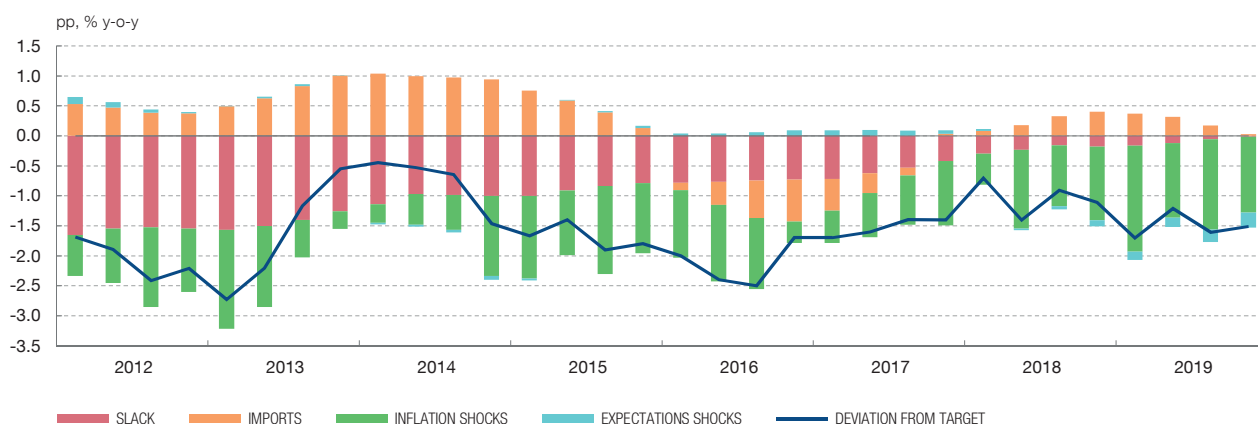
SOURCE: Banco de España calculations.

a Excludes the effect of the tax hike in 2014.

equation. First, despite the relatively flat slope of the Phillips curve, the contribution of the degree of slack in the economy is negative throughout the period, although it gradually decreases over time thanks to the improvement in the output gap. The contribution of import prices varies over time, very much in line with the yen exchange rate (which, for instance, depreciated substantially in 2013-14 following the introduction of the QQE). However, the other component helping to explain the inflation deviation from the target is the adaptive component, which is reflected in the contributions of the inflation shocks. These include the inflation shocks to the Phillips curve and their feedback through the weight of past inflation in both the Phillips curve and the expectations equation.[41]

To check whether these results could have changed in recent years with the introduction of the various monetary policy strategies, we once again estimate the Phillips curve and the long-term expectations equation with 5-year time windows (rolling regressions) to analyse the parameters' stability over time. Chart 9 shows changes in the past inflation parameters in the Phillips curve and the long-term expectations equation. The weight of past inflation in the Phillips curve remained very stable following the introduction of QQE in 2013 and, although it appeared to decrease very slightly following the adoption of YCC in 2016, it then increased until the coefficient exceeded 0.8. As regards the equation of long-term inflation expectations, the coefficient on past inflation has gradually increased in recent years,[42] with even the slight decrease following the introduction of YCC being purely temporary and swiftly

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**41** These results are in line with other studies that also confirm the importance of the degree of slack, the low inflation expectations and appreciation in the exchange rate as the factors driving Japan's low inflation rate since the 1990s (Nishizaki, Sekine and Ueno (2014), Okimoto (2019) and Turner et al. (2019)).

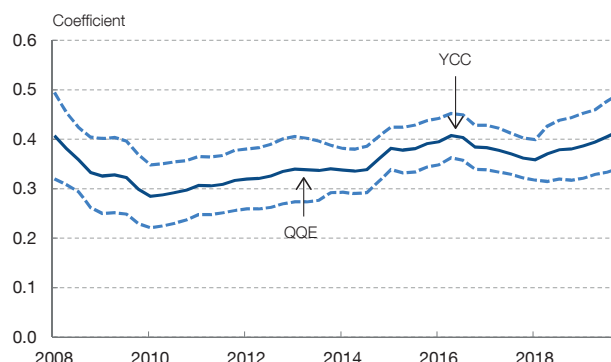**42** See also, for example, Hogen and Okuma (2018).

