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History of Bank of Japan's more than two decades of unconventional monetary easing with special emphasis on the frameworks pursued in the last 10 years

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ADBI Working Paper Series

HISTORY OF BANK OF JAPAN'S MORE THAN TWO DECADES OF UNCONVENTIONAL MONETARY EASING WITH SPECIAL EMPHASIS ON THE FRAMEWORKS PURSUED IN THE LAST 10 YEARS

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Abstract

Low inflation hit the Japanese economy shortly after the burst of the bubble in stocks and real estate in 1991 and has haunted the domestic economy ever since. The bubbles were partly attributable to prolonged monetary easing in the second half of 1980s, which was conducted to increase domestic demand and mitigate the recession induced by the appreciation of the Japanese yen. Furthermore, the country was adversely affected by US pressure to reduce trade deficits and resolve the prolonged trade dispute. In the early 1990s, Japan faced sluggish economic growth and low inflation, as well as severe structural financial and corporate sector balance sheet problems. Reflecting global trends regarding providing central banks with operational independence and the lessons learnt from Japan's bubble experience, meanwhile, the Bank of Japan (BOJ) was granted independence under the new 1997 Bank of Japan Act. Japan's economic problems starting from the 1980s also coincided with the period when the global Great Moderation was only in its early stages. The newly independent BOJ, in order not to put its credibility at risk, opted for cautiousness, which proved to be excessive. Not only was there a reversal in the August 2000 rate increase, but the BOJ also launched an unprecedented monetary experiment in 2001 called *Quantitative Easing Policy*. Moving the main operational target from short-term interest rates to current account balances at the BOJ and supplying sufficient liquidity beyond the required reserves was a milestone in the history of central banking. This shift was accompanied by subsequent novel monetary easing policies that were pursued over the last 20 years. Ever since, the BOJ has become not only a pioneer in pursuing unconventional monetary policies, but also a reference point for other central banks. At this stage, it is difficult to judge the effectiveness and efficiency of the BOJ's policy tools, as achievement of inflation beyond the 2% price stability target since last year is clouded by doubts regarding its sustainability. This paper provides a detailed description of the BOJ's policy, especially under Haruhiko Kuroda's 10-year governorship.

Keywords: monetary policy, yield curve control, quantitative and qualitative monetary easing, negative interest rate policy, the Bank of Japan, central bank independence, inflation targeting

JEL Classification: E31, E52, E58

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1. INTRODUCTION

The end of Haruhiko Kuroda's 10-year term in office marks an important milestone in Japanese monetary policy. Under his governorship at the Bank of Japan (BOJ), Japan gradually moved away from deflation, and toward a path of achieving the 2% price stability target over the medium term. Kuroda was renowned for introducing quantitative and qualitative monetary easing (QQE) in the early days of his term, which began in 2013. In 2016, under his leadership, the BOJ introduced yield curve control (YCC) with simultaneous efforts to buy selected Japanese financial assets. The aim of reaching an inflation rate above 2% has been accomplished since April 2022. However, the factors behind current inflation pressures are external in nature, of which supply-side commodity price factors as well as the depreciation of the yen (reflecting the interest rate differentials with other major economies such as the United States), seem to be key. Both are, however, of an interim nature. Inflation is projected to decline moderately below 2% from the end of 2023 and in 2024. Moreover, there is a risk that, if the BOJ opts to withdraw from policies pursued during the Kuroda's tenure in the near future, the inflation rate may become well below 2% again. The likelihood of inflation returning to a level where it had been prior to Kuroda's arrival, namely in negative territory, however, may be lower. This is not because of expectations of higher domestic demand, but rather because of external or supply-side factors—including aging and serious labor shortages in Japan; rising production costs in People's Republic of China (PRC) and as a result of relocating production locations to Japan and other countries; higher inflation due to climate change, prevalence of infectious diseases in the world, the Russian invasion of Ukraine, etc.

An assessment of Kuroda's term at office must be preceded by a brief description of events prior to his arrival at the helm of the BOJ (see Appendix Table 1). This should help to understand how deeply the issue of low inflation in Japan has been rooted. Japanese policy makers spent almost two decades, the so-called “lost two decades,” addressing falling general prices prior to Kuroda's advent to power in the spring of 2013. Bubbles in real estate and stock prices emerged in the second half of 1980s in response to the BOJ's substantial policy rate cuts and maintenance of that level. Monetary easing was conducted to help pull Japan out of recession induced by the sharp appreciation of the yen that had been promoted jointly to reduce US trade deficits through foreign exchange intervention among G-5 countries under the 1985 Plaza Accord. The monetary easing decision was also supported by the United States to reduce Japan's trade surplus and by the Japanese government to generate domestic demand-driven economic growth.

As the real estate bubble reached an uncontrollable level, the BOJ's monetary policy stance suddenly shifted to monetary tightening by 1989, and it raised policy rates several times. Together with the introduction of the real estate tax to discourage transactions, monetary tightening led to the collapse of the bubble starting in 1990 and resulted in banking sector problems with large non-performing loans throughout the 1990s. Japan's economy went into a recession and became stagnant partly due to slow government response to the banking sector problems. Reflecting the bubble-burst episode and following global trends toward central banking operational independence, the BOJ achieved monetary policy independence in 1997 (which became effective in 1998) by revising the previous BOJ Act compiled during World War II. In an effort to maintain credibility gained under the new Act, the BoJ refrained from risky monetary easing experiments and resisted government pressure. The changing demographic structure of Japanese society made the BOJ's task even more difficult, as the needs of an ever-larger aging society differed substantially from those who were about to enter

the labor market. Last but not least, the so-called Great Moderation¹ in the global economy was a serious obstacle for Kuroda's predecessors.

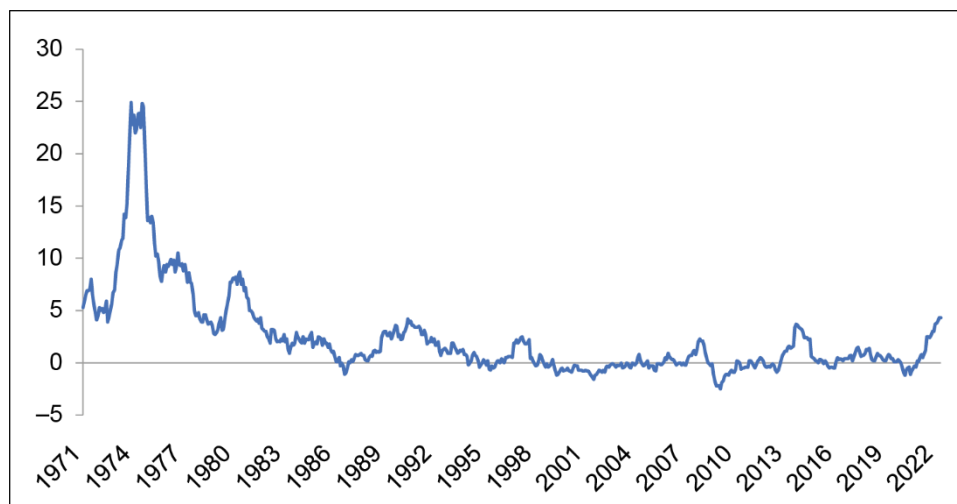
Therefore, Kuroda's arrival coincided with significant economic challenges. However, he also had a strong start. First, he enjoyed almost unlimited support of Prime Minister Shinzo Abe whose political party had just won a landslide victory in the 2012 general election. Moreover, both Abe and Kuroda were strongly determined to conquer deflation and generate domestic demand. Second, Kuroda could draw upon the valuable experience of his predecessors. Third, he inherited the economy and the banking system in far better shape compared to their state in the 1990s or even early 2000s. Finally, unlike in the case of his predecessors, the BOJ's policy to purchase financial assets under Kuroda's term was no longer a novelty as it was in the early 2000s led by the US Federal Reserve. This paper aims to assess the effectiveness of the BOJ's monetary policy measures under Kuroda's leadership and whether the aims of the central bank were achieved during his term. It consists of a detailed description of BOJ policies implemented during Kuroda's tenure, and their effectiveness in the wake of ever-changing global conditions.

2. THE CONDITIONS LEADING TO ENHANCED MONETARY EASING IN 2013

2.1 Economic and Financial Conditions in the 1990s

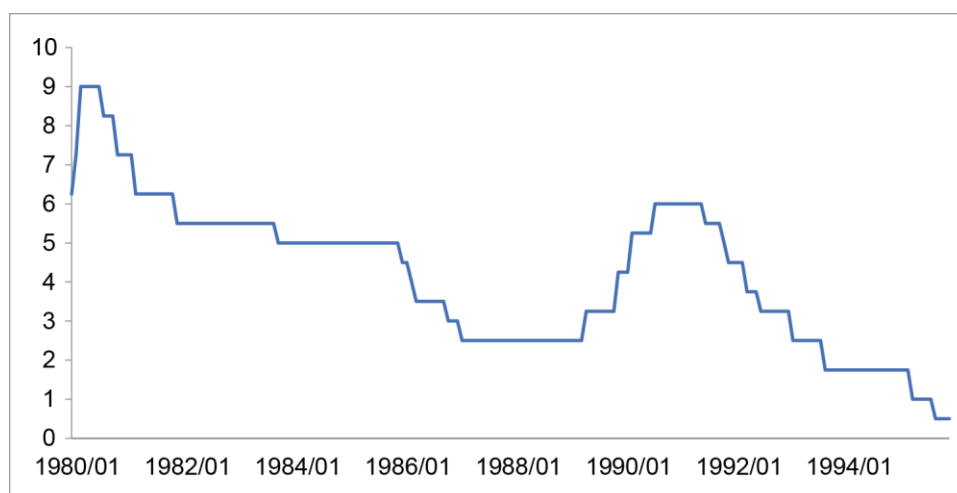
Early deflationary signs in Japan were detected as early as 1994. If the GDP deflator is used, inflation fell below 1.0% as early as 1992 and remained there. In 1993, all indices of price increases—measured on a monthly basis—pointed at inflation below 1.0%. In the wake of high growth in the late-1980s, the BOJ set in motion a tightening process that saw rates reaching 6.0% in August 1990 from a record low of 2.5% (see Appendix Table A1). The easing cycle began in July 1991, with the first out of nine cuts that took place in the 1990s. In September 1993, the BOJ entered uncharted territory as the official rate reached an all-time low of 1.75%. Two years later, in September 1995, interest rates were at an unprecedented level of 0.5%. However, a fall in interest rates from 6.0% to 0.5% proved to be insufficient. The domestic economy was becoming weaker and its fragile soundness was one of the key reasons behind the banking crises in the second half of 1990s. On 9 September 1998, the uncollateralized overnight call rate—the market-based policy rate adopted in 1995—was cut to 0.25%, and in the press announcement the BOJ expressed its readiness to provide ample funds should the need arise. Finally, in February 1999, interest rates reached levels close to 0%. Despite BOJ action, Japan was on the brink of the so-called “liquidity trap.”

¹ Great moderation generally refers to the period of low growth and low inflation commonly observed among industrial countries since the 1980s. Because of this, even inflationary pressures stemming from higher commodity prices were not strong enough to generate high headline inflation among these economies.

Figure 1: The Rate of Inflation Between March 1971 and 1995 (%)

Source: Prepared by the authors based on *Bloomberg* data.

The last decade of the 20th century is often regarded as the (first) lost decade for Japan, mainly because of slow and possibly inappropriate economic policies pursued during that time. The BOJ is often being perceived as one of the culprits of these unsatisfactory economic policies, which could (and) should have revitalized the domestic economy. Ben Bernanke in his famous 1999 paper described Japanese monetary policy as a case of self-induced paralysis (Bernanke 1999). This paper views that such an assessment is a bit too harsh, if not unfair.

Figure 2: The Basic Discount Rate and Basic Loan Rate (%)

Source: Prepared by the authors based on Bank of Japan data.

By the late-1990s, Japan was still in the middle of a complex economic and structural transition. The 1990s did not present an ideal environment to launch innovative monetary policy solutions to face both economic and financial challenges of the domestic economy. Both the collapse of the bubble and banking sector problems preceding it had a tremendous impact on the Japanese policy makers. Furthermore, it was a period where Japan continued to be bashed by its foreign competitors, the US in particular. Bergsten, Ito, and Noland wrote in their book that Japan had been the only

country toward which the US pursued explicit country-based policies (Bergsten, Ito, and Noland 2001). The Clinton administration even created a “Japan team” to deal with the then second-largest economy. The same authors believe that if in the 1970s and 1980s, US attention focused mainly on trade issues (either restricting sales of Japanese products in the US or exerting pressure to gain access for US products in Japan), in the 1990s, the US shifted its focus toward macroeconomic and monetary issues. If the yen’s appreciation seemed to be justified economically (such as due to growing inflation differentials between Japan and the United States), its further rise—at the time of Japan falling into a recession—was a mistake and was a result of US pressure.²

During the 1990s, Japan witnessed not only a sharp reduction of interest rates, but also an enormous transition at the BOJ, which helped it to transform from a rather unique (but obsolete) institution into one of the most innovative central banks in terms of the variety of monetary easing tools it used. In other words, one can argue whether or not the policies implemented in the 1990s were efficient, but without them, it would be simply impossible for the BOJ to play a pioneering role as far as operational policies (not to mention policies pursued under Kuroda’s stewardship) are concerned. That is why a brief review of policies implemented prior to the start of unconventional policies is needed. The aim of this review is to emphasize the already mentioned issue of excessive (and not always justified) criticism of the BOJ (coming mainly from abroad) and subsequent questioning of its wisdom.

Even at the time of the bubble’s burst, the BOJ was an institution whose action depended on what the government deemed important. Its policy kit was obsolete, still relying on so-called “Window Guidance,” a framework from the late-1950s. Window Guidance’s efficient implementation was only possible in a highly regulated market, detached from the liberalized international markets, by rather restrictive controls. Therefore, the need for an imminent change was greater than ever.

The process of modernizing the BOJ can be divided into the legal process and the monetary process. The legal process was confined to a single event of enormous importance. The BOJ gained independence in 1998 as a result of the Bank of Japan Act of 1997 promulgated on 18 June 1997 (which became effective in March 1998).

The monetary process was confined to the BOJ’s operational policies, which need to be reviewed in a more detailed manner. Efforts to reform the operational framework had begun in the late-1980s; however, the most crucial steps were not undertaken until the 1990s. Itoh, Morita, and Ohnuki (2020) offer a detailed and chronological assessment of monetary policy in Japan—or perhaps a silent revolution that took place in the area of operational policy.

It is sufficient to say that after several decades, Window Guidance was finally abolished in June 1991. As Fukumoto, Higashi, Inamura, and Kimura (2010) explain, Window Guidance was supposed to be an interim framework only employed during periods of monetary tightening. However, it became a permanent framework that was used even during periods of accommodative policies. Pursuing this particular framework was only possible in the environment of heavy market regulations. Amamiya (2019) points out that the efficiency of Window Guidance started to weaken once Japan launched its rather slow process of both deregulation and liberalization of its markets. The

² See press reports from 1993 *New York Times* articles.
<https://www.nytimes.com/1993/05/28/business/worldbusiness/IHT-tokyos-anger-at-us-bubbles-as-yen-rises.html> or <https://www.nytimes.com/1993/04/17/business/currency-markets-clinton-backs-stronger-yen-and-dollar-sinks-against-it.html>.

dismantling of Window Guidance was a milestone, but it was not until the mid-1990s, when all regulations on bank loans and deposits were lifted.

An accomplishment of the deregulation of money markets and interest rate liberalization in 1994 encouraged the BOJ to give up control of the official discount rate and to adopt a new market-based policy rate (uncollateralized overnight call rate). On 31 March 1995, a new framework was introduced, which consisted of guiding interest rates, namely throughout public statement releases (Itoh, Morita, and Onuki 2020). At the same time, the BOJ's market operations focused on enhancing the development of money markets. Among the various measures implemented, the purchase of different instruments must be mentioned, in which Treasury bills, government bonds, Certificates of Deposit, and Commercial Paper played a fundamental role. In September 1995, another guideline was adopted, according to which *“The Bank will maintain the money market interest rate (the uncollateralized overnight call rate) slightly below the discount rate on average.”* (Itoh, Morita, and Onuki 2020). From January 2001, the official discount rate was replaced formally by the “basic discount rate and basic loan rate”. However, the official discount rate). Even after 2001, the label of the official discount rate was still used under the monetary policy statement. The basic discount rate and basic loan rate was supposed to function as a lower bound on the uncollateralized overnight market rate.

A deep financial crisis that hit Japan in 1997 (failures of Sanyo Securities, Hokkaido Takushoku Bank, and Yamaichi Securities) was an incentive strong enough for the BOJ to launch market operations aimed to provide liquidity large enough to ensure smooth working of the interbank market. Going further, the BOJ in September 1998 eased its monetary stance with a subsequent reduction in the interest rates. As a result of this meeting, the BOJ encouraged the uncollateralized overnight call rate to move on average around 0.25%

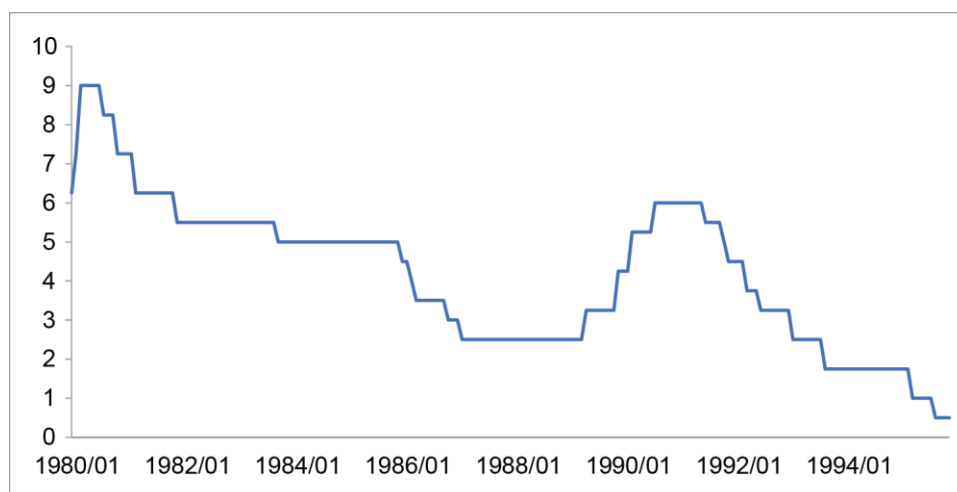
Despite an unprecedented effort to ease monetary policy in Japan, the foreign exchange markets did not react as expected. During the first period of sharp cuts in interest rates (from 1990 to 1995), the value of yen against the US dollar almost doubled. In April 1990, the exchange rate rose to ¥160 against the US dollar; 5 years later, it fell to ¥80. If this fall was to a large extent related to policies pursued in the US (especially during the first Clinton administration, which perceived a higher value of yen as a weapon in the trade war with Japan), this magnitude of appreciation neutralized the BOJ's expansionary efforts almost entirely. It was not until the period stretching from 1996 to early 1998, when a combination of the Asian crisis, the domestic banking crisis, and above all, a turnaround by the Clinton administration (as highlighted by US Treasury Secretary Robert Rubin's statement that a strong dollar is in the interest of the US), helped to reverse much of the yen's gains from the first half of the 1990s. By mid-1998, the yen's fall generated even coordinated interventions with the United States aimed to bring about an end to the depreciation of the Japanese currency (see Appendix Figure A1).

2.2 BOJ's Decision to Introduce the Zero Interest Rate Policy (ZIRP) in 1999

Under normal circumstances, a resumption of easing policies by the BOJ in 1998 should have helped the yen's exchange rate against the US dollar to remain relatively weak. However, this was not the case. Even Bernanke (1999) described the yen's external value in the 1990s as a sort of a puzzle. Regardless of Bernanke's doubts regarding the value of the yen, market events did not wait too long to test the BOJ's determination to ease its policies.

A combination of the Russian crisis in August 1998 and the collapse of Long Term Capital Management in the US a month later changed the sentiment among market investors. All of a sudden, safe-haven currencies started to enjoy unprecedented demand. Between 5–9 October 1998, the value of the US dollar against the Japanese currency (whose economy was in a deep recession) plunged more than 13% (with the dollar losing 9 yen in one day, namely 7 October—far more in percentage points than on the first trading day following the Plaza Accord in September 1985). Furthermore, at the turn of 1998 and 1999, Japan experienced a sharp increase in government bond yields. In October 1998, the JGB 10-year yield was less than 0.73%; by early-February 1999, it increased more than three-fold (to around 2.2%). In order to counter it, the BOJ opted on 12 February 1999 to implement the so-called Zero Interest Rate Policy (ZIRP). Kuttner (2014) explained that it was not all about pursuing a literally 0% rate. The BOJ was supposed to provide ample funds and encourage the uncollateralized overnight call rate to decline as much as possible. The statement from 12 February 1999 mentioned explicitly that it was all about guiding the uncollateralized overnight call rate to around 0.15%, and subsequently induce further declines in view of market developments. The subsequent statement issued on 25 February 1999 clarified that the BOJ will encourage the call rate to move as low as possible. ZIRP was conducted for almost 18 months from February 1999 to August 2000.

Figure 3: The Japanese Yen to US Dollar from Early 1989 to Early 1999



Source: Prepared by the authors based on Bloomberg data.

While the BOJ announced also its readiness to support economic recovery consistent with price stability, it is difficult to evaluate this period. Notwithstanding that the BOJ showed in its statements a determination to pursue new policies, its board members used to give speeches that sent some contradictory messages. Kuttner (2014) referred to a speech by Governor Masaru Hayami on 21 March 2000,³ where almost explicitly questioning the wisdom of combating deflation. Throughout this period, signs of a recovery in the corporate sector were perceived as strong enough incentives to raise rates. Hayami was also very critical of the inflation-targeting framework, which according to him was a recipe for inflation. Just one week before the end of ZIRP, Deputy Governor Yutaka Yamaguchi emphasized another important factor behind the

³ https://www2.boj.or.jp/archive/en/announcements/press/koen_2000/ko0003b.htm.

BOJ decision: the negative impact of low interest rates on pensioners.⁴ He said that the BOJ sympathizes with pensioners' situation, and noted that the elderly used to hold (at the turn of the century) a relatively large amount of financial assets (about half of the total financial assets of individuals used to be held by those aged 60 and above), whose earned incomes were rather modest. As a result, the elderly were the most seriously affected by the prolonged period of low interest rates.

Both the market and history criticized the BOJ severely for a premature termination of ZIRP. Long-term interest rates—after an initial increase—fell substantially in the aftermath of this hike, implying a further fall in inflation expectations. Even the Japanese government did not refrain from expressing fierce criticism of the BOJ decision (Itoh, Morita, and Ohnuki 2020). Orphanides (2004) compared this BOJ blunder to the Fed's disastrous decision to raise rates in 1937. For the BOJ, which gained independence only 3 years earlier, this mistake could cast a shadow on its reputation. It desperately needed to regain credibility. In August 2000, the BOJ terminated the ZIRP by raising the uncollateralized overnight call rate to on average around 0.25%.

2.3 The Quantitative Easing Policy (QEP): 2001–2006

In the wake of these circumstances, the BOJ opted to behave in a very pragmatic manner using some of the experience gained in the previous decade. It gave serious consideration to the Bernanke proposal, and opted to launch it in line with its own preferences, albeit cautiously. The result was a milestone in the history of both central banking and monetary policy: a new kind of framework, which came to be known as a set of “unconventional policies” in March 2001. Prior to the beginning of this new chapter in the BOJ's history, the Bank announced on three occasions (4 January, 13 February, and 1 March), a cut in its un the official discount rate, which was reduced from 0.75% to 0.5%, and further to 0.35%, and 0.25%, respectively.⁵ The third and the last cut in the official discount Rate took place 6 months after the launch of the Quantitative Easing Policy (QEP) on 18 September 2001, and the rate was set at 0.1%.

The world needed some time to digest the QEP. Initially, unconventional policies were perceived as being unique to Japan. However, in the aftermath of the Global Financial Crisis other major economies imported this framework—although their central banks increased asset purchases without explicitly targeting the current account balances at the central bank like the BOJ. Furthermore, in the recent pandemic, selected emerging economies chose to follow the policies Japan had implemented on 19 March 2001.

Unconventional monetary policy is a term that has undergone enormous transition over time. Nowadays, it can be defined relatively easily. For example, the Reserve Bank of Australia (RBA) defines unconventional policy as any policy that occurs when tools other than changing a policy interest rate are used. These tools include forward guidance, asset purchases, term funding facilities, adjustments to market operations,

⁴ https://www2.boj.or.jp/archive/en/announcements/press/koen_2000/ko0008a.htm.

⁵ There is some inconsistency in the BOJ source regarding the official discount rate. There are links claiming that official discount rate was used for the last time in September 1995 and it was subsequently replaced on 4 January 2001 by the basic discount rate and basic loan rate <https://www.boj.or.jp/en/statistics/boj/other/discount/discount.htm>. However, other sources from February 2001, March 2001, and even September 2001, still refer to ODR, https://www.boj.or.jp/en/mopo/mpmdeci/mpr_2001/k010209b.htm https://www.boj.or.jp/en/mopo/mpmdeci/mpr_2001/k010228a.htm, and https://www.boj.or.jp/en/mopo/mpmdeci/mpr_2001/k010918.htm.

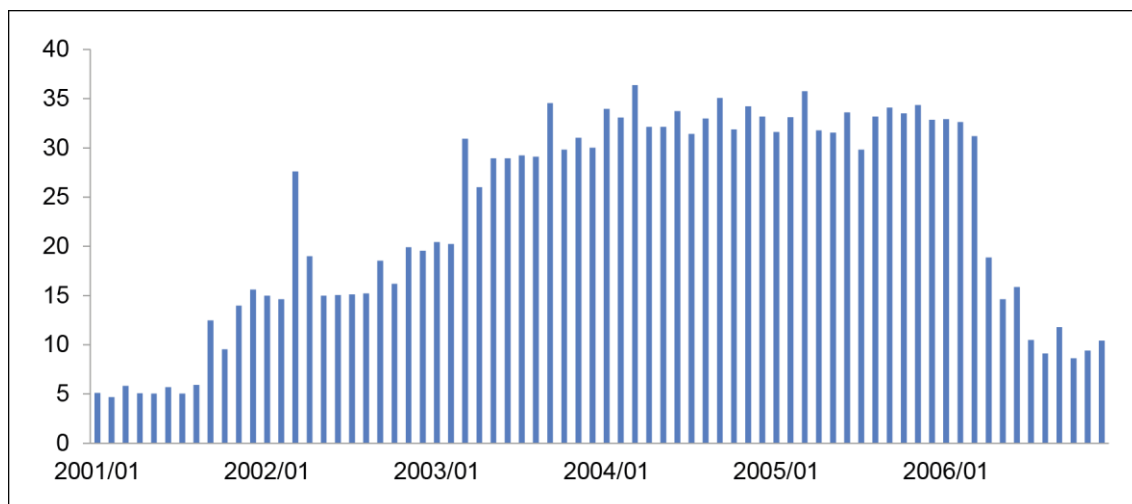
and negative interest rates.⁶ The BIS (2019) shares a similar view and refers to monetary policy as unconventional measures targeted at something other than short-term interest rates. According to the same definition, some measures were designed to affect term spreads (or, equivalently, long-term risk-free rates), while others were directed at influencing liquidity and credit spreads (or, equivalently, interest rates on various non-risk-free instruments). Sticking further to the BIS definition, some authors argue that unconventional measures must focus on variables other than the short-term interest rate. As an example of such variables, they point at term spreads (or, equivalently, long-term risk-free rates); liquidity and credit spreads (or, equivalently, interest rates on various non-risk-free instruments), and financial stability for the sake of supporting the monetary policy transmission mechanism (Bindseil 2016). With these tools, central banks became intermediaries for a broader range of financial activities.⁷ They stepped in to fill the gap created by the receding activity of private sector participants, thereby also affecting participants' incentives. Smaghi stated that unconventional tools include a broad range of measures aimed at easing financing conditions (Smaghi 2009). According to him, these may range from providing additional central bank liquidity to banks to directly targeting liquidity shortages and credit spreads in certain market segments. Policy makers then must select measures that best suit those objectives. Cúrdia and Woodford (2010) adopted a narrower definition and perceived it as a shift from short-term interest rates to the monetary base. No matter how unconventionally monetary policy is defined, it is impossible to refer to these policies without mentioning the BOJ and its action taken in March 2001, the day it started its first quantitative easing, called the Quantitative Easing Policy (QEP). QEP, which was supposed to reinforce ZIRP, stretched from March 2001 and March 2006 (Westelius 2020). This is why it is also known under a combination of two acronyms (ZIRP+QEP).

As for the main definitions reviewed above, the initial BOJ action seemed to fit the definition described by Cúrdia and Woodford (2010). To be more precise, the BOJ substituted its short-term policy rate with the amount outstanding of its current account as an operational target. Maeda, Fujiwara, Mineshima, and Taniguchi (2005) argue that the new target had been revised upward on several occasions and claimed that as the target level had far exceeded the level of required reserves, the adoption of the quantitative easing policy implied that the BOJ had to provide additional funds to financial institutions that did not have an incentive to hold a large amount of excess reserves. Shirai (2018) described this policy as reserve targeting since the operation target was switched from the uncollateralized overnight call rate to the outstanding balance of current accounts at the BOJ. The target was set initially at ¥5 trillion and surpassed by ¥1 trillion the level of required reserves. After nine upward adjustments, the target reached a range spreading from ¥30 trillion to ¥35 trillion.

To encourage financial institutions to hold their funds at the BOJ current account, the central bank began purchasing different kinds of assets including bills received from banks, Treasury bills, and Japanese government bonds at the short end of the curve (Shirai 2018) and (Kuttner 2014). According to Kuttner (2014), the average maturity of JGBs in the BOJ portfolio fell in 2005 from 6 years to less than 4 years. The scope of purchased assets was extended throughout the entire process.

⁶ <https://www.rba.gov.au/education/resources/explainers/unconventional-monetary-policy.html>.

⁷ <https://www.bis.org/publ/cgfs63.pdf>.

Figure 4: The BOJ Current Account Balance During 2001–2006 (¥ trillion)

Source: Prepared by the authors based on BOJ data.

Separately from the QEP, the BOJ began purchasing equities directly from banks from November 2002 until September 2004 to stabilize the financial system—not as a monetary easing tool. The purchase of equities rated BBB – or higher was made to mitigate market risk associated with banks’ holdings of stocks and thus expedite the disposal of non-performing loans (Shirai 2020). The total amount of stock purchase amounted to about ¥2 trillion.

The QEP, apart from targeting the level of BOJ current account and purchase of different classes of assets, also consisted of forward guidance, even if this term was not coined at that time. Both Shirai (2018) and Nakaso (2017) referred to the April 1999 press conference when Governor Hayami made an explicit commitment according to which ZIRP would be continued “until deflationary concern is dispelled.” The statement issued on 19 March 2001 stressed that monetary easing would continue until the core CPI registers stably 0% or an increase year over year. This was state-contingent guidance, linked to the continuation of the quantitative easing policy. Nakaso (2017) is convinced that the policy was based on the same idea as what was later called forward guidance, in that it enhances the impact of monetary easing by guiding the future policy path.

The QEP introduced in 2001 was implemented in a gradual manner. There were neither measures aimed to exert any influence nor reduce the spreads at the long end of the curve (Kuttner 2014). One more issue needs to be borne in mind. The QEP was accompanied (but not related) by large volumes of FX interventions conducted by the BOJ on behalf of the Ministry of Finance (MoF) through issuance of 3-month financing bills to the market, aiming at debilitating the value of the yen. FX intervention at the time of QEP reached levels above ¥40 trillion (see Appendix Figure A1). However, contrary to a popular belief according to which the funds coming to the BOJ’s current account came from FX interventions,⁸ the series of transactions related to the yen selling had a neutral effect on the current account and the BOJ’s market operations. The reason behind this false belief was the fact that the MoF used some private financial institutions as intermediaries throughout the process of settling these interventions. These financial institutions opted to deposit funds (received from the MoF) in the BOJ current account. However, the MoF was quick to issue financial

⁸ <https://www.ecb.europa.eu/events/pdf/conferences/mpimp/maeda.pdf> (pp. 12–13).

securities (namely bills) aimed to absorb these funds. That is why, if there were any increases in the BOJ current account balance following FX interventions, they were short and interim in nature. As a result of the issuance of bills by the MoF, the overall effect of FX interventions was neutral and hence could not be considered a factor in achieving a higher level of the BOJ current account.

Regardless of the impact of the FX interventions on the BOJ current account, Japan offered a unique combination of simultaneous QEP and FX interventions. Obviously, there were countries that relied on FX interventions to pursue unconventional policies, namely Switzerland and Denmark. However, the experience of these countries differed from Japan's experience during its QEP. Both Switzerland and Denmark relied on negative interest rates. Even if Denmark tried to exert influence on the price of its bonds—at the time of pursuing negative interest rates and FX interventions—it did not do so through a purchase of bonds, but rather through a suspension of issuance of bonds from January 2015 to October 2015 (Jensen, Mikkelsen, and Spange 2017). The final effect was almost identical to a purchase of bonds, but it reflected structural differences between Denmark (very low public debt) and Japan (high public debt).

The QEP came to an end exactly 5 years after its inception in March 2006. At the same time, a decision was announced to reintroduce the standard uncollateralized overnight call rate as a policy target for market operations instead of the outstanding balance of current accounts at the BOJ. The proposal was almost unanimously approved with only one board member (out of eight) dissenting. The new target for the uncollateralized overnight call rate was set at effectively 0% (Shirai 2018).

At the March 2006 Monetary Policy Meeting, the BOJ adopted a new framework for the conduct of monetary policy by introducing a longer-run inflation outlook—the so-called “understanding of medium- to long-term price stability.” This is the level of the CPI inflation rate recognized as price stability by each member of the Policy Board of the BOJ. An agreement was reached among board members that the inflation rate would remain approximately between zero and 2.0%, with the median of 1.0%. It was also agreed that the rate would be reviewed annually (Shirai 2018). This agreement was not an announcement of a single-digit inflation target yet (for which Japan had to wait almost further 7 years until January 2013).

The move away from quantitative easing contributed to a decline in the value of the current account by about two-thirds. However, the QEP cannot be described as a complete failure, especially when we look at economic indicators other than inflation. Attention should be paid primarily to economic growth. After bottoming out in Q1 2003, the domestic economy started to grow almost in an uninterrupted manner until Q2 2007.⁹ Between 2004 and 2007 alone, economic growth amounted to almost 2.0% on average. When it comes to inflation, achievements of the first QEP in boosting it were far more modest. Inflation in the period under review oscillated around 0% (Kuttner 2014). This had to be a disappointing result, as the policies pursued in the period under review coincided with a massive increase in commodity prices and a depreciating yen

⁹ Depending on the way GDP is calculated, there was a least one quarter of negative growth, namely the third quarter of 2006. However, this fall did not undermine the fact that from the end of the first quarter of 2003 to the end of the second quarter of 2007, nominal GDP grew from ¥5,21,346 billion (the lowest nominal GDP level since mid-1995) to ¥5,42,279 billion. The QEP finished in March 2006, but its effects were felt for at least a few more quarters. That is why, this paper extends the analysis beyond the first quarter of 2006. Source: <https://dashboard.e-stat.go.jp/en/graph?screenCode=00140>.

(which started to weaken as a result of the ever more profitable carry trade).¹⁰ On the other hand, this was also a period when the so-called “Great Moderation” was gaining momentum and thriving many industrialized countries. Great Moderation generally refers to the period of low growth and low inflation commonly observed among industrial countries since the 1980s. Because of this, even inflationary pressures stemming from higher commodity prices were not strong enough to generate high headline inflation among these economies.

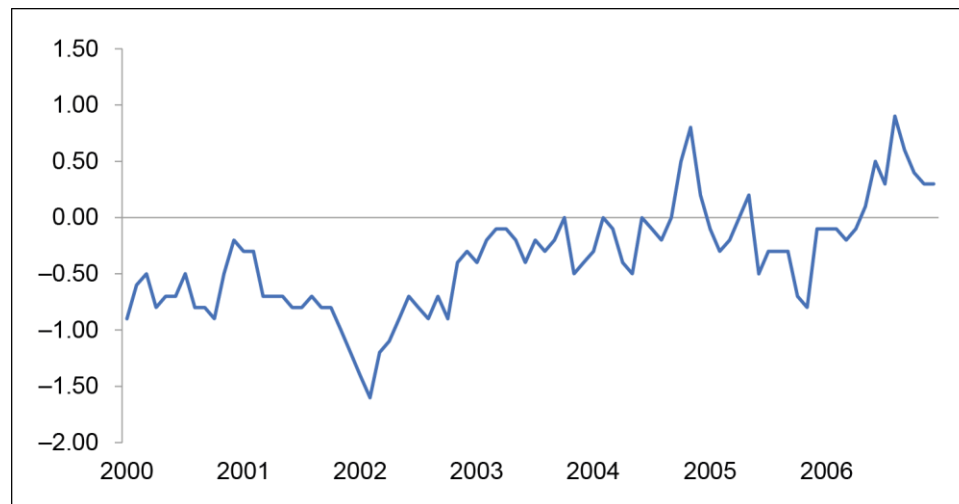
As this paper refers often to the concept of Great Moderation, it makes sense to take a closer look at it. The term itself was coined by James H. Stock of Harvard University and Mark W. Watson of Princeton University. In their famous paper, *Has the Business Cycle Changed? Evidence and Explanations*,¹¹ they refer to a significant reduction in the volatility of economic activity. But it was not until Ben Bernanke started to refer to this notion on a regular basis, that its popularity started to spread all over the world. It is interesting that Bernanke in his speech on 20 February 2004¹² referred to the article by Olivier Blanchard and John Simon which noted that the variability of quarterly growth in real output (as measured by its standard deviation) had declined by half since the mid-1980s, while the variability of quarterly inflation had declined by about two-thirds. Bernanke attributed the Great Moderation to structural reforms, improved macroeconomic policies, and good luck. Throughout the Great Moderation, some inflationary factors (like commodity prices) quite often displayed upward tendencies. If the oil price in the period stretching from 1986 to 1998 hovered on average at a rather low level of around \$17 per barrel, in the following years (from 1999 to mid-2008), it rose from approximately \$10 per barrel to almost \$150 per barrel. Such a sharp rise hardly affected inflation around the globe. Bernanke attributed this phenomenon to low-inflation environment, stable inflation expectations, and a general perception that firms did not have enough pricing power to translate higher commodities into higher inflation. There are some discrepancies regarding the end of the Great Moderation. The Federal Reserve’s History section points at 2007 as the final year of the Great Moderation. However, in the same section it is admitted that the Great Moderation was merely interrupted by the Great Recession and continued afterward (Hakkio 2013). In the 2010s, the Great Moderation was often used to describe a continuous period of low inflation. It was not until the outbreak of two crises (the COVID-19 pandemic and the Russian invasion in Ukraine) that this phenomenon came to an end in 2022 (Roubini 2022).