Chart 9
ADAPTIVE EXPECTATIONS IN JAPAN

1 COEFFICIENT ON PAST INFLATION IN THE PHILLIPS CURVE
(5-YEAR ROLLING REGRESSIONS)
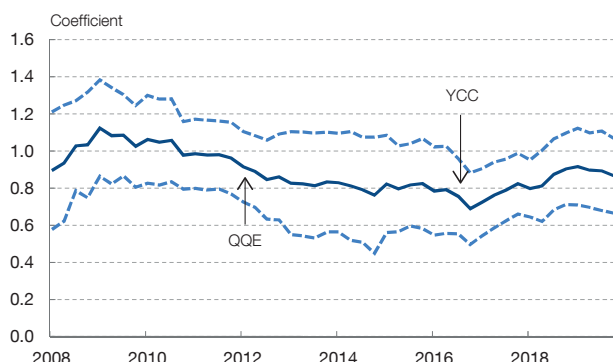
2 COEFFICIENT ON PAST INFLATION IN LONG-TERM EXPECTATIONS
(5-YEAR ROLLING REGRESSIONS)

SOURCE: Banco de España calculations.
NOTE: The broken lines show 95% confidence intervals.

reverting. In sum, the two estimates lead to a similar conclusion: the changes in the Bank of Japan's monetary policy in recent years have not yet successfully altered the largely adaptive nature of the process of formation of prices and inflation expectations.

This strong degree of inflation persistence could be partly explained by how households and firms form their inflation expectations, and how the latter set prices.[43] First, household inflation expectations have consistently exceeded the 2% target. Chart 10.1 shows the median of households' inflation perceptions, together with their short and long-term inflation expectations, according to the Opinion Survey, since 2007.[44] While short-term inflation expectations show strong volatility, in general they have remained between 2% and 3% over the last decade. Meanwhile, long-term inflation expectations are more stable, having remained at 2% for several years.[45] In terms of median expectations, this behaviour masks substantial heterogeneity across age cohorts: inflation expectations are lower among younger generations (who have grown up in a low-inflation or deflationary environment) than among older cohorts (who remember periods of high inflation)[46] (see Chart 10.2).

Against a backdrop of low wage growth, households' tolerance of price increases is low,[47] as they perceive prices to be high and that they will lose purchasing power, which

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43 For a more detailed analysis, see, for example, Shirai (2018).

44 Hori and Kawagoe (2011) and Ueno and Namba (2014) confirm this upward bias of households' inflation expectations.

45 Indeed, Kamada, Nakajima and Nishiguchi (2015) have suggested that households' long-term inflation expectations are not affected by actual inflation.

46 See, for example, Diamond, Watanabe and Watanabe (2020), IMF (2020) or Bank of Japan (2021). This latest study by the Bank of Japan also shows that the younger the age group, the lower their inflation expectations and the less sensitive their inflation expectations are to changes in current inflation.

47 See, for example, Bank of Japan (2018).

Chart 10

AGENTS' INFLATION EXPECTATIONS

1 HOUSEHOLD PERCEPTIONS AND EXPECTATIONS OF INFLATION
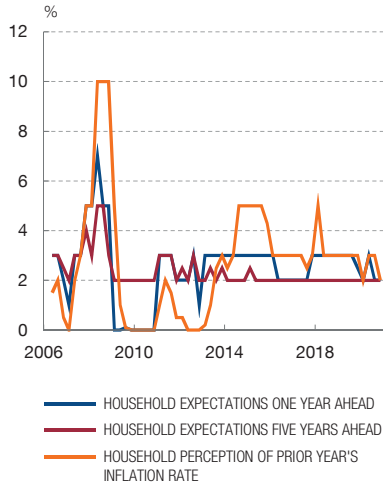
2 INFLATION EXPECTATIONS BY AGE COHORT