The aforementioned increase in energy prices and higher utility prices led to an achievement of 0% core inflation in October 2005 and positive numbers in the following months. These favorable price developments led the BOJ to terminate the QEP and tighten monetary policy. From the end of June 2006 to the beginning of May 2007, the uncollateralized overnight call rate was raised from 0% to 0.5%. The current account continued to shrink further and by January 2007 it fell to approximately ¥7.5 trillion before recovering somewhat, and hovered below ¥10 trillion until the outbreak of the Great Financial Crisis (GFC).

¹⁰ Carry trade refers to an FX strategy, which consists of borrowing in a low interest rate currency and investing the funds in a currency bearing higher interest rates. At the time of QEP, the currency of choice for investors was the New Zealand dollar. Still, the carry trade was not confined to the NZ dollar, but included other currencies as well (such as the US dollar).

¹¹ https://www.princeton.edu/~mwatson/papers/jh_2.pdf.

¹² <https://www.federalreserve.gov/boarddocs/speeches/2004/20040220/#fn1>.

Figure 5: The Rate of Change in CPI in Japan in 2000–2006 (%)

Source: Prepared by the authors based on Bloomberg data.

2.4 The Great Financial Crisis (GFC): An Exogenous Affair

To understand the impact of the GFC on a subsequent reaction of the BOJ aimed to counter this crisis, we present a brief description of the features of the Japanese financial system.

First, the roots of the GFC should be sought in the Western Hemisphere (namely the US) rather than the eastern one. In other words, this crisis was a completely different one from the crisis that hit Japan in the 1990s (which was mainly of an internal nature). This feature is well documented, not only in Japanese research (to be discussed later), but in foreign literature as well (Vollmer and Bebenroth 2012).

Second, Japan was very slow in countering its financial (and banking) crisis in the 1990s. On its way to resolve the crisis, serious mistakes were made that had a detrimental impact on the economy. Many aspects of this crisis could (and should) have been addressed in a better way. Nevertheless, reforms were implemented and financial institutions drew lessons from the crisis, and subsequently fared much better than their European and US peers. These conclusions are echoed in Sato (2019) and Nakaso (2016).

Third, despite having a financial system in better shape compared with that of the United States, due to Japan's ever-rising external trade dependence, the country could not remain immune to GFC. This aspect is strongly emphasized by Kawai and Takagi (2009). Similar conclusions can be drawn from research conducted at the IMF by Sommer (2009).

Fourth, after being a pioneer in implementing QEP, the BOJ most probably was well aware of its constraints. And being in a totally different position compared to the main casualties (who became frontrunners in pursuing unconventional policies) of GFC, the BOJ needed more time to design a suitable response to the needs of the domestic economy, where the relatively stable financial sector stood in stark contrast to the adversely affected real sector.

The BOJ's initial response was to reverse the earlier rate increases. In October 2008, the policy rate was cut 0.3% and two months later to 0.1%. The turn of 2008 and 2009 saw the launch of several lending facilities, which had hardly any major and sustainable effect on the credit action. A rather modest reaction from the BOJ only encouraged foreigners to invest in yen assets. The carry trade which used to prevail prior to the GFC was substituted by a RO–RO (Risk on–Risk off) trade, with the latter being a dominant strategy. The yen seemed to be a currency of choice of ever more concerned investors. An announcement of the second round QE¹³—called the second round of large-scale asset purchases (LSAPs)—in August 2010 (and launched in November 2010) by the Fed, brought about another selloff in the US dollar. This led to appreciation of the yen against the US dollar to the level not recorded since spring 1995. On 15 September 2010, therefore, the MoF with an intermediation through the BOJ, decided to intervene in the foreign exchange market for the first time in 6 years by purchasing foreign currencies.

2.5 Launch of the Comprehensive Monetary Easing (CME)

It was a launch in October 2010 of a new program under the name of Comprehensive Monetary Easing (CME), which set a new chapter in the BOJ history operational monetary policy.

Among measures within the CME, the uncollateralized overnight call rate was lowered further to a range of 0%–0.1%. Another important element of the CME was the asset purchase program. The scope of assets covered by this program was more extensive than under the previous QEP pursued from March 2001 to March 2006. Apart from JGBs and T-Bills, it also embraced commercial paper, corporate bonds, (stock) exchange traded funds (ETFs), and Japanese Real Estate Investment Trusts (J-REITs). The remaining maturity of JGBs to be purchased was initially at up to 2 years. In April 2012 it was raised to up to 3 years.

At the very beginning of the CME, the total planned maximum outstanding amount of assets to be purchased (sort of a reference point) was ¥35 trillion, which was the highest level of the last binding range for QEP set in its late stages. The target was lifted on eight occasions before it reached (as a result of the nine adjustments) ¥111 trillion in January 2013. Thereafter, the amount was supposed to be binding until the end of 2014.

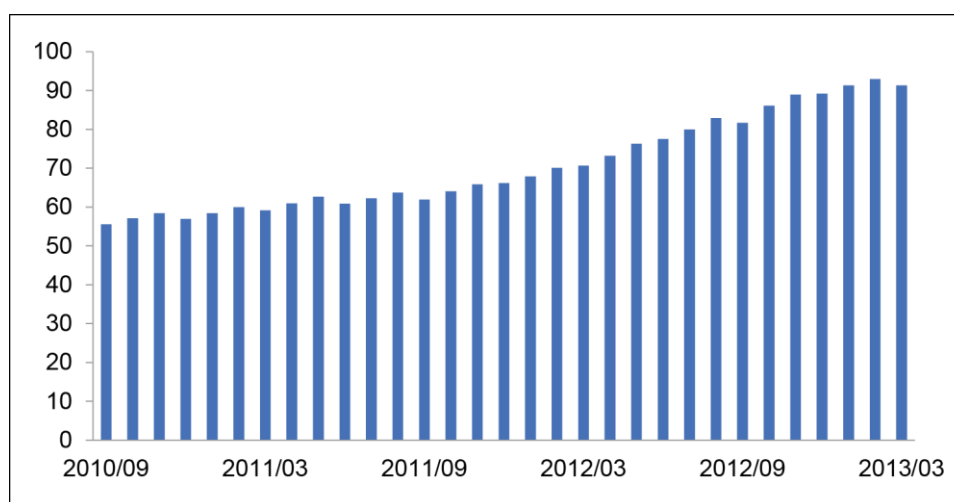
From the early days of the CME inception, the amount of purchased assets lagged significantly below the maximum amount of assets (or a reference point). Only until mid-2011, the amount of assets purchased was rather close to the level determined by the maximum amount of assets. And by the turn of 2012 and 2013, the amount of purchased assets was below two-thirds of the maximum amount of assets (a reference point).

The CME is again being perceived by market participants and experts as a program implemented without enough vigor. Between October 2010 and March 2013, the amount of JGBs rose by approximately 60% (from around ¥55.5 trillion to a bit more than ¥91.3 trillion). The average yield of bonds with maturities spreading from 1-year to 3-year fell from almost 0.14% in the final days of September 2010 to slightly above 0.05% in March 2013. 10-year bond yields (which were not targeted within CME), recorded a slightly less pronounced fall, from around 0.94% to around 0.55% (with much of this fall materializing in the final month, most probably as a result of

¹³ <https://www.newyorkfed.org/markets/programs-archive/large-scale-asset-purchases>.

speculation regarding a shift in the policies). However, while comparing an increase in the balance sheets of the BOJ and the Fed, the analysis does not point to a lack of vigor. While the BOJ balance sheet during the period under review rose approximately 37%, the Fed's balance sheet increased by slightly more than 39%. This shows that there was no significant difference in terms of the rate of balance sheet expansion between the two central banks.

Figure 6: The BOJ's Holdings of JGBs During the CME (¥ trillion)



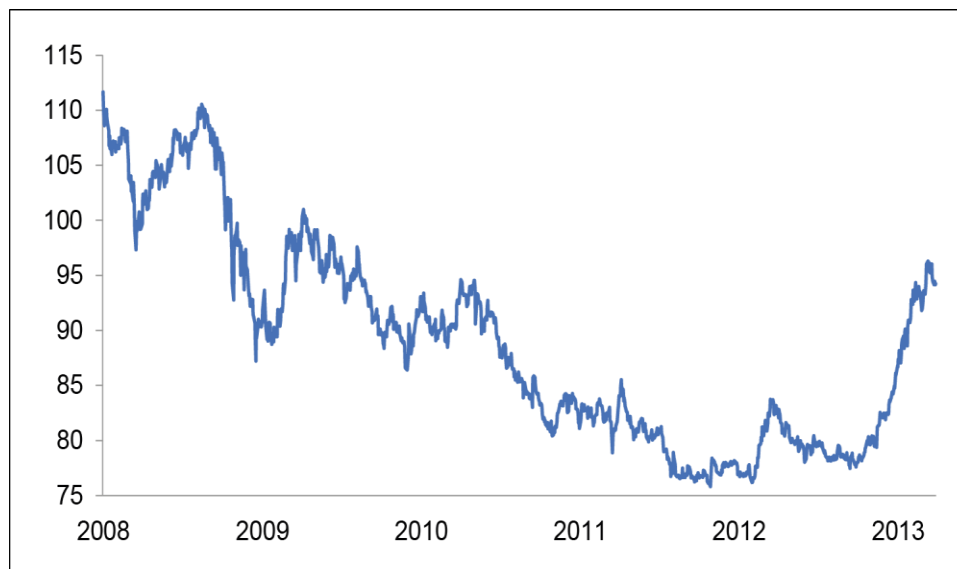
Source: Prepared by the authors based on BOJ data.

The CME efficiency appeared to be overshadowed by various external shocks. During its lifespan, several financial tensions had stemmed from the eruption of the euro area's sovereign crisis, the ratings downgrade of US Treasury securities (as a result of which the world's largest economy lost its AAA rating in August 2011), etc. But there was one important domestic shock on 11 March 2011, i.e., the Great East Japanese Earthquake. This natural disaster generated the first in almost 13 years coordinated FX intervention among G-7 economies in March 2011 aimed at reversing an excessive appreciation of the yen. The last coordination took place in September 2000 when the G-7 economies performed coordinated intervention in the foreign exchange market to prevent the depreciation of the euro.

Ben Bernanke pointed out that a nominal appreciation of the yen in a recessionary environment was a bizarre phenomenon (Bernanke 1999). While in the first decade of the 21st century the value of the yen against the US dollar had somewhat stabilized (in a range of around ¥90 to ¥130 compared with a range of ¥80 to ¥160 in the 1990s), the start of the second decade saw a sharp resumption of the appreciation trend of the yen. October 2010 saw the US dollar falling close to all-time lows recorded in April 1995. This record was ironically broken in the aftermath of the Great East Japan Earthquake and the ensuing economic slowdown. Subsequent coordinated FX interventions in March 2011 prevented further yen appreciation for a while. However, in the second half of 2011, escalation of the sovereign crisis in the euro area (and uncertainty in the market amid the ratings downgrade of US Treasury securities as well as uncertainties regarding the US economy and associated continuation of the expansionary Fed policy without an end in sight) increased demand for safe-haven currencies including the yen and the Swiss franc. With Switzerland involved in keeping a lid on the Swiss franc (by introducing in September 2011 an asymmetrical band for its currency as a result of which, the Swiss franc could not appreciate beyond

EUR/CHF1.20), there was no alternative action in Japan to mitigate the yen's safe-haven status.

Figure 7: USD/JPY Exchange Rate During 2008–2013



Source: Prepared by the authors based on BOJ data.

The Japanese MoF started to intervene in the early autumn of 2010, but it was the autumn 2011 when the purchase of US dollar reached unprecedented levels. On 31 October 2011 alone the Japanese monetary authorities bought US currency worth around ¥8.1 trillion (see Appendix Figure A1).¹⁴ And in Q4 2011, MoF bought almost ¥9.1 trillion. Only Q1 2004 saw higher interventions (¥14.8 trillion, but with no single intervention even approaching the level recorded on 31 October 2011). Despite heavy intervention, the yen continued to appreciate. In early 2012 it fell again to a level close to USD/JPY76. This was not an environment to fight deflationary pressures in the domestic economy. But it was in the final months of the same year, when a breakthrough in Japanese economic policy occurred. On 16 November 2012, Prime Minister Yoshihiko Noda announced the dissolution of the Lower House of Parliament; paving the way for general elections on 16 December 2012. The Liberal Democratic Party won. As a result, Shinzo Abe, became the first Prime Minister to return to office since Shigeru Yoshida in 1948.¹⁵ Abe was the longest serving Prime Minister in the history of Japan. If his first term in office was short and rather uneventful, the second one marked a real breakthrough for the world's third-largest economy. And in November 2012, the BOJ's balance sheet reached an all-time high of ¥156.4 trillion, surpassing the level of ¥155.6 trillion set in December 2005 during QEP. Reaching this all-time high was most probably a pure coincidence and had nothing to do with Abe's re-emergence on the political stage. However, this coincidence was of a symbolic nature. It heralded the beginning of the BOJ's journey into the uncharted territories.

¹⁴ https://www.mof.go.jp/english/policy/international_policy/reference/feio/monthly/index.html.

¹⁵ https://en.wikipedia.org/wiki/Shinzo_Abe.

3. THE COMMENCEMENT OF UNPRECEDENT MONETARY EASING UNDER KURODA AND THE TEN YEARS AFTER

3.1 Shinzo Abe, His Three Arrows, and the Advent of Haruhiko Kuroda

Shinzo Abe was sworn in as Prime Minister on 26 December 2012. Shortly afterward, he announced his economic agenda, known as “the three arrows,” where each arrow represented an item of his economic policy. The first arrow represented monetary easing policy, the second represented flexible fiscal policy, and the third arrow was meant to depict growth strategy and structural reforms. For obvious reasons, this paper will focus on the first arrow.

2012 was an important year from the point of view of defining monetary policy objectives, as both the Fed and the BOJ adopted the 2% inflation target (although the BOJ’s approach was rather vague at this stage since it was not single-digit 2% inflation target). As a result, these two central banks joined the group of central banks pursuing a monetary framework, known broadly as inflation targeting. This framework was first applied in New Zealand at the turn of 1989 and 1990. But it was not until the UK opted for this framework in October 1992, following the country’s exit from the Exchange Rate Mechanism, which was part of the then European Monetary System. Following the UK’s successful experience with inflation targeting (as well as earlier positive experiences recorded by Canada, Australia, and New Zealand), inflation targeting started to spread around the globe. Still, the three largest central banks refrained from this framework for quite some time.¹⁶

The European Central Bank (ECB) was the first to give up partially its reticence toward inflation targeting. At the time of its inception in June 1998, the ECB opted for a hybrid solution, which consisted of a mixture of a reference value for the growth of a broad monetary aggregate and a broadly based assessment of the outlook for future price developments, and the risks to price stability in the euro area as a whole were described in the ECB Monthly Bulletin.¹⁷ It was not until May 2003, when the medium-term target for inflation was redefined to a value “below but close to 2%.”¹⁸ Back then, the ECB refrained from using in its official parlance the term inflation target and preferred to refer to its mandate laid down in the Treaty on the Functioning of the European Union, Article 127.¹⁹ Even after introducing the symmetrical inflation target in 2021, the ECB still prefers not to use the word “target.” According to the ECB website, the Governing Council considers that price stability is best maintained by aiming for 2% inflation over the medium term.²⁰

¹⁶ <https://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp742.pdf> p. 22.

¹⁷ “The strategy consists of three main elements: (i) a quantitative definition of the primary objective of the single monetary policy, namely price stability and the “two pillars” of the strategy used to achieve this objective; (ii) a prominent role for money, as signaled by the announcement of a reference value for the growth of a broad monetary aggregate; and (iii) a broadly based assessment of the outlook for future price developments and the risks to price stability in the euro area as a whole.” See: <https://www.ecb.europa.eu/pub/pdf/mobu/mb199901en.pdf>.

¹⁸ <https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180504.en.html>.

¹⁹ https://ireland.representation.ec.europa.eu/about-us/introduction-eu-ireland-european-commission_en.

²⁰ Op.cit.

It was not until 2012, when the remaining large central banks started to shift toward a framework resembling an inflation target. The US Fed has pursued a three-pillar strategy since November 1977,²¹ where each pillar represented inflation, employment, and long-term interest rates. But it was not until January 2012, when the Fed said that the Committee judged that inflation at 2%, as measured by the annual change in the price index for personal consumption expenditures, was most consistent over the longer run with the Federal Reserve's statutory mandate. From then on, a pre-determined level was referred to as the inflation goal.²²

Finally in February 2012, it was the BOJ that introduced its own version of an inflation-targeting framework by adopting the price stability goal. In its minutes from the 13–14 February 2012 meeting, the BOJ judged “the price stability goal in the medium to long term” to be within a positive range of 2% or lower in terms of the year-on-year rate of change in the CPI and, more specifically, set a goal at 1% for the time being.”²³ Prior to the February 2012 decision, the BOJ had been extensively criticized because the previous framework of “understanding of medium- to long-term price stability” was not a common price stability target adopted by the policy board members. It was merely to describe a range of inflation rates that each board member understood as price stability from a medium- to long-term viewpoint. Despite the improvement, the price stability goal remained ambiguous since it was not clear whether the BOJ was seeking a 1% or 2% inflation target.

That is why in January 2013, a significant amendment was made under the new government led by Prime Minister Shinzo Abe. In the minutes from the Monetary Policy Meeting held on 21 and 22 January 2013, it was noted that “*Based on this recognition, the Bank sets the price stability target at 2% in terms of the year-on-year rate of change in the consumer price index (CPI).*”²⁴ Shortly afterward, in February 2013, the Prime Minister nominated Haruhiko Kuroda as his candidate for the Governor of BOJ. On 20 March 2013, Haruhiko Kuroda (who until 18 March was the President of the Asian Development Bank) became the 31st BOJ Governor, succeeding Masaaki Shirakawa. The newly appointed governor did not wait too long to launch a new chapter in the history of Japanese monetary policy.

3.2 BOJ's Substantial Monetary Policy Shift During Kuroda's Governorship

It is not easy to evaluate BOJ policies during Haruhiko Kuroda's governorship at this stage since he just ended his term on 8 April 2023. His tenure is likely to be remembered as the period during which greater efforts to generate more monetary easing impetus to pursue the BOJ's aim to eliminate deflationary threat were made. With the benefit of hindsight, it can be said that being so concerned with an absence of inflation in the domestic economy, his term ended with inflation above the 2% level, which was very important to him, but he himself admits that this is unlikely to be sustainable. At the start of Kuroda's governorship in 2013, deflationary pressures were gathering pace in Japan, but to some extent in industrial economies as well. At the end of his term in early 2023, the global economy had been facing the largest inflation threat in the last 50 years. Two crises in less than 3 years were enough to derail long-

²¹ <https://www.federalreservehistory.org/essays/fed-reform-act-of-1977>.

²² [Federal Reserve Board - Federal Reserve issues FOMC statement of longer-run goals and policy strategy](#).

²³ https://www.boj.or.jp/en/mopo/mpmsche_minu/minu_2012/g120214.pdf.

²⁴ https://www.boj.or.jp/en/mopo/mpmsche_minu/minu_2013/g130122.pdf.

lasting achievements of the Great Moderation. Under these circumstances, it is not surprising to see that inflation in Japan has also exceeded the 2% price stability target. The only question is whether the high inflation levels recorded since April 2022 will start to rise again once the current factors contributing to higher inflation including commodity price hikes and depreciation of the yen likely attenuate in the near future. The BOJ hopes that inflation will pick up again in the future based on the virtuous cycle driven by higher wage growth, employment growth, sustainable corporate profit increase, positive output gap, strong and sustainable underlying inflation, and higher long-term inflation expectations. There are concerns that inflation based on the virtuous cycle may not materialize soon once the temporary supply-side driven inflation pressures ease.

This paper is unable to answer the aforementioned question yet. The BOJ under the new governor, Kazuo Ueda just announced a plan to perform a broad review of monetary policy over 25 years within 1–1.5 years at the 28 April 2023 monetary policy meeting. There were plenty of measures applied ranging from a purchase of diverse assets, various forms of forward guidance, and yield curve control, to the sophisticated lending scheme aimed at mitigating the COVID-19 pandemic-driven crisis. In the period under review, the BOJ also joined a group of countries to resort to nominal negative interest rates. If, at a certain point of time, there were at least six other central banks using different versions of the so-called negative interest rate policy (NIRP), as of April 2023, Japan remains the only country to employ this particular monetary easing tool. The BOJ has been the only country to apply a hybrid of three separate frameworks: purchases of various assets, Negative Interest Rate Policy (NIRP), and Yield Curve Control (YCC). This is a unique hybrid among major central banks that opted to use unconventional monetary policies.

This paper presents a review of BOJ's monetary policy tools and effectiveness, especially under Kuroda's governorship in chronological order (see Appendix Table A1). Some key criteria including inflation and real GDP growth were compared with other major economies (and the US Fed in particular). Even though the real GDP variable is not part of the BOJ's direct mandate, it gained in importance following the Shinzo Abe declaration in his third year in office to set a goal for the nominal GDP. In September 2015 a new document was submitted where a nominal GDP goal of ¥600 trillion for the year 2020²⁵ had been set. An expansionary monetary policy was one of Abe's three arrows with the help of which, the late Abe wanted to reach his economic policy goals, namely revive the Japanese economy from 2 decades of deflation, all while maintaining fiscal discipline. This program became known as "Abenomics."²⁶

Prior to the start of our analysis one issue regarding the notion of two decades of deflation needs to be clarified. In April 2016, at Columbia University in New York, Kuroda offered a brief description of deflation in Japan. According to him, Japan's consumer prices only fell by 4.1% in total in the 15 years from fiscal 1998 to fiscal 2012, which is equivalent to an annual average rate of only 0.3%. Thus, while deflation was much milder than it had often been assumed, it lasted for a decade and a half. That is why Kuroda proposed in his speech to distinguish the aforementioned Japanese deflation from the one recorded in the 1930s. According to Kuroda, chronic diseases tend to cause relatively little pain to patients, but for that reason they can be "silent killers" that quietly ruin the entire body. A relatively mild but prolonged deflation in Japan was dangerous because it discouraged both Japanese firms and households

²⁵ https://www.japan.go.jp/abenomics/userdata/abenomics/pdf/170508_abenomics.pdf.

²⁶ <https://www.japan.go.jp/abenomics/index.html>.

from spending as households postponed consumption until prices dropped lower and companies cut wages and accumulated cash at their bank deposits without expanding capital and R&D spending by taking risks. It also hampered the efficiency of monetary policy (because of ever higher real interest rates). In the wake of these remarks, it was clear the task of combating deflation became of paramount importance for the newly appointed BOJ governor.

3.3 Quantitative and Qualitative Monetary Easing (QQE) Launched in April 2013

As already mentioned, Quantitative and Qualitative Monetary Easing (QQE) consisted of a shift of the operational target from the short-term interest rate toward the monetary base. This definition had enjoyed such popularity that many observers started to use quantitative easing interchangeably with unconventional monetary policies. A more complex story is related to qualitative easing. Its earliest definition is attributed to Willem Buiter. In an interview with the Financial Times in late-2008, he defined qualitative easing as a process of increasing the illiquidity and credit risk of the assets on the central bank's balance sheet, by outright purchases of private securities (including, in the limit, equity and corporate debt).²⁷ Roger E. A. Farmer gets straight to the point by referring to qualitative easing as a change in the asset composition of the central bank.²⁸ Farmer believes that because qualitative easing is conducted by the central bank, it is often classified as a monetary policy. But because it adds risk to the public balance sheet, which is ultimately borne by the taxpayer, qualitative easing is better thought of as a fiscal or quasi-fiscal policy. Qualitative easing was most probably already a component of other central banks' attempts (such as the Fed and the Bank of England) to pursue unconventional monetary policies, but it was the BOJ again, which explicitly used this term in its policy.

The Monetary Policy Meeting of 4 April 2013 was the first where Kuroda acted as BOJ Governor. It was during this meeting that QQE was announced. Its key aim was to achieve 2% inflation with a time horizon of about 2 years. The BOJ made it clear that it would not hesitate to continue with its program, and even strengthen it, should such a need arise. The policy target was changed from the policy interest rate (uncollateralized overnight call rate) to the monetary base. An annual increase in the monetary base was supposed to be somewhere in the range from ¥60 trillion to ¥70 trillion. The key elements of these purchases have been:

- JGBs: with a maturity up to 40 years, with an average maturity of 6–8 years (7 years).
- Exchange Traded Funds (ETFs): ¥1 trillion
- Real Estate Investment Trust (J-REITs): ¥30 billion

As for commercial paper and corporate bonds, the BOJ decided to continue with those asset purchases as set in December 2012 and January 2013 under CME, increasing them until their amounts outstanding reach ¥2.2 trillion and ¥3.2 trillion, respectively, and thereafter maintaining those amounts. The whole program was further boosted by forward guidance. Details regarding ETF purchases are described in Shirai (2020).

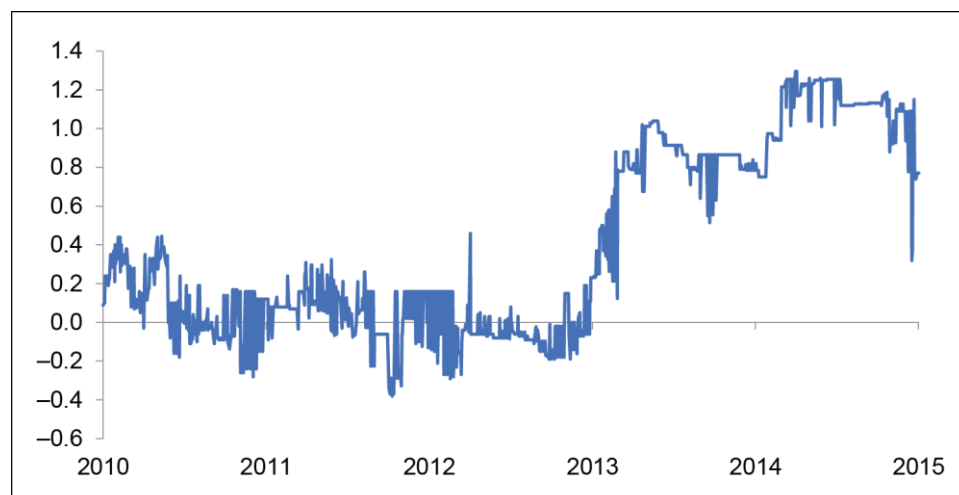
²⁷ <https://www.ft.com/content/e9744bce-d820-11dd-bcc0-000077b07658> To be more precise, Buiter used this term even earlier on his blog "Maverecon" Financial Times blog, which is no longer available in the net.

²⁸ <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2013/quarterly-bulletin-2013-q4>.

The initial effect was rather moot, as the yields were subject to large fluctuations. Spring 2013 was very turbulent in global financial markets. Shortly after the April BOJ announcement, gold prices plummeted. In less than a week they lost approximately 15% of their value. Even if this fall was attributed to a large extent to talk suggesting a sale of gold by Cyprus aimed to cover emergency payments to the ECB,²⁹ there were other factors at play. There were more signs that the US economy was getting in better shape and subsequently fueling speculation regarding an imminent end of ultra loose monetary policy in the US. Speculation was quickly translated into action, with the “taper tantrum” initiated on 22 May 2013. In the last 8 months, the US 10-year yields rose from around 1.6% to 3.0%, while the yield of the German bunds increased from roughly 1.2% to almost 2.0%. These were not good circumstances to launch expansionary monetary policies.

As Shirai (2018) explains in her book, QQE emphasized long-term inflation expectations as one of the most important channels to achieve the 2% inflation target. This was based on the view that higher long-term inflation expectations might help to increase the current levels of prices and wages by accelerating current levels of spending. The BOJ also hoped that an increase in long-term interest rates might lead to a decline in the rate in real terms and thus bring in more accommodative monetary conditions. The emphasis on long-term inflation expectations was clearly different from the previous rounds of BOJ’s series of monetary easing including the CME. The sharp depreciation of the yen—starting from November 2012 in anticipation of massive monetary easing under the new governor in the following year—contributed to the increase in long-term inflation expectations (Figure 8). The yields on JPY Inflation Swap Forward 5Y5Y in November 2012 were negative (falling as low as –0.16%), 6 months later, they reached levels above 1.0%. However, an increase in long-term inflation expectations did not last long since such inflation expectations began to decline from around mid-2014.

Figure 8: Market-Based Long-Term Inflation Expectations in 2010–2014 (%)



Source: Prepared by the authors based on BOJ data.

Oil prices, which only in June 2014 were trading above \$115 crashed 6 months later, losing approximately 50% of their value. Lower oil prices only augmented a decline in long-term inflation expectations. Furthermore, from April 2014, an increase of the

²⁹ <https://www.cfainstitute.org/-/media/regional/arx/post-pdf/2017/09/26/the-anatomy-of-the-gold-crash-of-april-12-15-2013-from-a-liquidity-per.ashx>.

so-called consumption tax from 5% to 8% (which was announced by Prime Minister Yoshihiko Noda in 2012) was implemented. While the consumption tax hike raised Japan's inflation by around 2%, it reduced household consumption and weakened economic growth. All these factors led to an upward revision of parameters of QQE on 31 October 2014.

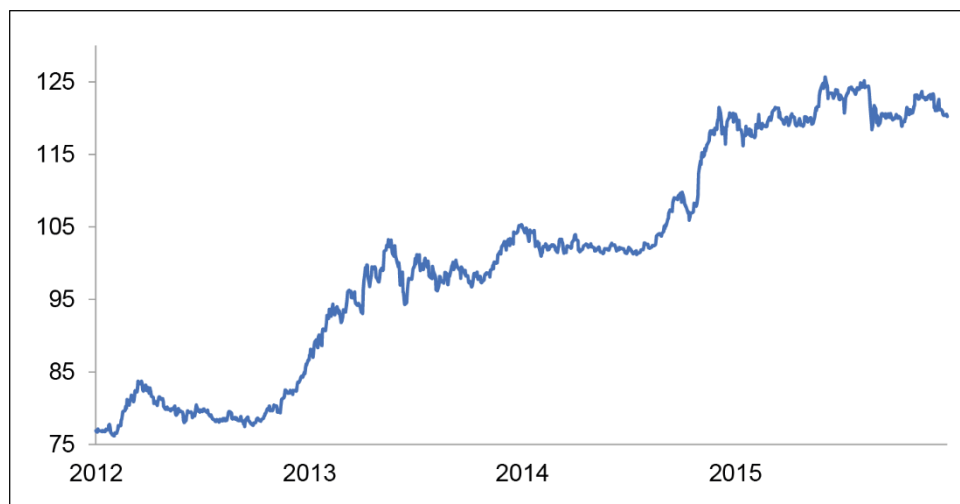
The most important change was the BOJ's decision to accelerate the annual pace of increase in the monetary base—the main operating target for money market operations—from about ¥60 trillion–¥70 trillion to about ¥80 trillion. To achieve this monetary base targeting, the amount outstanding of JGB holdings was increased from an annual pace of about ¥50 trillion to about ¥80 trillion. With a view to encourage a further decline in interest rates across the entire yield curve, the BoJ extended the average remaining maturity target of JGB purchases from about 7 years (6–8 years) to about 7–10 years and called this an extension for a maximum of 3 years. In addition to JGBs, the BoJ decided to increase purchases of risk assets such as ETFs and J-REITs, tripling their amounts outstanding and increasing their annual pace of purchase from about ¥1 trillion to about ¥3 trillion and from about ¥30 billion to about ¥90 billion, respectively. The BOJ also included the ETFs that track the JPX–Nikkei Index 400 as eligible for purchase.

The revision of the QQE parameters in October 2014 might have contributed to the further depreciation of the yen. However, this time around an external factor affected the depreciation of the yen more strongly. Namely, the driver was a sign of the US dollar buoyancy as markets following the end of the Large-Scale Asset Purchases (LSAP) began to expect that a tightening of the Fed's monetary policy was approaching. Furthermore, this depreciation of the yen did not translate into higher long-term inflation expectations. Inflation data proved that the effect of an increase in the consumption tax on inflation was of an interim nature. As a result, a decline in long-term inflation expectations continued and Abe's announcement in November 2014³⁰ to postpone another scheduled tax hike from 8% to 10%—along with the already mentioned crash of oil prices—made decline even stronger. In October 2014, the yield of JPY Inflation Swap Forward 5Y5Y was well above 1.0%, but it fell to level slightly above 0.6% by early February 2015.

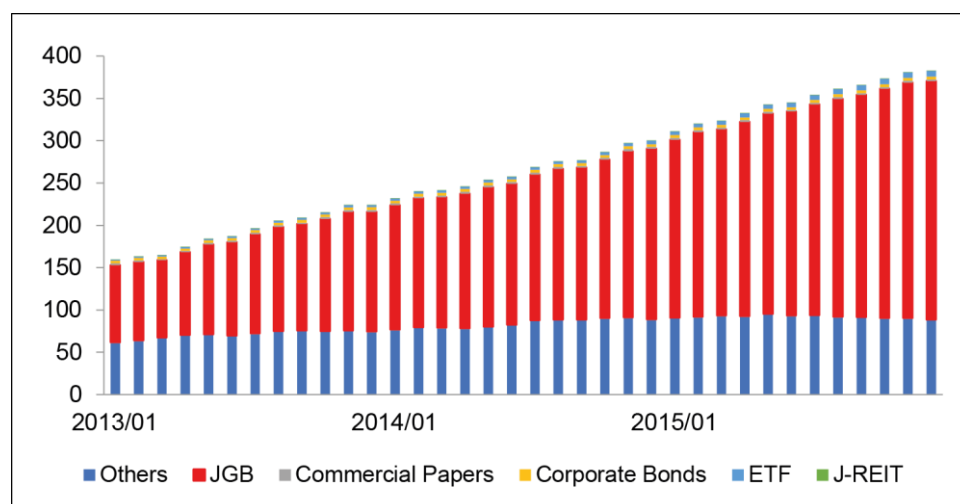
Higher parameters of the QQE only increased an already existing gap between the BOJ and other major central banks. By the end of 2014, the BOJ balance sheet surged above the symbolic threshold of ¥300 trillion. In early 2015, the ratio of the BOJ's balance sheet to nominal GDP was approaching a threshold of 60%—a very high level compared to almost 25% in case of the Fed, 22% in case of the Bank of England, and only 17.6% for the ECB (which was yet to launch its Public Sector Purchase Program in March 2015). The same was true for the monetary base, which in the case of the BOJ exceeded 54% of nominal GDP compared with 23.4%, 20.8%, and 11.9% for the Fed, the Bank of England, and the ECB, respectively.³¹

³⁰ <https://www.nippon.com/en/features/h00013/the-political-history-of-japan%E2%80%99s-consumption-tax.html>.

³¹ <https://www.ecb.europa.eu/press/key/date/2015/html/sp150227.en.pdf?8f9125275da1c587c770d8a9d14b6e5c>.

Figure 9: The Japanese Yen per US Dollar in 2012–2015

Source: Prepared by the authors based on Bloomberg data.

Figure 10: The BOJ's Financial Assets in 2013–2015 (¥ trillion)

Source: Prepared by the authors based on BOJ data.

Even though these numbers are impressive, in April 2015—2 years since the inception of the QQE—the BOJ was not able to achieve its 2% price stability target as envisaged initially. According to its original schedule, its aims should have been achieved around that time. Excluding the direct impact of the April 2014 consumption tax hike, which led to an increase in inflation of around 2 percentage points until March 2015), the 2% price stability target was not achieved in a sustainable manner. Long-term inflation expectations were boosted again in mid-2015 by further yen depreciation, but from the second half of the year onward, they started to fall again.

To make things worse, Japan was also subject to spillovers from stock market volatility emanating from the People's Republic of China (PRC). The collapse of the bubble in PRC's stock prices in June 2015, the modification of the second-largest economy's exchange rate policy in August 2015, as well as economic slowdown in PRC gave rise to instability to both real and financial sectors worldwide including in Japan. In September 2015, the CPI in Japan fell to 0%, while the CPI excluding fresh food

reached a negative level a month before. More and more signs were pointing at an imminent need for far-reaching modifications of the QQE. The yen started to appreciate somewhat from the final months of 2015 to January 2016, which could be viewed as one of the reasons leading to the adoption of the negative interest rate policy. This is because ECB's adoption of the negative interest rate policy in mid-2014 as described in detail below had been viewed widely as having contributed to the depreciation of the euro.

Depending on exchange rate, the objective of annual purchases worth ¥80 trillion equaled at the turn of 2015 and 2016 to a value slightly above €600 billion. The size of BOJ's asset purchases amounted to around 85% of all ECB purchases pursued under the *expanded Asset Purchase Program (eAPP)*, which prior to its upgrade in March 2016 used to buy annually assets worth €720 billion. Following the upgrade of eAPP, which saw the monthly mark of €60 billion being raised to €80 billion, the ECB's annual purchases reached €960 billion—approximately 50% of annual purchases done by the BOJ. However, to determine the true size of monetary accommodation by both central banks, it is better to compare the aforementioned purchases in terms of nominal GDP. Purchasing assets of about ¥80 trillion a year implied that within 12 months, the BOJ purchased some 15% of the Japan's GDP. In the case of ECB's purchases including eAPP, the amount of augmented €960 billion accounted for around 9.3% of the euro area nominal GDP. Furthermore, ECB by early-2016 had been conducting the full version of its expanded APP for less than 15 months,³² while the BOJ had been pursuing its QQE for almost 3 years. As a result, the BOJ balance sheet was close to 75% of Japan's GDP by the end of 2015—well above the levels recorded by the ECB and the Federal Reserve. That is why, the decision to introduce negative rates in January 2016—despite the amount of purchase assets—was perceived as an unexpected event.

3.4 Negative Interest Rate Policy (NIRP) Announced in January 2016

On 29 January 2016, the BOJ became the fifth major central bank to announce a Negative Interest Rate Policy (NIRP) in the following month. This announcement surprised market participants. Negative interest rates on deposits hardly suit the logic of monetary policies pursued by any monetary authority resorting to large purchase of assets. There is one important caveat, namely, introducing negative rates can discourage investors from selling a central bank their assets (Shirai 2018). After all, much of the funds coming from the sales of these assets end up on the current account of a central bank. That is why, negative interest rates were used neither in the United Kingdom nor the United States. Despite a reluctance regarding this measure in Anglo-Saxon countries, negative interest rates, however, are not a new concept.