3 FIRMS' INFLATION EXPECTATIONS

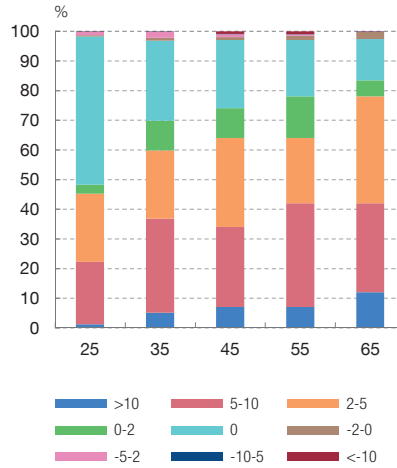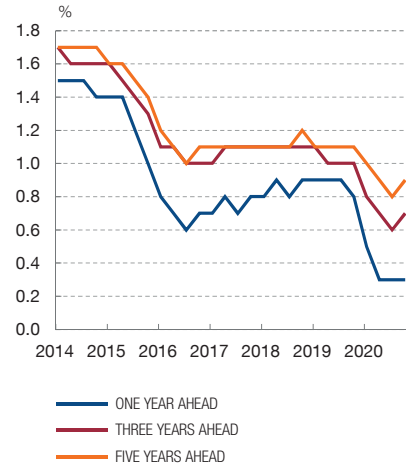— HOUSEHOLD EXPECTATIONS ONE YEAR AHEAD
— HOUSEHOLD EXPECTATIONS FIVE YEARS AHEAD
— HOUSEHOLD PERCEPTION OF PRIOR YEAR'S INFLATION RATE

■ >10   ■ 5-10   ■ 2-5
■ 0-2   ■ 0   ■ -2-0
■ -5-2 ■ -10-5 ■ <-10

— ONE YEAR AHEAD
— THREE YEARS AHEAD
— FIVE YEARS AHEAD

SOURCES: Bank of Japan's Opinion Survey (household expectations), Diamond, Watanabe and Watanabe (2020) (expectations by age cohort) and Bank of Japan's Tankan survey (firms' expectations).

results in their spending plans being very restrained (see Chart 10.1). It is in this context of weak household demand that firms define their price setting strategy, in which they also take into account their competitors' prices. Chart 10.3 shows Japanese firms' short and long-term inflation expectations, according to the Bank of Japan's *Tankan* survey. An across-the-board decline in expectations, from 1.5% to 1%, can be seen in recent years.[48] Added to this is the intense competition among firms, which motivates them to try to limit price increases by instead using strategies such as discounts, reducing the size or weight of their products or incorporating technological advances that help them cut costs.[49] All of this leads to businesses being highly cautious when increasing their prices and to the persistence of a very low rate of inflation in Japan.[50]

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[48]   See Inamura, Hiyama and Shiotani (2017). Using a different data source, Kaihatsu and Shiraki (2016) show that firms' short and long-term inflation expectations increased following the QQE.

[49]   For an analysis of these business strategies, see Bank of Japan (2018) or Imai and Watanabe (2014).

[50]   See Watanabe and Watanabe (2018).

5 Lessons learnt from Japan's experience

In spite of the Bank of Japan's efforts to sustainably push up inflation to achieve the 2% target through the progressive application of different non-standard monetary policy measures and strategies, including yield curve control since September 2016, progress towards meeting that target has been insufficient.[51] As shown in the empirical exercise conducted in this document, the findings of which are in line with those obtained by the Bank of Japan itself, one of the main obstacles to meeting the target has been the markedly backward-looking and adaptive nature of the process of formation of prices and inflation expectations in Japan, along with other structural features of the Japanese economy, such as population ageing and the decline in the natural rate of interest. And the various monetary policy strategies implemented by the Bank of Japan have not yet succeeded in overcoming these difficulties.