The creator of the concept of negative interest rates is considered to be the Belgian-born German economist Silvio Gesell. He was probably the first to deal with the fact that among the three roles that money fulfils, it would be possible to separate the circulation function from that of hoarding. He put his thoughts on paper in an 1891 study entitled *Die Reformation im Muenzwesen als Bruecke zum sozialen Staat* (Reform of the Essence of Money as the Bridge to the Social State). In his reflections,

³² The eAPP was not confined to a purchase of the government bonds only. These purchases were known under the name of Public Sector Purchase Assets (PSP). Even if the PSP got most of the media attention, it was not the only component of the eAPP. Among other components of eAPP were covered bonds and its purchases were known under the name of Cover Bonds Purchase Programme 3 (CBPP3). The CBPP3 was the first programme to be launched and goes back to October 2014.

Gesell came to very interesting conclusions (Gesell 1891). According to him, all goods in the world are subjected to the process of destruction. To put it simply, every good has an expiration date. The only exception is money, which is why its owners play for time and delay as long as they can the process of acquiring other goods with the help of their monies. Delaying on the part of money holders is aimed at making other goods subject to the process of destruction. Then their desperate owners will have to take out credit from the holders of money in order to further maintain the production process. Thus, Gesell thought that there was a gross injustice in society. Wanting to repair this injustice, Gesell came up with the concept of taxing money. It would be about stamping money on a weekly basis (such a stamp would be tantamount to a progressive loss of value of money), so that money would lose about 5% of its value per year. In this way, Gesell wanted to counter the danger of deflation.

The popular opinion is that the Swiss National Bank (SNB) referred in this way to the practice used in the 1970s (Jordan 2015). However, that comparison is not justified: In fact, in February 1978, the Swiss central bank introduced draconian negative rates (up to 10% quarterly), but these restrictions were in fact an extraordinary tax on non-residents (Jordan 2015). They were intended to discourage them from buying the Swiss franc. Moreover, these restrictions have proved ineffective. Instead of depositing previously acquired Swiss francs in a bank, investors invested them in stocks and real estate.

Among central banks, the first one to implement them was the oldest central bank in the world, the Swedish Riksbank. In July 2009, it lowered the deposit rate to -0.25% , which was a side effect of bringing the reference rate to 0.25% . This move had almost no impact on money market conditions in Sweden. The fact is that the Swedish Riksbank conducted fine tuning operations in which the aim was to ensure that the market rate (overnight) did not deviate too far (more precisely than ± 10 basis points) from the reference rate. In other words, Swedish banks did not experience negative deposit interest rates between 2009 and 2010.

In a search of a case where negative interest rates had a binding effect, the case of Denmark must be mentioned. In July 2012 it introduced a negative interest rate on the so-called certificates of deposit. The Danish banks could then deposit their surpluses either on a current account or in certificates of deposit. The negative interest rate applies to the latter, while the former bore 0% . In order to make negative interest rates binding, there was a strictly limited amount of funds banks could hold on the current account (until March 2021, when the two rates were unified). The limit of funds to be held on current account could be even perceived as an extra instrument in the central bank's toolkit, which was used quite often. A similar policy was applied in Switzerland, where the SNB resorted to the so-called threshold factor, which defined the amount exempted from interest rates. In the case of the SNB the threshold factor in a modified version is used after the NIRP came to an end.³³

Neither the Danish nor the Swiss central banks in their bid to keep a lid on exchange rate resorted to a purchase of domestic assets. However, there were two other central banks that experimented with negative interest rates prior to the BOJ tried to combine negative interest rates with a purchase of domestic assets. The ECB implemented negative deposit rates in June 2014 before launching its eAPP (October 2014), while the Riksbank cut its reference rate below zero simultaneously with a launch of its decision to purchase assets in February 2015.³⁴ Both central banks were very stringent

³³ https://www.snb.ch/en/i/about/stat/statrep/id/current_interest_exchange_rates.

³⁴ https://archive.riksbank.se/Documents/Rapporter/PPR/2015/150212/rap_ppr_150212_eng.pdf.

in applying negative rates without leaving almost no possibility to avoid them.³⁵ In the case of the ECB, it was only a minimum reserve requirement (with interest at 0%), and Sweden did not leave any leeway at all (as the Riksbank does not apply reserve requirements any more). That is why, in these two countries, unlike in the case of Denmark and Switzerland, it is difficult to talk about the exemption threshold in its capacity as yet another monetary tool.³⁶

Implementation of negative interest rates in Japan paved the way to an introduction of a three-tier deposit system, where funds held by banks were divided in three sub categories. Only one of them is exposed to effects of negative rates.

As already mentioned, BOJ introduced the following three types of deposit rates:³⁷

- Tier 1: Basic Balance: a positive interest rate of 0.1%
- Tier 2: Macro Add-on Balance: zero interest rate
- Tier 3: Policy-Rate Balance: a negative interest rate of –0.1%

Basic Balance (Tier 1) includes the outstanding balance of the current account at the BOJ that each financial institution accumulated under QQE. The BOJ will continue to apply the same interest rate as before. The average outstanding balance of current account, which each financial institution held during benchmark reserve maintenance periods from January 2015 to December 2015, corresponds to the existing balance and will be regarded as the basic balance to which a positive interest rate of 0.1% will be applied.

Macro Add-on Balance (Tier 2) will be applied on the following amounts outstanding. The amount outstanding of the required reserves held by financial institutions subject to the Reserve Requirement System. Tier 2 also applied to the amount outstanding of the BOJ's provision of credit through the Loan Support Program and the Funds-Supplying Operation to Support Financial Institutions in Disaster Areas affected by the Great East Japan Earthquake for financial institutions that are using these programs.

Policy Rate Balance (Tier 3) will be applied to the outstanding amount exceeding the two above-mentioned balances (Tier 1 and Tier 2).

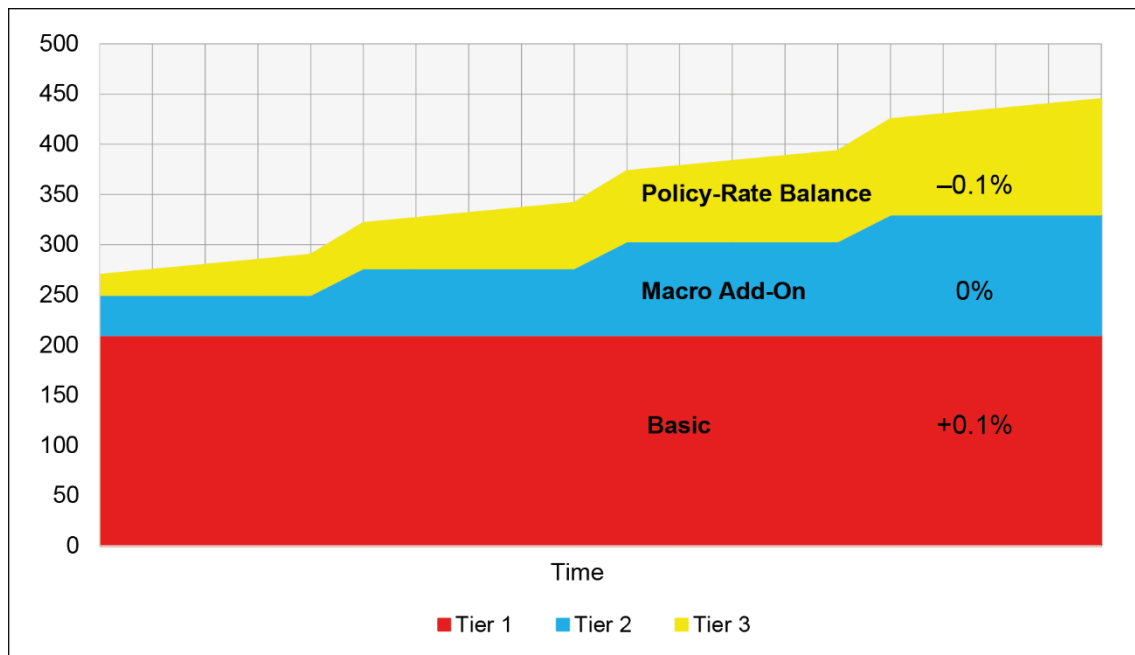
The following graph illustrates how the three-tier deposit operates.³⁸ The BOJ took every possible effort to minimize the scale of damage of negative interest rates from the point of view of government bond sales. In other words, most of these purchases are not affected by the impact of negative rates. It is important to emphasize that each tier will be adjusted over time in order to preserve the share of banks' funds exposed to negative interest rates at a relatively small level (somewhere between ¥10 trillion and ¥30 trillion).

³⁵ https://www.bis.org/publ/qtrpdf/r_qt1603e.htm.

³⁶ Apart of the cases described in this paper, negative interest rates were also introduced in Hungary and Norway. However, a more detailed description of these two cases go beyond the scope of this paper.

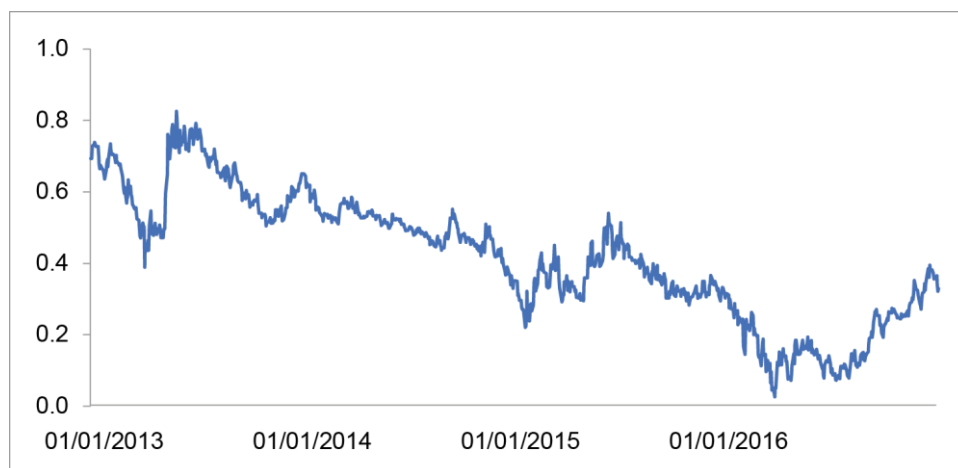
³⁷ https://www.BOJ.or.jp/en/announcements/release_2016/k160129a.pdf.

³⁸ https://www.BOJ.or.jp/en/announcements/press/koen_2016/data/ko160414a2.pdf.

Figure 11: Amount Outstanding of BOJ's Current Account Balance

Source: Prepared by the authors based on BOJ data.

Westelius (2020) argues that that interest rate on excess reserves was cut below zero in order to exert further downward pressure on short-term interest rates and raise inflation expectations (in mid-January 2016, inflation expectations fell below an important level of 0.5% for the first time in almost 3 years) by emphasizing again the BOJ's commitment to reach its own 2% price stability target. Kuroda denied in a speech delivered at Columbia University in April 2016 voices claiming that by introducing NIRP, a shift in the monetary easing framework from purchasing assets toward the interest rate was conducted. According to Kuroda, the latest move was aimed to enhance the QQE program and from then on, he referred to it as “*QQE with a Negative Interest Rate*” (Kuroda 2016)

**Figure 12: The Slope of the Japanese Yield Curve
(Difference between 10-Year Yield and 1-Year yield) in 2013–2017 (%)**

Source: Prepared by the authors based on Bloomberg data.

3.5 Yield Curve Control (YCC) Announced in September 2016

After only 8 months since introducing negative interest rates, the BOJ opted to launch a new strategy, known as YCC. It was a well thought out decision. The BOJ's Executive Director at the time, Masayoshi Amamiya, presented a detailed historical review of the YCC concept (Amamiya 2017). He stated that the history of central banks' influence on the yield curve dates back to World War II. The entry of the US into the War began to generate expectations of a strong expansion of the budget deficit and an increase in inflation. They were not unfounded. While negative inflation was recorded in the United States in September 1940, it exceeded 12% in February 1942. In order to reduce the US taxpayer's burden of financing military expenses, both the government and the central bank took steps to slow down the growth of yields on long-term Treasury securities and Treasury bills. Both 10-year bonds and 3-month Treasury bills became subject to a cap limit of 2.5% and 0.375%, respectively.

The end of the World War II in 1945, contrary to appearances, only made it more difficult for the authorities to influence the yield curve. This was because the abolition of the price control system pushed inflation to 17.7% in November 1946. And in March 1947, inflation reached 19.7%. Under such conditions, it was impossible to influence the short-end of the curve. Therefore, already in July 1947, the limit of 0.375% was abandoned. Meanwhile, it took much longer to resort to the control of the long-end of the curve, until 1951, when the US government and the Federal Reserve signed the so-called Accord. And already in 1953, the Fed announced that its main goal would be to stabilize prices, and the tool to achieve such a defined goal was to be short-term Treasury bills. (i.e., the so-called "bills only policy"). As it soon turned out, less than a decade later, the Fed reminded itself of the long-end of the curve's concept: the famous Operation Twist conducted in the early 1960s. Its aim was to stimulate economic growth by keeping low rates at the long-end of the curve, and high rates at its short end in order to deter capital outflows. According to Amamiya (2017), the dominant view formed at that time was that the role of Operation Twist on interest rates was minimal. This view was the key reason why policy makers opted to move away from targeting the curve toward targeting short-term interest rates. Another country where, at the same time, the central bank was buying government bonds was the United Kingdom. Initially, in the first few years following the end of World War II to 1947, the maximum ceiling for long-term interest rates was set at 2.5%. In later years, the Bank of England bought bonds intermittently until 1971.

It was not until September 2011, when the story of the YCC was recalled when Ben Bernanke opted to do something similar to what had been done in the early 1960s.³⁹ His action quickly revived memories of Operation Twist.⁴⁰ Regardless of Operation Twist, large-scale purchase of Treasury securities by the Fed was bound to bring to mind the YCC concept. Amamiya (2017) mentioned in his review that after the introduction of "QQE with a Negative Interest Rate" in early 2016, the purchase of long-term government bonds combined with applications of negative interest rates to a part of funds held at the BOJ's current account balances could also exert strong downward pressure on long-term interest rates. Accumulated experiences from the past served as a basis for the BOJ to consider the introduction of yield curve control.

However, there were other important reasons behind this decision, as a further continuation of the QQE+NIRP started to generate tensions in bond and financial markets. The key challenge was a substantial concentration of JGB holdings at the

³⁹ [Federal Reserve Board - Federal Reserve issues FOMC statement.](#)

⁴⁰ <https://www.ft.com/content/3deaf5fc-e478-11e0-92a3-00144feabdc0>.

BOJ's balance sheet. By mid-2016, the BOJ was in possession of almost 40% of all JGBs. This meant that the central bank found it increasingly challenging to meet the monetary base target, which requires an annual purchase of JGBs of around ¥80 trillion. There were also concerns among market participants about the rising scarcity of JGBs, reduced liquidity and functioning of the JGB market. The BOJ thus needed to find a new approach to switch from the quantity-based operational target (Shirai 2018).

There was yet one more important factor; a threat of an excessive flattening of the curve (Borralló Egea and del Río López 2021). In particular, institutional investors were concerned about negative 10-year yields. Market participants in Japan widely share the view that the BOJ's decision to set the 10-year yield target at around 0% was done deliberately to raise the yield from negative territory (Shirai 2018). That is why a shift in the operational target of the monetary easing policy was made. With a comprehensive review released in September 2016, the BOJ made changes to the QQE framework. The changes can be divided into the following three groups:

1. The monetary base was substituted by the 10-year yield of JGB newly introduced and the negative interest rate already adopted earlier as the operational target. From then on, there were two pinpoint targets: negative interest rate of -0.1% (applicable to part of outstanding balance of current account at the BOJ) and 10-year yield set at around 0%. These two parameters were selected to ensure a positive slope of the yield curve.
2. Monetary Easing Stance: QQE with yield curve control will continue as long as necessary to achieve the 2% target in a stable manner. Monetary easing will be added mainly by a cut in the two interest rates if necessary.
3. Inflation Overshooting Commitment: The monetary base will expand until core inflation exceeds 2% and stays above 2% in a stable manner. BOJ projects to expand JGB purchases more or less in line with the current pace—about ¥80 trillion.

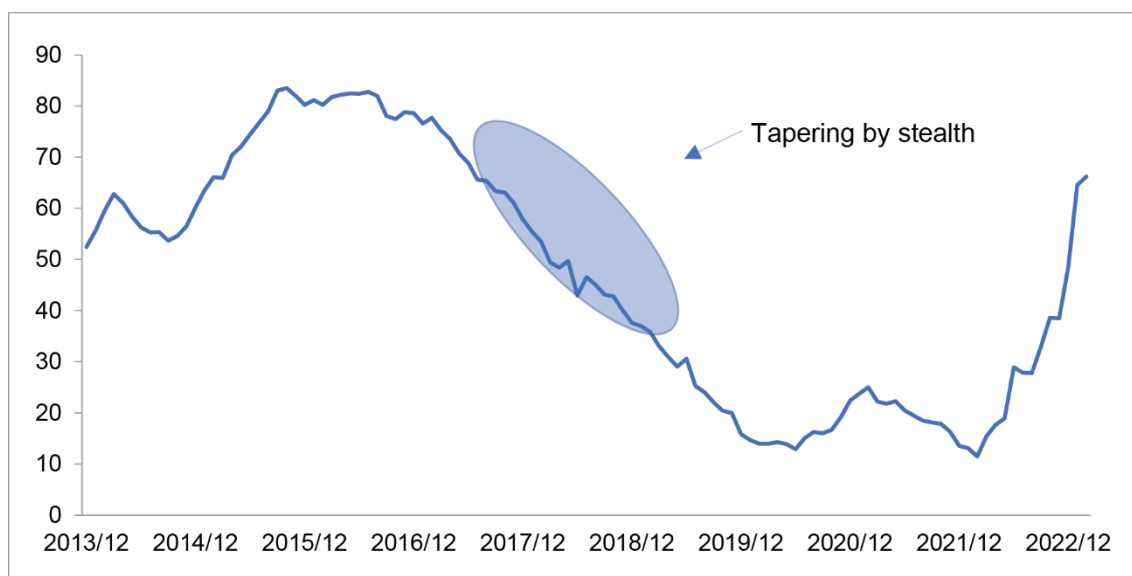
Before the introduction of YCC, the BOJ policy mix (consisting of QQE and NIRP) was becoming complex and to some extent inconsistent from the perspective of making it more challenging to continue large-scale asset purchases (Shirai 2018). The BOJ took some measures to mitigate the side effects arising from the NIRP by adopting a three-tier system on the current account balance at the BOJ. While this helped to mitigate a decline in the banking sector's profits, the interest margin (difference between lending and deposit rates) dropped further from the already squeezed level. Moreover, the YCC also appears to have created some inconsistency between QQE and YCC since the former stresses the "quantity" aspect of massive JGB purchases and the latter focuses on the 10-year yield level target by making the quality of JGB purchases internally determined depending on market conditions. Similar conclusions are drawn in number of different papers (Borralló Egea and del Río López 2021).⁴¹ The issue of policy inconsistency is also raised explicitly by Ito (2021).

⁴¹ Borralló Egea and del Río López refer to Shirai's research to justify their conclusions. So, in order to strengthen the case advocated by Shirai, it suffices to get familiar with conclusions drawn at the Bond Market Contact Group (BMCG) organized under the ECB auspices. During the BMCG's meeting on 7 February 2017, Shirai's comments were echoed among its participants. https://www.ecb.europa.eu/paym/groups/pdf/bmcbg/170207/summary_of_discussion.pdf?856935213fbc1ee366102d28ebefd469. As an evidence see a presentation delivered on this particular meeting by Garry Naughton and available under the following link: https://www.ecb.europa.eu/paym/groups/pdf/bmcbg/170207/Item_3_-_Yield_curve_targeting_-_Part_II.pdf?856935213fbc1ee366102d28ebefd469.

Preserving massive JGB purchases had to be translated into higher prices of bonds and a subsequent drop in yields. In other words, preserving QQE and YCC at the same time can be viewed as unsustainable. And one of these two variables needed to be given up and be determined endogenously. Indeed, the BOJ tried to dilute its commitment regarding an annual purchase of JGB worth ¥80 trillion by adding more flexible expression such as “more or less” to the ongoing JGB purchases. The BOJ changed the description further from the July 2018 policy statement when the 10-year target range was introduced (the target range was not mentioned in the policy statement but rather at the press conference by the governor). The July 2018 statement inserted more flexibility regarding the JGB purchases by removing “more or less” to “in a flexible manner.”⁴²

Surprisingly enough, the BOJ pursued this notion until 27 April 2020. It was in the minutes from the 22 May 2020 meeting, when the rhetoric of purchases in a flexible manner was removed. But it was immediately after the September 2016 announcement that market commentators detected this contradiction and coined a term to describe the BOJ policies regarding QQE, namely “tapering by stealth.”⁴³ Nicolaus Westelius went even further and referred to the aforementioned process as the sign of a growing discrepancy between the quantity guidance and the actual amount of JGB purchases by the BOJ (Westelius 2020).

Figure 13: Tapering by Stealth Performed by the BOJ (¥ trillion)



Source: Prepared by the authors based on BOJ data.

Indeed, the BOJ began to reduce steadily the annual pace of JGBs purchases from ¥80 trillion from late-2016 onward. As shown in Figure 13, purchased JGBs fell to levels below ¥30 trillion in 2019, implying that there was significant room for improvement regarding the BOJ’s communication with the markets.

⁴² It was written in the following way: With regard to the amount of JGBs to be purchased, it would conduct purchases in a **flexible manner** so that their amount outstanding would increase at an annual pace of about JPY 80 trillion. https://www.boj.or.jp/en/mopo/mpmdeci/state_2018/k180731a.htm.

⁴³ <https://asia.nikkei.com/Economy/BOJ-s-trim-of-bond-purchases-hints-at-stealth-tapering>.

The flexibility was, nevertheless, applied explicitly not in the area of QQE, but rather in the area of YCC. Even if the BOJ in the early days of the YCC did not confirm it explicitly in the statement, there was an implicit tolerance of ± 10 basis points for the deviation of JGB yields from its target of 0%. In July 2018, however, the tolerance band was explicitly expanded to ± 20 basis points. Its aim was mainly to accommodate market volatility. Furthermore, the purchase of JGBs even at a smaller pace contributed to the saturation effect. The BOJ started steadily approaching the threshold where every second JGB was in its possession, leading to a substantial decline in volume of this instrument. This process is referred further in this paper either as a drying out effect (from the point of view of markets as liquidity is dried out) or a saturation effect (from the point of view of the BOJ) and will be described in the last section of this paper.

Despite resorting to a very complex framework, there was little progress in approaching the 2% price stability target, not to mention its overshooting commitment. Inflation was moving almost in parallel with inflation expectations and both parameters seemed to be far more sensitive to oil prices (its spike in early 2018 helped push CPI inflation briefly to levels above 1%, before giving up all these gains a year later). Prime Minister Abe's ambitious nominal GDP target (of ¥600 trillion, to be achieved by 2020) introduced in September 2015 was becoming more and more difficult to accomplish. There were still hopes that the 2020 GDP target might have been achieved because of substantial construction and tourism activities needed for hosting the Olympic Games in Tokyo in 2020 (the Games were postponed to 2021 amid the COVID-19 pandemic). The 8th year (2020) of both Abe and Kuroda's tenure promised to be a crucial one. After all, 2020 was supposed to be a year when the nominal GDP was projected by the Prime Minister to reach ¥600 trillion. It did not. However, the year proved to be a crucial one, but for reasons that neither Abe and Kuroda nor anyone else could have imagined: the COVID-19 pandemic.

3.6 The COVID-19 Pandemic and its Impact on the BOJ's Monetary Policies

In March 2020, it was the BOJ balance sheet that surpassed ¥600 trillion. Once this figure was published, it was clear that the ¥600 trillion nominal GDP target was impossible to achieve in the following year (indeed, nominal GDP for 2020 and 2021 turned out to be ¥538 trillion and ¥550 trillion, respectively). The COVID-19 pandemic, which erupted in early 2020 derailed almost every economic forecast and forced policy makers worldwide to take unprecedented monetary and fiscal measures to mitigate the adverse economic effects of this pandemic crisis.

Compared with other central banks, the BOJ's reaction was rather muted in terms of asset purchases. Both the Fed and the ECB opted for further purchase of assets, government bonds in particular. Similar conclusions can be drawn from the studies conducted by BIS (2023)⁴⁴ or other research groups.⁴⁵ In the case of the BOJ, it was not feasible to increase the dynamics of bond purchases further. The balance sheets of neither the Fed nor the ECB (Eurosystem) prior to COVID-19 were anywhere near the levels of the BOJ (which surpassed 100% nominal GDP and are currently reaching around 130%). That is why, the BOJ started to seek the following two approaches:

⁴⁴ <https://www.bis.org/publ/cgfs68.htm>.

⁴⁵ <https://www.yardeni.com/pub/balsheetwk.pdf>.

- Continuation of the YYC
- Launching new programs aimed to foster banks' credit extension to the domestic private sector

Of these two approaches, the second one (loan programs) deserves more attention because of its novelty. The importance of the the new funding-for-lending type measures to cope with surging loan demand amid the COVID-19 pandemic is emphasized by OECD (2021) among others.⁴⁶ It is worth reviewing briefly a history of *fund-for-lending programs*. Their origin goes back to 2012, when the Bank of England and the UK government opted to encourage banks and building societies to boost their lending to households and businesses (above all small and medium enterprises). This worked by letting banks and building societies obtain funds on preferential terms from the Bank of England for up to 4 years (Nardi, Nwankwo, and Meaning 2018).⁴⁷ However, the accessibility to these preferential funds was subject to conditionality, namely the volume of credit action generated by a given bank. Banks that were increasing their lending were supposed to pay the lowest fee on their borrowing, while those that saw a reduction in lending, were supposed to pay a higher fee.⁴⁸

The fund-for-lending programs started to spread quickly. The Hungarian Central Bank (MNB) enacted a somewhat similar program (known as Funding for Growth Scheme) as early as 2013. But perhaps the most spectacular example of the fund-for-lending programs was a launch of the *Targeted Long Term Refinancing Operations (TLTRO)* by the ECB in 2014. But it was the COVID-19 pandemic, which triggered the spread of the fund-for-lending programs across the world (BIS 2023).⁴⁹ Among countries that launched this kind of program were Australia, Brazil, and Republic of Korea. As the BIS observed in its report, these lending programs differ across countries, depending on their aims and the circumstances under which they were implemented. Regardless of these differences, the fund-for-lending programs are considered yet another unconventional monetary policy tool. As the BIS claims, these programs are perceived as tools aimed to support monetary policy objectives, financial stability objectives, government lending programs, or a combination thereof.

In March 2020 the BOJ launched the ***Special Funds-Supplying Operations to Facilitate Corporate Financing regarding the Novel Coronavirus (COVID-19)***. The first loan was offered on 24 March 2020. As the BOJ described in its statement on monetary policy, the aim of these operations was to ensure smooth corporate financing and maintaining stability in financial market, considering the impact of the outbreak of COVID-19 on economic activity.⁵⁰ To mitigate the impact of the negative interest rate (−0.1%) applied to the outstanding balance of the current account at the BOJ, the central bank decided to include twice as much as the amount outstanding of the loans provided under the new funds-supply operations in the Macro Add-on Balances (subject to the 0% interest rate) in current account held by financial institutions at the BOJ—the approach equally applicable to existing Funds-Supplying Operations.

With the help of this new tool, the BOJ was providing loans up to the value of corporate debt pledged as the pool of eligible collateral. Initially, the program was supposed to be

⁴⁶ https://www.oecd-ilibrary.org/economics/oecd-economic-surveys-japan-2021_124266a0-en.

⁴⁷ <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2018/term-funding-scheme-web-version.pdf>.

⁴⁸ <https://www.gov.uk/government/publications/funding-for-lending-infographic>.

⁴⁹ https://www.bis.org/publ/mc_funding_for_lending_programmes.pdf.

⁵⁰ https://www.boj.or.jp/en/mopo/measures/mkt_ope/ope_v/index.htm.

implemented until September 2020, with a duration of 1 year and the rate of 0% per annum. But because of its popularity, the deadline for new applications for loans was extended on several occasions. The first change took place as early as April 2020, when the range of eligible collateral applicable under this scheme was expanded, for example, by including household debt. The number of eligible financial institutions was also increased by accepting smaller financial cooperatives as counterparties. Most importantly, the interest rate applied to the BOJ's outstanding current account balances corresponding to the amounts outstanding of these loans was raised from 0% to 0.1% to promote lending to the private sector. Later in March 2021, the interest rate was raised further to 0.2% if financial institutions provided loans to the private sector under this scheme using their own funds, while the 0.1% interest rate remained applicable to financial institutions that provided loans to the private sector guaranteed by the Credit Guaranteed Corporations and against private debt pledged as collateral. As charging positive interest rate on the current account balances with the BOJ helped to mitigate the adverse impacts of the NIRP, the BOJ expected that the banking sector would be encouraged to extend more credit to the private sector. This facility was scaled down gradually and terminated in March 2023.

As a result of these measures, loans on the assets side of the BOJ increased significantly. Prior to the COVID-19 pandemic, the share of loans offered by the BOJ was less than 10% of the central bank's balance sheet. At the turn of 2021 and 2022, it exceeded 20% before reversing course, as the loans had to be repaid, thus reaching the highest share since the start of QQE since late-2012. Comparisons with other central banks must be done with caution and taking into consideration features of the domestic economy. Bearing in mind this caveat, we attempt to compare the BOJ efforts to the action undertaken by the ECB.

In the euro area, the share of the already mentioned TLTRO in all the loans offered by the ECB to the euro area banking system was much higher than the share of the BOJ's *Special Funds-Supplying Operations* in all the loans offered by the BOJ to the domestic economy. By the end of the Q1 2022, the amount of loans granted by the ECB to the banking system reached about €2.20 trillion (compared to around €618 billion prior to the COVID-19 pandemic), an overall cumulative⁵¹ increase of around €1.58 trillion. All the loans offered by the ECB amounted to more than 25% of Eurosystem's total assets. Resorting to the central balance sheet as a reference point, however, does not seem to be the optimal strategy for a comparative analysis. A proportion of loans to nominal GDP seems to be a better reference point. Sticking to the GDP criterion, all the loans offered by the BOJ (corresponding to around 18% of GDP) during the pandemic were higher than all the loans offered by the ECB (which amounted a little more 12% of GDP).

A reliance on these loans had one more advantage for the BOJ. The loan program did not contradict with the YCC, as was the case of the QQE. As far as the latter is concerned, some minor changes in its implementation were observed, most probably because of the already mentioned saturation effect observed in the JGB markets. We will return to this issue toward the end of this paper.

An increase in BOJ assets was mirrored by an identical increase in its liabilities. As in the case of other central banks, the banknotes issued by the BOJ used to be its largest liability. Now, it was no longer the case as the funds on the current account of many

⁵¹ As already noted, this comparative analysis must be treated with caution. For instance, in the case of the Eurosystem, during the period under review (from March 2020 to March 2022), some loan programs within LTRO expired (the case of the Additional LTRO), while others, for instance, were extended (the case of the Pandemic LTRO).

central banks outnumbered the value of cash in circulation. The importance of the ratio of value of cash to the amount of funds held at the current account seems to go beyond academic importance. In the aftermath of the Fed balance sheet reversal initiated in October 2017, the amount of funds held by depository institutions fell below the value of cash for the first time in 8 years. With the benefit of hindsight, this fall is being considered the first sign of tensions in the US market, which led the Fed in September 2019 to do a U-turn (namely resuming a purchase of assets). The BOJ is long way off from even considering a reversal of its balance sheet. Nevertheless, the US experience should be borne in mind.

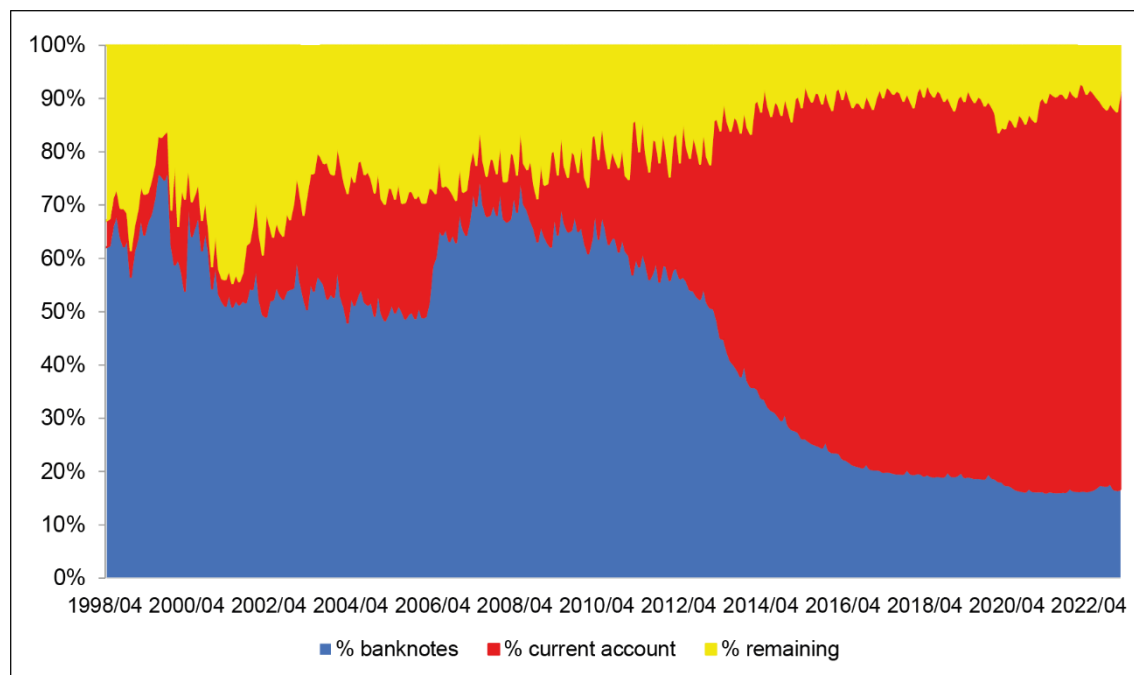
At the turn of the century, banknotes constituted approximately 65% of all BOJ liabilities. Comparing the amount of banknotes to the funds held at the BOJ current account, the former on average was 10 times larger than the latter. An advent of unconventional policies changed all that (*the pecking order*). The launch of QEP in March 2001 caused that the two liabilities to reach parity (the amount of cash equaled the amount of funds held at the current account) in early 2004. In the final days of QEP, the amount of funds was actually slightly higher than the value of the entire cash. The end of the QEP in March 2006 saw an imminent return to the pre-March 2001 pecking order. Launching the CME in October 2010 helped to restore (in the final months of the CME before the commencement of QQE in April 2013) again the parity between the value of the cash and the amount of funds held on the current account.

The policies pursued by the BOJ during Kuroda's governorship led to a sort of a revolution regarding the BOJ liabilities' pecking order. In early-2022, the amount of funds held by credit institutions at the BOJ current account alone surpassed 100% nominal GDP.⁵² It was, and is, by far the largest position of all BOJ liabilities. At the start of QQE in April 2013, the amount of these funds on the current account represented approximately 35% of the balance sheet. In early-2022, this share had more than doubled before declining somewhat in the next 12 months. At the same time, the share of banknotes fell from about 50% in March 2013 to around 16% mainly due to an increase in the amount outstanding of current account held by financial institutions at the BOJ as a result of asset purchases and lending activities. May 2013 was the last month when the value of cash was above the amount of funds held on the BOJ current account. It is unlikely to see any signs pointing toward any reversal in this pecking order in the foreseeable future.

While the ratio of notes in circulation dropped over time, it does not mean that demand for cash was weakening. Indeed, since the inception of the QQE, demand for cash grew by about 47% compared with 11.4% of nominal GDP growth (from Q1 2013 to Q4 2022). By way of comparison, the same value for the euro area were approximately 74% and 36%, respectively. Japan's ratio of cash to nominal GDP, which had been close to 21%, is the highest among the most industrialized economies. The value of banknotes in circulation at the end of December 2022 was ¥125 trillion (i.e., 18.6 billion in terms of the number of banknotes). If these banknotes were stacked up, they would reach a height of approximately 1,859 kilometers—equivalent to 492 times the height of Mount Fuji (3,776 meters). If placed side by side, the banknotes would reach a length of around 2.89 million kilometers—long enough to circle the globe about 72 times, or eight times the distance from the earth to the moon.⁵³ The growing demand for cash is a puzzle since digital payment tools are spreading in Japan, at least in central cities. It is possible that the negative interest rate policy is partly responsible for this trend.

⁵² <https://dashboard.e-stat.go.jp/en/graph?screenCode=00140>.

⁵³ <https://www.boj.or.jp/en/about/education/oshiete/money/c06.htm>.

Figure 14: BOJ's Liabilities Classified by Major Components (%)

Source: Prepared by the authors based on BOJ data.

To evaluate the BOJ's legacy over the past 10 years, special attention must be given to the final year of Kuroda's term in office. The very beginning of this paper referred to a Ben Bernanke article, where he advocated among others the concept of yen's depreciation in the bid to generate inflationary pressure in the domestic economy. For most of the 21st century, the Japanese yen was frequently subject to appreciation since it was regarded as a safe-haven currency like the Swiss franc. The two countries shared similar features such as persistent low inflation and current account surpluses with well-developed financial and capital markets. Thus, the yen tended to appreciate at the time of economic crises. The advent of 2022 changed all that.

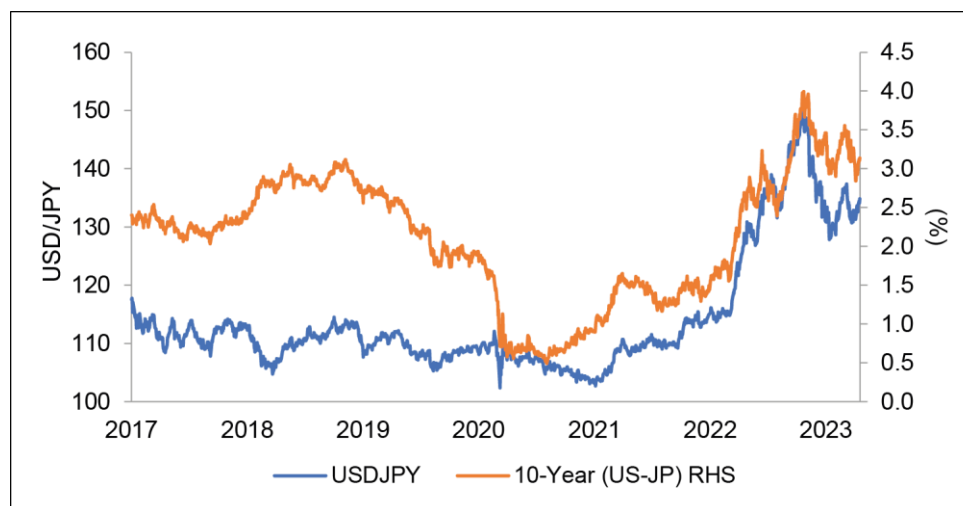
3.7 Revisiting FX Interventions Became a Part of the BOJ's Legacy in the Last 10 Years

If the QQE alone managed to generate substantial yen depreciation (which was ironically to a great extent reversed by the QQE+NIRP hybrid in 2016), the YCC framework managed to keep the yen's exchange rate against the US dollar range bound (in a range from ¥105 to ¥115) for more than 5 years. The exchange rate against the dollar had shown the lowest volatility since the yen's floatation (in 1971). Even a brief period when the Fed was diminishing its balance sheet (from October 2017 to August 2019) had no major effect on the yen. The pandemic crisis, which saw all central banks resorting to expansionary monetary policies, hardly affected the rate of the yen on a sustainable basis.