In addition, the Japanese experience highlights the limitations and side effects of the different monetary policy strategies. Thus, in a setting of very low interest rates, the implementation of sizeable QE programmes, accompanied by negative policy rates in the case of the Bank of Japan, may give rise to financial stability risks stemming from the excessive flattening of the yield curve, and to limitations and tightening in bond markets.[52] The main advantage of the YCC strategy that the Bank of Japan began to apply in September 2016 is that, in principle, it allows for more sustainable implementation of an expansionary monetary policy over a longer period of time, since it reduces the volume of purchases required to maintain long-term interest rates at the desired level and to raise the slope of the yield curve at longer maturities, mitigating any potential risks to financial stability. However, it is essential for economic agents to put their trust in the central bank's credibility and ability to control the yield curve and for the defined target levels to be consistent with the economic conditions of the country concerned. The Bank of Japan[53] considers that Japan is meeting those conditions, allowing it to continue its reflationary process gradually over time, by providing accommodative financial conditions and a boost to economic activity, which should translate into higher inflation rates and inflation expectations in the future.

In any event, the example of Japan also shows the difficulties of bringing inflation up in a sustained manner when there has been a protracted period of very low inflation, inflation expectations are disanchored and monetary policy is constrained by the effective lower bound on interest rates.[54] These difficulties are compounded when a mindset of very low inflation, or indeed a deflationary one, takes hold among economic agents. Such a mindset is

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51 According to the Bank of Japan's analyses, based on macroeconomic models, the different monetary policy strategies, particularly QQE from 2013 onwards, did allow the Japanese economy to move out of deflation and achieve higher inflation rates and economic growth than would have been possible without them (Bank of Japan (2016a and 2021) and Kan, Kishaba and Tsuruga (2016)). For other analyses of the macroeconomic effects of the different monetary policy strategies in Japan, see also Berkmen (2012), Hausman and Wieland (2014 and 2015), Ugai (2006), Michaelis and Watzka (2017), Dell'Ariccia, Rabanal and Sandri (2018) or Dufrénot, Rhouzlane and Vaccaro-Grange (2019).

52 See the Bank of Japan's assessment of these potentially adverse side effects for financial stability (Bank of Japan (2016a and 2021) and Kuroda (2016)).

53 See Kuroda (2019).

54 See, for example, Ehrmann (2015).

ultimately self-fulfilling, since it strongly influences firms' price-setting behaviour.[55] According to the IMF's recommendations,[56] the clear and effective communication of inflation targets by the central bank, something that has only happened in Japan in recent years, is essential for overcoming these difficulties. In addition to the monetary policy stimulus measures, other economic policies could contribute to achieving those targets, particularly fiscal policies and structural reforms that would revive the Japanese economy and have a positive impact on economic agents' expectations.

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55 See, for example, Shirai (2018).

56 See IMF (2020). The IMF also proposes some monetary policy alternatives, such as setting more achievable targets, introducing a target range of 1%-3% or adopting inflation forecast targeting. Arbatli et al. (2016) suggest adding incomes policies.

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Annex 1   The Bank of Japan's monetary policy strategies