All this changed in 2022, when almost all central banks worldwide started to tighten their policies to cope with rising inflation triggered by global energy and food price hikes. The BOJ was the only noticeable exception among developed economies. And this interest rate divergence supported by the YCC was strong enough to generate

substantial yen depreciation, as a result of which, the yen fell to levels last seen in 1990. The exchange rate was evidently following the spread between the US and the Japanese 10-year bonds. The yen fell out of its almost 6-year-old range in early March 2022, and in the next few months it fell below levels not seen during Kuroda's term in office. In June, it fell below levels recorded in early-2002. The fall in the value of the yen started to pose a dilemma for the Japanese monetary authorities. The yen exceed ¥150 against the US dollar briefly at the end of October. Since then, the yen's depreciation was stopped and reversed to around ¥130 with substantial fluctuations, mainly reflecting the decline in the 10-year yield in the United States. At the same time, however, inflation started to pick up and in April 2022 it surpassed 2%. Compared with other industrialized economies (such as the United States and the euro area), this increase was rather modest. It was clear that it was sort of an imported inflation—mainly higher food and energy prices stemming both from post-COVID-19 supply constraints in the global economy and effects of international geopolitical tensions. Similar to the euro area and unlike the United States, Japan was, and still is, a net importer of energy and food commodities. The outburst of the Russian invasion of Ukraine had a negative impact on almost all energy importers.

Figure 15: Correlation between USD/JPY and the Spread of the 10-Year Yields between US and Japanese Government Bonds



Source: Prepared by the authors based on Bloomberg data.

There were, however, small clues pointing at domestic demand-driven inflation. That is why, the BOJ firmly stuck to its ultra-loose monetary policies, even though they were in contrast with what other central banks were doing. But it was precisely this contrast that exerted downward pressure on the yen even further. That is why, the MoF's decision to intervene (with the BOJ's intermediation) started to send conflicting messages,⁵⁴ despite reassurances from the Japanese monetary authorities, that this was not the case.⁵⁵ Market participants viewed the actions by the MoF and the BOJ as contradictory since the foreign exchange intervention was done by selling US dollar liquid assets in exchange for purchasing the Japanese yen, while the BOJ continued to supply Japanese yen into the market. In the medium term, this strategy could not have been sustainable. That is why it was rather fortunate for the MoF and the BOJ, that

⁵⁴ [Japan's Yen Intervention Has Limited Impact to Market, Ex-FX Chief Says - Bloomberg.](#)

⁵⁵ [Japan sees BOJ easing and govt FX intervention not contradictory | Reuters.](#)

shortly after October 2022 interventions, a reversal of trends in the world economy occurred, as a result of which the US dollar started to give up its earlier gains in response to a fall in the long-term yields in the United States.

As far as the FX intervention are concerned, these were large-scale purchases of the yen. In September and October 2022, the BOJ purchased ¥2.8 trillion and ¥6.3 trillion, respectively (see Appendix Figure A1).⁵⁶ These were large enough to exert an impact on the FX market. In September, the BOJ intervened once, while a month later it intervened on two occasions: on 21 October buying ¥5.6 trillion and on 24 October purchasing an additional ¥0.7 trillion. The September intervention brought the yen's exchange rate against the dollar from level above ¥146 to levels close to ¥142. The largest October intervention helped the yen to strengthen from almost ¥152 to levels close to ¥144.5.⁵⁷ Apart from large purchases of the domestic currency, there was one more factor behind the success of these interventions, namely a surprise effect. Contrary to its tradition, the BOJ intervened outside Tokyo trading hours.⁵⁸

Most probably in order to avoid similar tensions in the future, the BOJ expanded in December 2022 its tolerance band around the YCC's target of 0% from ± 25 basis points to ± 50 basis points.⁵⁹ The target range was increased from ± 20 basis points to ± 25 basis points in March 2021 to allow flexible YCC operations. The actions to increase volatility of the 10-year yield were undertaken relatively smoothly in 2018 and 2021, mainly because of limited upward pressures on the 10-year yield. The BOJ's decision to expand the target range to ± 50 basis points in December 2022 created substantial volatility in the JGB bond market mainly because Kuroda had strongly rejected such a move in September 2022.⁶⁰ While the 2018 and 2021 decisions were made to increase fluctuations of the 10-year yield and can be viewed as steps toward normalization of the YCC, the 2022 decision was conducted for different reasons.

The BOJ provided two reasons for expanding the target range last December—namely, correcting the distortions and to improve the functioning of the bond market (Shirai 2023a; 2023b). Distortions refer to the state in which the 10-year yield, which the BOJ had (at the time) kept below 0.25%, fell below the yields of JGBs with remaining maturities of shorter than 10 years (i.e., 8 years or 9 years). Amid growing global upward pressures on long-term yields, the BOJ decided to maintain the target range by carrying out fixed-rate JGB purchase operations (buying unlimited 10-year JGBs at a 0.25% interest rate) every business day from April 2022. The fixed rate operations were already introduced earlier, so the BOJ could do so every business day, but the BOJ highlighted the use of the operations every business day to signal to the markets its determination to maintain the 10-year yield ceiling. However, the frequent use of the operations in the midst of upward pressures driven by higher long-term yields in the United States and other countries ended up exerting a lot of downward pressure on (primarily) the 10-year yield, causing distortions. The second reason for the December 2022 decision was to improve the functioning of the JGB market that had been substantially deteriorated as a result of the continuous use of the fixed-rate purchase operations to encounter speculative activities led by foreign investors. As the BOJ's bond market intervention has been disproportionately large, the number of buyers and sellers in the JGB market has shrunk. Consequently, most transactions in the JGB

⁵⁶ https://www.mof.go.jp/english/policy/international_policy/reference/feio/monthly/20221031e.html.

⁵⁷ <https://www.ft.com/content/109d4945-9750-44c2-a74b-b44c14ddd265..>

⁵⁸ <https://asia.nikkei.com/Business/Markets/Currencies/Japan-s-currency-interventions-3-things-to-know>.

⁵⁹ <https://www.ft.com/content/9e3ff3db-24c8-4daa-bb92-9788cbbba1306>.

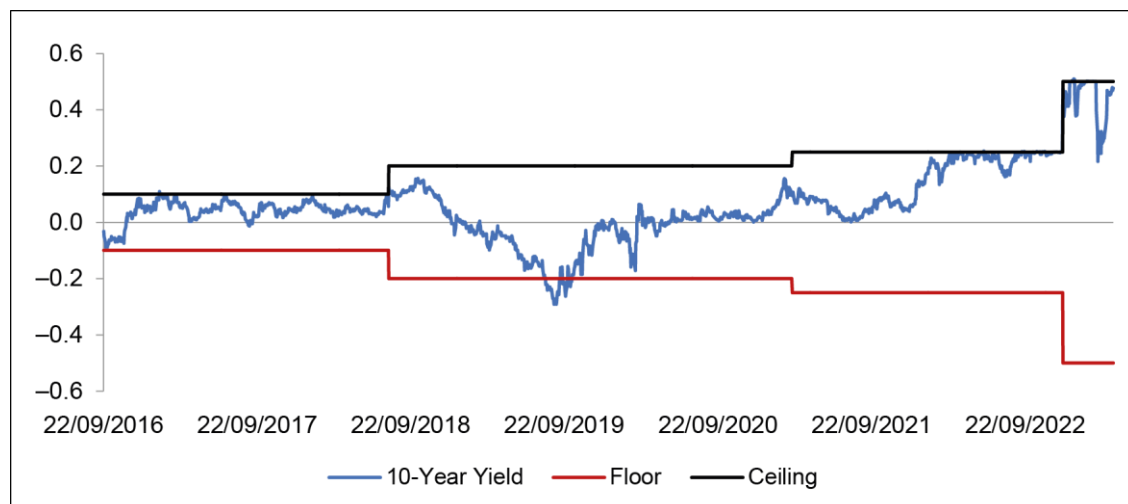
⁶⁰ <https://jp.reuters.com/article/boj-kuroda-idJPKBN2QR0DG>.

market concentrated on sales of JGBs by market participants to the BOJ as the largest investor. When the number of market participants had decreased and the depth of the market thinned, bond yields tended to fluctuate greatly when a sudden event occurred. In addition, since JGB yields form the basis for interest rates on corporate bonds and bank loans, market participants had also become increasingly concerned that distortions and the deterioration in the functioning of government bonds might adversely affect the pricing and procurement of private sector funds.

Reflecting these concerns, the BOJ expanded the 10-year target range to correct these two problems, but the distortions remained. Subsequently, at the meeting held in January 2023, the BOJ decided to revise the variable rate method of fund-supplying operations (open market operations) by lengthening the period from within 1 year up to 10 years. These operations aimed at providing loans to financial institutions against eligible collateral, including JGBs. Globally, central banks use such open market operations mainly to supply short-term funds for several months and thus the BOJ's action is viewed as an unusual response. Immediately, on January 23, the 5-year fund-supplying operation was implemented by the BOJ. The average successful bid interest rate was 0.145%, suggesting that banks could get a profit margin by borrowing at a low interest rate of just over 0.1% and purchasing 5- to 10-year government bonds. Thus, the number of bids was substantially high at 3.1 times the offer. Since then, the distortion has been somewhat corrected, but not eliminated. The BOJ conducted another 5-year fund-supply operation on February 14. The average successful bid interest rate was 0.121% in the midst of some modest upward pressures on the 5-year yield, and the number of bids was high at 3 times the offer. Despite these measures, the distortions and deteriorated functioning in the JGB market persist.

Since the BOJ expanded the target range by generating surprise, market participants began to anticipate another action to expand the target range at the January 2023 meeting. Some attempted speculative transactions by short-selling JGBs prior to the meetings. Prior to Kuroda's final monetary policy meeting held in March 2023, markets speculated again on further flexibility actions. However, the BOJ preserved the same policy by emphasizing that maintaining the current monetary easing stance remains essential for the Japanese economy.

After the March 2023 meeting, the fluctuations around the YCC target diminished substantially and they were even able to trade within the older tolerance band, as the crisis generated by the bankruptcy of Silicon Valley Bank and later by the fall of the Credit Suisse generated a sudden risk aversion (with Japanese assets regaining their traditional safe-haven status). Furthermore, a threat to global financial stability decreased other central banks' eagerness to tighten their policies further. This change of stance led to a substantial fall in the spread involving the US Treasury paper and the JGB, helping the Japanese currency rebound substantially.

Figure 16: The YCC with Lowest (Floor) and Highest (Ceiling) Tolerance Band (%)

Source: Prepared by the authors based on Bloomberg data.

3.8 Uniqueness of the BOJ's Policies

The BOJ was a pioneer in launching various unconventional monetary policy tools. Its beginning goes back to the ZIRP in 1999 and the QEP in 2001. Ever since, unconventional monetary policies have started to spread gradually around the globe. First it was the GFC that encouraged other major central banks such as the Fed to emulate the Japanese experience on their home ground. Then it was the COVID-19 pandemic crisis, which paved way for other central banks to adopt policies that were initially used by the BOJ.

Despite unconventional policies being tested by many other central banks, the BOJ's policies were able to preserve their unique character that other central banks are neither willing nor able to replicate. This uniqueness refers above all to the QQE. It is neither about being the first nor having the largest balance sheet. To be precise, despite being a pioneer, the BOJ was neither the first central banks to see its balance sheet surpassing the domestic economy's nominal GDP nor to reach the highest ratio of its balance sheet to nominal GDP. It was in August 2016, when the SNB balance sheet hit the 100% nominal GDP mark. And by early-2022, the SNB balance sheet reached an unprecedented 145%—a level yet to be reached by the SNB. Still, it must be borne in mind that the increase of the SNB assets, contrary to the BOJ and other major central banks, was almost entirely generated by a purchase of foreign assets. This is an important difference, because the supply of foreign assets—in stark contrast to domestic assets—is almost infinite. In other words, the SNB was practically free of the problem related to the supply's constraints of domestic assets.

So, what is the uniqueness of the BOJ policies? It is all about the amount and the structure of purchased assets. No other central bank is in possession of every second bond issued by its government. Prior to COVID-19, it was only the Swedish Riksbank that approached this point without reaching it. But it is not very meaningful to compare the case of Sweden with that of Japan. First, Swedish nominal GDP represents merely 13.6% of Japanese nominal GDP. And if PPP is applied, this share is even smaller, namely 11%. Second, it is all about the size of public debt. If Sweden's public debt is below 40% of nominal GDP, the Japanese one surpasses 260% of nominal GDP.

It is true that the outbreak of the COVID-19 pandemic induced other central banks to purchase government bonds. Their holdings of government bonds, however, did not reach the 50% nominal GDP mark. And finally, all the central banks that saw an increase in their holdings of government bonds, have already launched a reversal process. In other words, their ownership of government bonds managed to decrease. Contrary to these trends, the BOJ remains committed to the monetary easing framework including JGB purchases.

As the BOJ holds more than half of JGBs outstanding, it has a substantial impact on the bond markets in Japan. According to the latest BOJ liquidity indicator in the JGB market (based on the survey of bond market participants), liquidity defined as volumes of orders at the bid-ask price has dropped sharply since 2022. The inter-dealer daily transaction volume also fell substantially.⁶¹ In the early days of the QQE, the daily volume hardly traded below ¥600 billion, and the same volume at the turn of 2014 and 2015 surpassed quite often levels of ¥900 billion. Since the COVID-19 pandemic, the volume seldom surpassed ¥400 billion. This fall was mainly generated by the so-called on-the-run bonds, which fell by as much as 80% (from levels close to ¥150 billion to below ¥30 billion). The same is true for bid-ask spreads of inter-dealer transactions, with the upward trend clearly visible since the second half of 2022. If the average level of bid-ask spread varied for a long time around 0.5 basis points, it jumped to levels as high as 5 basis points. The increase in the spread was particularly visible in the off-the-run-bonds.

Risks or threats stemming from such a high ownership of the government debt are not confined to the effect of liquidity drying up. It is also related to potential BOJ losses stemming from this ownership. Higher inflation worldwide raises the prospect of higher interest rates and subsequently losses stemming from bonds purchased earlier. The BOJ has not published its Annual Review 2023 yet, but in the Annual Review for 2022, the BOJ claimed to have registered in FY2021 the so-called net special loss⁶² of ¥754.2 billion, compared with the loss of ¥523.4 billion from a year earlier. The BOJ's unrealized losses from JGB holdings reached ¥8.8 trillion at the end of December 2022. While the BOJ's accounting evaluates JGB holdings at amortized cost and thus is not based on mark to market, the issues related to huge unrealized losses has been often questioned in the *Diet* (Parliament). In response to the inquiries, the BOJ always reassures the Diet that the central bank will not default, as it can always secure profits by issuing sovereign currency. Nonetheless, the BOJ is likely to face actual non-negligible losses if the 2% price stability target is achieved stably and the interest rate applied to the current account balances at the BOJ begin to rise in the phase of monetary policy normalization.

No other central bank in the world seems to be exposed to such high risk related to the balance sheet. A process of increasing the credit and market risks of the assets on the central bank's balance sheet is further enhanced by a purchase of securities other than JGBs. The BOJ's holdings of foreign currency-denominated bonds are valued at market value. Although the amount of around ¥9 trillion is small compared to the amount of huge foreign reserves of ¥163 trillion held by the MoF, the appreciation of the yen could easily lead to a deterioration of BOJ's balance sheet. While ETFs and J-

⁶¹ <https://www.boj.or.jp/en/paym/bond/ryudo.pdf>.

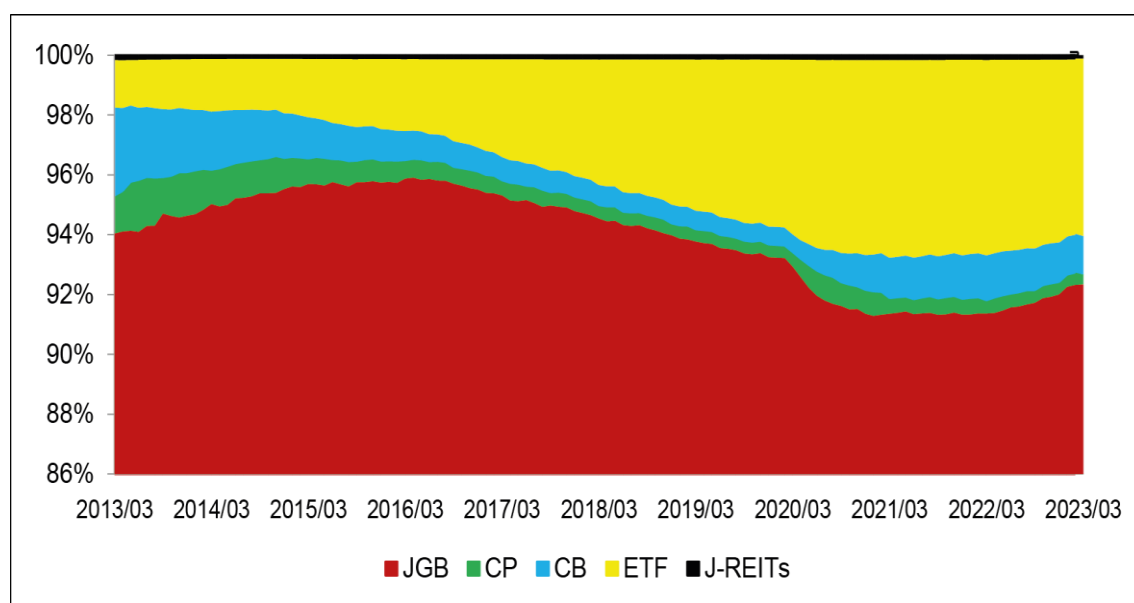
⁶² According to this review, such a loss was mainly due to (1) the transfer of funds to the provision for possible losses on bonds transactions to compensate for any fluctuation in net income arising from the implementation of Quantitative and Qualitative Monetary Easing with Yield Curve Control, and (2) the transfer of funds to the provision for possible losses on foreign exchange transactions following net foreign exchange-related gains. Net income for the term, after subtracting corporate income tax, inhabitants taxes, and enterprise taxes. See: <https://www.boj.or.jp/en/about/activities/act/ar2022.htm>.

REITs are valued at cost determined by the moving-average method, the impairment procedures will be applied in case of considerable price fall. Thus, the BOJ's balance sheet could deteriorate sharply if the appreciation of the yen, stock price fall, and the monetary policy normalization take place at the same time. While the BOJ's capital and provision amount to about ¥12 trillion currently, substantial losses, if continued for an extended period, may wipe them out entirely. In such circumstances, measures to recapitalize the balance sheet may need to be discussed at the Diet.