THE BANK OF JAPAN'S MONETARY POLICY STRATEGIES

Dates	Strategy	Measures
February 1999 – August 2000	Policy interest rate: 0%	Temporary reduction to 0.15% and then to 0%
March 2001 – March 2006	Quantitative Easing (QE)	Expanding the monetary base through bank reserves, which became a monetary policy instrument for the duration of the programme. The Bank of Japan's current accounts increased from ¥1 trillion to a target of ¥5 trillion, gradually growing over the course of the programme to a target of ¥35 trillion
October 2010 – April 2013	Comprehensive Monetary Easing (CME)	Financial asset purchase and a fixed-rate liquidity supply programme. Initially, this measure was capped at a combined amount of ¥35 trillion, most of which (¥30 trillion) centred on the liquidity programme. This amount was gradually increased to a maximum limit of ¥111 trillion, mainly for asset purchases. But this amount was never reached, and the programme remained at around ¥70 trillion
April 2013 – January 2016	Quantitative and Qualitative Easing (QQE)	Purchase of financial assets for an initial amount of ¥60-¥70 trillion per year. Most were government bonds with average portfolio maturity of 7 years. Other assets acquired were Exchange-Traded Funds and Japanese Real Estate Investment Funds (ETFs and J-REITs, respectively). In October 2014, the volume of purchases was increased to ¥80 trillion, and the average maturity of government bonds rose to 8.5 years
January 2016	QQE with negative interest rates	An interest rate of -0.1% was applied to part of the central bank's current account balances under a three-tier system. In addition, assets purchases were held at ¥80 trillion
September 2016	QQE with yield curve control	Setting the short-term interest rate at -0.1%, and the long-term interest rate at 0%, with an initially implicit fluctuation band for the latter of +/- 0.1%. The annual target for purchases was held at ¥80 trillion, but the volume of purchases was in fact lower. This cap on purchases was removed in April 2020. In July 2018, the fluctuation band for the long-term interest rate was widened to +/- 0.2%, and again to +/- 0.25% in March 2021.

SOURCE: Devised by authors.

Annex 2   Other countries' experiences of yield curve control

Central banks other than the Bank of Japan have at different times in recent history exercised control over medium and long-term interest rates. This annex gives a brief overview of the experiences of the US Federal Reserve and the Bank of England (following World War II) and of the Reserve Bank of Australia (since March 2020).[1]

In April 1942, the Federal Reserve and the Treasury agreed to cap both the short-term interest rates (0.375% for 3-month Treasury bills) and the long-term interest rates (2.5% for 25-year bonds), in order to keep down the costs of government debt issued to finance World War II. To this end, it purchased mostly short-term government bonds, sometimes in very large amounts. When the war ended, the members of the Federal Open Market Committee became increasingly concerned with the sharp rise in prices, once the controls imposed during the war had been removed. Inflation rose to more than 14% in 1947 (see Chart A2.1.1). To control inflation, the Federal Reserve removed the cap on short-term interest rates, increasing them substantially. However, the US Government managed to keep the cap on long-term interest rates for a few more years, for which the Federal Reserve had to step up its long-term bond purchases. Finally, in the context of the Korean War, inflation soared to more than 17% in early 1951, and in March of that same year, the Federal Reserve and the Treasury decided to put an end to their accord and remove the caps on interest rates. To protect long-term bondholders, including banks and insurance companies, from suffering substantial losses, it was decided to convert 25-year bonds to non-marketable 29-year bonds with 2.75% interest, with the Treasury absorbing the costs of this measure.

The Bank of England also embarked on a policy to control interest rates to limit the cost of financing the war, as it had done in World War I. Between 1945 and 1947, it purchased government debt to keep long-term interest rates below 2.5%. Following its nationalisation after the war, the Bank of England continued to purchase government debt for several decades (at least regularly until 1971), acting under the directions of the Chancellor of the Exchequer, until it was finally granted independence in 1998. As occurred in the United States, the yield curve control strategy in the United Kingdom had to tackle rising inflation, which reached double digits in several different years (see Chart A2.1.2). The examples of the United States and the United Kingdom show that an interest rate control policy aimed at keeping the cost of government debt low can turn into a form of financial repression, with the risk of monetary policy falling under fiscal dominance, which is difficult to overcome and may lead to significant surges in inflation.

The Reserve Bank of Australia adopted a yield curve control strategy more recently, in March 2020. Specifically, it set a target rate of 0.25% for 3-year Treasury bonds (the same it had for the short-term policy rate). Unlike the two cases described above, for the Australian central bank the objective was not to ease the financing of public debt, but

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1   For more detailed accounts of these experiences, see, for example, Bartsch et al. (2020), Hetzel and Leach (2001) or Chaurushiya and Kuttner (2003).
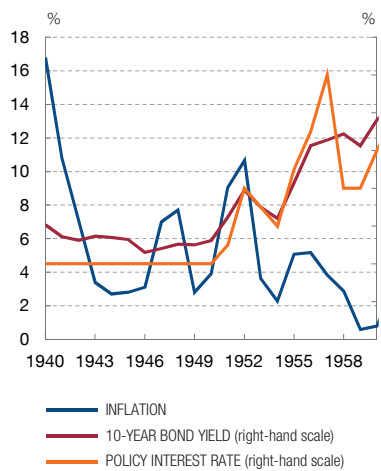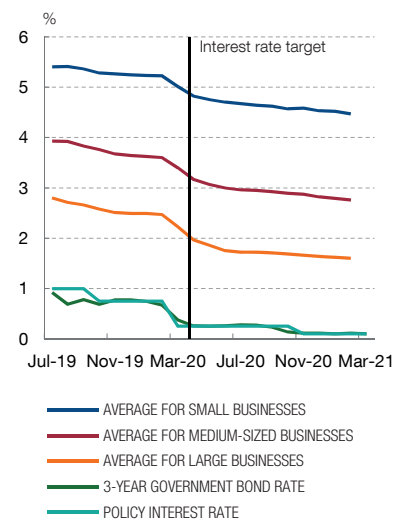
HISTORICAL EXPERIENCE WITH YIELD CURVE CONTROL (a)

1 INTEREST RATES AND INFLATION: UNITED STATES (1942-1951)

% year-on-year
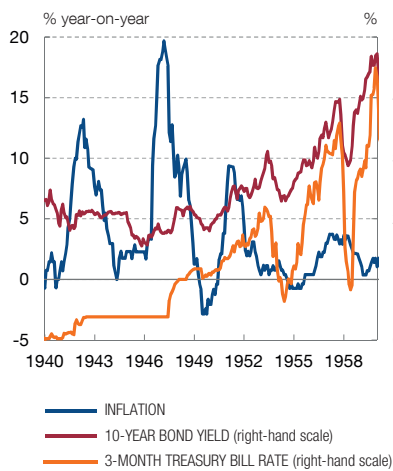
2 INTEREST RATES AND INFLATION: UNITED KINGDOM (1945-1947)

%

3 INTEREST RATES IN AUSTRALIA (2020-2021)

%

INFLATION
10-YEAR BOND YIELD (right-hand scale)
3-MONTH TREASURY BILL RATE (right-hand scale)

INFLATION
10-YEAR BOND YIELD (right-hand scale)
POLICY INTEREST RATE (right-hand scale)

AVERAGE FOR SMALL BUSINESSES
AVERAGE FOR MEDIUM-SIZED BUSINESSES
AVERAGE FOR LARGE BUSINESSES
3-YEAR GOVERNMENT BOND RATE
POLICY INTEREST RATE

SOURCES: Bureau of Labour Statistics, ECB, Refinitiv, Office for National Statistics and Reserve Bank of Australia.

a The dates in brackets refer to the episodes mentioned in the text.

rather to contribute to meeting its inflation and growth targets by flattening the yield curve. In addition, the Australian central bank also uses forward guidance (interest rates will be maintained until progress is made towards full employment and inflation stabilises in the target range of 2%-3%), and has embarked on a government bond purchase programme. To date, the strategy adopted in Australia has been a success and the yield on the 3-year bond has been kept close to the target, which was reduced in November (in line with the short-term rates) from 0.25% to 0.1%. This strategy has also succeeded in lowering the interest rate on borrowing for households and firms (see Chart A2.1.3).

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