J-REITs share in the pecking order of all purchased securities used to be relatively low compared to other major central banks, but the credit and market risks of these assets is higher. The BOJ seems to be the only central bank to hold the stock of a large number of listed companies indirectly through an intermediation of large positions in the ETFs (Harada and Okimoto 2019). The BOJ initially allocated its budget to major stock market indices such as the Nikkei 225. However, as the BOJ's holdings of stocks increased and become major shareholders of 225 companies, the BOJ gradually shifted the weight of ETF purchases toward the TOPIX, which covers all listed companies on the Prime market of the Tokyo Stock Exchange (Shirai 2020). Since 2021, the BOJ has purchased the TOPIX-linked ETFs only.⁶³

Because of the large amount of JGBs purchased by the BOJ, the volume of purchases of securities other than JGBs was initially difficult to detect due to their relatively small sizes. It was the introduction of the YCC in September 2016, which enabled the share of JGBs in the pecking order to fall slightly, from around 95.4% in the summer of 2016 to around 93.1% at the turn of 2019 and 2020. The eruption of the COVID-19 pandemic saw this trend gathering pace. As a result, in the first 12 months of the pandemic, the share of JGP fell to as low as 91.1%.

Figure 17: Share of the BOJ's Assets Classified by Major Components in Total Assets (%)



Note: CP refers to commercial paper and CB refers to corporate bonds.

Source: Prepared by the authors based on BoJ database.

⁶³ https://www.boj.or.jp/en/mopo/measures/mkt_ope/ope_t/opetori21.htm.

Thus, the key beneficiaries of the BOJ's purchases, other than JGBs, were corporate bonds, commercial paper, ETFs, and J-REITs. As far as corporate bonds and commercial paper are concerned, the BOJ pursued reinvestment strategies to maintain their amounts outstanding at about ¥3.2 trillion and ¥2.2 trillion, respectively. The BOJ decided in April 2020 to increase the maximum amount of additional purchases of commercial paper and corporate bonds and conduct purchases with the upper limit of the amount outstanding of about ¥20 trillion in total. To achieve this purchase amount, the maximum amounts outstanding of a single issuer's corporate bonds and commercial paper were raised, and the maximum remaining maturity of corporate bonds was extended to 5 years. As a result, corporate bonds' share in the pecking order of all acquired assets more than doubled (from around 0.65% of all the purchased assets to 1.5% in early 2022). After reaching a peak in March 2022, it started to fall gradually. A somewhat different pattern was observed in case of commercial paper. During the early months of the pandemic, their share rose from 0.42% of the BOJ's total assets in February 2020 to 0.9% 6 months later. However, after reaching the peak in August 2020, the ratio started to fall gradually to the levels observed prior to the pandemic. These trends with regards to corporate bonds and commercial paper were actually almost in line with the BOJ's announcement in December 2021 that it would purchase about the same amount of commercial paper and corporate bonds as the level prior to the COVID-19 pandemic from April 2022 onward. This meant that the amounts outstanding of these two assets would decrease gradually to the pre-pandemic levels, namely, toward about ¥2 trillion for commercial paper and about ¥3 trillion for corporate bonds.⁶⁴

The BOJ also decided to purchase ETFs and J-REITs somewhat more actively. This was done by setting the upper limit of ¥12 trillion and ¥180 billion to purchase ETFs and J-REITs, respectively. Prior to this, the ETF and J-REIT purchases were made in a manner that their amounts outstanding would increase at annual paces of about ¥6 trillion and about ¥90 billion, respectively. The BOJ could achieve these amounts in a flexible manner from the perspective of lowering risk premia of such asset prices depending on market conditions. As a result, for example, the share of ETFs in the first 2 years (early-2020–early-2022) of the pandemic rose moderately from around 5.5% to 6.5% of the BOJ's total assets. The targets for upper limits (of ¥12 trillion and ¥180 billion for ETFs and J-REITs, respectively) were confirmed in the latest Statement on Monetary Policy on 10 March 2023.

Based on the development of the BOJ's monetary easing process under Kuroda's governorship, this paper views that no other central bank was able to match the BOJ's boldness and courage in pursuing both quantitative and the qualitative easing extensively. The BOJ's unprecedented efforts were aimed at fulfilling its promises to get Japan out of the deflation trap.

4. CONCLUSIONS AND SUMMARY

Kuroda's arrival at the BOJ coincided with a process—known as “Japanification”—gathering pace. Japanification is the term that is widely understood and frequently used particularly among experts and the media outside of Japan. It refers to a period of low inflation (or even deflation) and subsequent low interest rates (Wakatabe 2022). Many central banks in developed economies often referred to the need of avoiding the Japanification and deflation when they were trying to justify their decisions to launch large-scale monetary easing. In order to understand the Japanification better, it

⁶⁴ https://www.boj.or.jp/en/mopo/mpmdeci/state_2021/k211217a.htm.

is important to clarify the differences between the Japanification and the Great Moderation. Can the latter be perceived as a derivative of the former? Only to a certain extent. Indeed, Japan tended to display lower inflation well ahead of the Bubble burst at the turn in the late 1980s. Japan tended to be among a few countries (along with Switzerland and West Germany) with the lowest inflation since overcoming the second oil shock (in the early 1980s). However, a rapidly aging society in Japan (far quicker than in other countries) has been another factor that makes the case of this country special. The same is true when it comes to assessing the effect of insularity on the Japanese economy—especially from the point of view of its local and still rather closed domestic labor market.

The legacy of BOJ policies pursued during Kuroda's tenure offers plenty of room for interpretation. If the inflation rate—which is driven by higher domestic demand, corporate profits, and resultant wage growth—is taken as the key criterion in judging his achievement, it has not yet been met. It was Kuroda himself, who offered at the end of 2022, his verdict on this particular issue. According to him, Japan's economy, as a result of monetary easing policies pursued during his term in office, is no longer in deflation, in the sense of a sustained decline in prices. However, Japan—in the words of its outgoing central banker—had not yet reached a situation where the price stability target of 2% had been achieved in a sustainable and stable manner, accompanied by domestic demand and wage increases (Kuroda 2022).

The BOJ emphasizes the relationship between wages and prices. There is no doubt that the BOJ tried to stimulate domestic price increases through stimulating domestic demand. However, rather long-standing stagnant wages proved to be a factor inhibiting a sustainable increase in price level. The lack of wage hikes stemmed from a particular and rather unique feature of the Japanese labor market. The latter is exposed to a dual structure (somewhat similar to what occurred in Spain in the late 20th century): the share of non-regular employees (who are more flexible and have wages and fringe benefits that are lower than those of regular workers) started to grow at the expense of regular employees (generally hired permanently until the official retirement age, with promotion and wages based on seniority). The use of non-regular workers was preferred by companies because of the accompanying high cost lay-offs of regular workers and lower wages demanded by non-regular workers. Furthermore, the labor market is exposed to some structural changes, namely higher share of female workers in the workforce as well as senior workers, preventing upward wage pressures to take hold, although enabling housewives and senior people to increase their household incomes. This wage and employment structure may be attributable to productivity growth.

At his final press conference held on 7 April 2023 as Governor of the BOJ, Kuroda repeated his view that a gradual growth rate of wages is now taking place in Japan. This is because the perception long embedded in Japanese society (so-called “*norm*” often used by the BOJ)—the idea that the society views that it is natural that prices and wages do not rise)—appears to be changing even though this change was triggered by companies' decision to raise wages to compensate for import price shocks and growing calls by the government to raise wages. It is true that companies show more eagerness to raise wages to increase workers' incentives and cope with labor shortages. Kuroda also emphasized that unconventional monetary easing had been effective enough to remove Japan out of deflation and that the reason why the 2% price stability target was not achieved stably was due to the prevalence of the “*norm*.”

Indeed, it were the developments in the labor market, which took place in the aftermath of COVID-19 pandemic, that contributed to a surge in inflation worldwide. For employers who had to dismiss their staff in the early days of the pandemic, it proved to be impossible to re-hire, once the pandemic came to the end, their former staff on similar terms prior to the pandemic. Much of this labor force either emigrated somewhere else in search of new opportunities or decided simply to change professions. The only way to re-hire dismissed employees was to raise their remuneration. Whether this pattern described by Harold James in his book *Seven Crashes. The Economic Crises That Shaped Globalization*, can be replicated in Japan is yet to be seen (James 2023).

However, it is not yet clear whether Japanese companies will keep raising wages sustainably in the future given that domestic demand and potential economic growth has become substantially low. An average real GDP growth rate for 2013–2022 was just 0.5% compared with 0.7% of the previous decade. The cabinet office estimates that on the average, the potential GDP growth rate was a mere 0.6% for 2013–2022 and 0.5% for 2003–2012. Households' real consumption growth was –0.1% in 2013–2022 compared with 0.6% in the previous decade. Sluggish real domestic demand growth and potential GDP growth rates are clearly impacted by the rapid pace of aging, where the ratio of population aged 65 years and above accounts for about 30% of the total, while those aged below 15 years account for just 11.8% (and declining). According to the latest estimate by the National Institute of Population and Social Security Research released in April 2023, Japan's total population has been declining since 2009 and is expected to drop further by 3.5 million people over the next 5 years (during the new governor's term); only the elderly (aged 65 years and above) are projected to increase by 417,000, while the working age population (15 to 64 years old) and young population (below 15 years old) will likely drop significantly (National Institute of Population and Social Security Research 2023). It is uncertain whether Japan's domestic demand and potential GDP growth rates will pick up over the next 5 years. The life expectancy is expected to rise further and thus the elderly may be willing to save more for the longevity risk and rising medical cost.

It is also yet to be seen how the policies pursued by the BOJ in the last 10 years will be evaluated in the future: will they be seen as a separate chapter in Japanese monetary history, or will they be considered an important part of a set of policies whose origins go back to the start of the QEP in March 2001 or even the ZIRP initiated in February 1999. Both the ZIRP and the QEP were unprecedented events in the history of economics. With the benefit of hindsight, the consensus is that ZIRP had not been pursued long enough, while the QEP could have been more aggressive and decisive. Kuroda's legacy also depends on how the new governor Kazuo Ueda will treat his predecessor's policy. So far, he has expressed strong support for Kuroda's monetary easing and plans to continue until inflation outlook confirms the achievability of 2% inflation stably (Shirai 2023a; 2023b). Meanwhile, many market participants and experts expect that the current yield curve control should be abandoned sooner without waiting for achieving the 2% price stability target because of their concerns about side effects arising from prolonged monetary easing.⁶⁵

⁶⁵ <https://asia.nikkei.com/Editor-s-Picks/Interview/BOJ-may-end-yield-curve-control-by-September-MUFG-markets-chief>.

Despite various challenges ahead regarding the direction of future monetary policy, the BOJ's experience has inspired many other central banks in the world. During the Global Financial Crisis, many central banks in industrialized countries opted for unconventional monetary easing tools including asset purchases, some of which had been experimented in Japan. And in the wake of an outbreak of the COVID-19 pandemic in early 2020, even some major emerging economies (Poland, Croatia, Chile) opted for implementing a massive purchase of assets. The BOJ's conduct of monetary policy under Kuroda's governorship deserves credit for its boldness in pursuing complex frameworks, which were often hybrids of regimes pursued somewhere else. The YCC regime is a framework, for whose creation Japan cannot take credit. However, the YCC was long forgotten and perceived as an obsolete framework prior to Kuroda's arrival at the BOJ and the subsequent attempt to employ this particular framework. During the pandemic, the Reserve Bank of Australia (RBA) opted to implement the YYC. Obviously, there were significant differences between the YCC pursued by Japan and Australia, with the latter opting to target the yield of 3-year government bonds instead of 10-year bonds. One thing, however, is clear: had the Japanese experience with the YCC been perceived as a flop, RBA would have never considered the YCC framework as the right choice to address the unprecedented challenges during the COVID-19 pandemic.

Wakatabe (2022) stated that the world may be in transition from a low inflation period to one of higher inflation and interest rates. One of the reasons behind this concept is the end of the peace dividend and a subsequent shift toward a wartime economy. If history can serve as a guide, US President Franklin Roosevelt's economic policies set in motion in 1933 hardly contributed to the end of deflation (nor even a period of low inflation). It was not until an outbreak of three wars in succession with rather short intervals in between, namely World War II in the 1940s, the Korean war in the 1950s, and the Viet Nam war in the 1960s, that deflationary memories disappeared entirely and inflation pressures took hold of the world economy. The Russian invasion of Ukraine along with a possible escalation of tensions in other regions may fit the logic of an inflationary wartime economy. However, this extremely pessimistic scenario should not be taken for granted. Relying excessively on a shift from the peace dividend toward a wartime economy is too risky. The new BOJ governor and management appear to continue to aim for the 2% price stability target and, together with the government, may work toward finding a macroeconomic formula that would fit the needs of a modern and highly developed large, aging economy. Based on the detailed review undertaken in this paper, we conclude that if Japan finds its formula, it will be only a question of time before the rest of the world opts to implement it.

REFERENCES

- Amamiya, M. 2017. *History and Theories of Yield Curve Control*. Keynote Speech at the Financial Markets Panel Conference to Commemorate the 40th Meeting. 11 January. https://www.boj.or.jp/en/about/press/koen_2017/data/ko170111a1.pdf.
- . 2019. *Japan's Experience and its Implications for China - Monetary Policy and Financial System*. Speech by Mr. Masayoshi Amamiya, Deputy Governor of the Bank of Japan, at the PBC School of Finance, Tsinghua University. Beijing. 7 November 2019. BIS Central Bank Speech. <https://www.bis.org/review/r191107d.htm>.
- Bank of Japan. 2022. Bank of Japan Annual Review 2022. <https://www.boj.or.jp/en/about/activities/act/ar2022.htm>.
- Bergsten, F. C., T. Ito, and M. Noland. 2001. *No More Bashing - Building a New Japan-United States Economic Relationship*. The Peterson Institute for International Economics.
- Bernanke, B. 1999. *Japanese Monetary Policy: A Case of Self-Induced Paralysis?* Princeton University. https://www.princeton.edu/~pkrugman/bernanke_paralysis.pdf.
- Bernanke B. 2004. *The Great Moderation*. Remarks by Governor Ben S. Bernanke at the meetings of the Eastern Economic Association. Washington, D.C. 20 February. <https://www.federalreserve.gov/boarddocs/speeches/2004/20040220/#fn1>.
- Bank for International Settlements. 2019. *Unconventional Monetary Policy Tools: A Cross-Country Analysis*. Report Prepared by a Working Group Chaired by Simon M Potter (Federal Reserve Bank of New York) and Frank Smets (European Central Bank). <https://www.bis.org/publ/cgfs63.htm>.
- Bindseil, U. 2016. *Evaluating Monetary Policy Operational Frameworks*. Federal Reserve Bank of Kansas City. https://www.kansascityfed.org/documents/7036/BindseilPaper_JH2016.pdf.
- Borralló Egea, Fructuoso and Pedro del Río López. 2012. Monetary Policy Strategy and Inflation in Japan. Banco de España Eurosistema Documentos Ocasionales N.º 2116. <https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesSerias/DocumentosOcasionales/21/Files/do2116e.pdf>.
- Cúrdia, V., and M. Woodford. 2010. Conventional and Unconventional Monetary Policy. *Federal Reserve Bank of St. Louise Review* 92(4): 229–264. July/August. <https://files.stlouisfed.org/files/htdocs/publications/review/10/07/Curdia.pdf>.
- Delgado M., T. Gravelle. 2023. CGFS Papers No 68 Central Bank Asset Purchases in Response to the COVID-19 Crisis. BIS. [Central bank asset purchases in response to the Covid-19 crisis \(bis.org\)](https://www.bis.org/cgfs/p68/).
- Fukumoto, T., M. Higashi, Y. Inamura, and T. Kimura. 2010. Effectiveness of Window Guidance and Financial Environment—In Light of Japan's Experience of Financial Liberalization and a Bubble Economy. *Bank of Japan Review 2010-E-4*, International Department. the Bank of Japan. August. https://www.boj.or.jp/en/research/wps_rev/rev_2010/rev10e04.htm.
- Gesell, Silvio. 1891. *Die Reformation im Münzwesen als Brücke zum sozialen Staat*. Buenos Aires: Selbstverlag.

- Ghaffour, A.R. 2023. Funding for Lending Programmes Insights from a Markets Committee Workshop Chaired by Abdul Rasheed Ghaffour (Central Bank of Malaysia), https://www.bis.org/publ/mc_funding_for_lending_programmes.pdf.
- Hakkio, C. S. 2013. *The Great Moderation*. Federal Reserve History Section. <https://www.federalreservehistory.org/essays/great-moderation>.
- Harada, K., and O. Tatsuyoshi. 2019. The BOJ's ETF Purchases and Its Effects on Nikkei 225 Stocks. *RIETI Discussion Paper Series 19-E-014*. The Research Institute of Economy, Trade and Industry. <https://www.rieti.go.jp/jp/publications/dp/19e014.pdf>.
- Ito, T. 2021. An Assessment of Abenomics: Evolution and Achievements. *Asian Economic Policy Review*, Vol. 16. Issue 2. pp.190–219, 18 July. <https://onlinelibrary.wiley.com/doi/full/10.1111/aepr.12353>.
- Itoh, M., Y. Morita, and M. Ohnuki. 2020. Monetary Policy in the 1990s: Bank of Japan's Views Summarized Based on the Archives and Other Materials. *Monetary and Economic Studies* 38: 55–168. November. Institute for Monetary and Economic Studies (IMES), Bank of Japan. <https://www.imes.boj.or.jp/research/papers/english/me38-3.pdf>.
- James, H. 2023. *Seven Crashes. The Economic Crises That Shaped Globalization*. Connecticut: Yale University Press.
- Jordan, T. 2015. The Swiss National Bank's Monetary Policy and the Swiss Financial Centre. Speech by Mr. Thomas Jordan, Chairman of the Governing Board of the Swiss National Bank, at the First Meeting of the "Rencontres Économiques de Genève." Organized by Fondation Genève Place Financière, Institut National Genevois, Investment Strategists Association of Geneva. Geneva. 3 November. <https://www.bis.org/review/r151105c.pdf>.
- . 2022. *Monetary Policy Under New Constraints: Challenges for the Swiss National Bank*. Speech by Thomas Jordan, Chairman of the Governing Board, Jackson Hole Economic Policy Symposium: Reassessing Constraints on the Economy and Policy. 27 August. https://www.snb.ch/en/mmr/speeches/id/ref_20220827_tjn.
- Jensen, J.R., J. G. Mikkelsen, and M. Spange. 2017. The ECB's Unconventional Monetary Policy and the Role of Exchange Rate Regimes in Cross-Country Spillovers. Danmarks National Bank Working Paper No. 119. https://www.nationalbanken.dk/en/publications/Documents/2017/10/DNWP_119.pdf.
- Ito, T. 2021. An Assessment of Abenomics: Evolution and Achievements. *Asian Economic Policy Review* 16: 190–219. <https://doi.org/10.1111/aepr.12353>.
- Kawai, M. and S. Takagi. 2009. Why Was Japan Hit So Hard by the Global Financial Crisis? Asian Development Bank Institute Working Paper Series No. 153. October. <https://www.adb.org/sites/default/files/publication/156008/adbi-wp153.pdf>.
- Kuroda, H. 2016. The Battle Against Deflation: The Evolution of Monetary Policy and Japan's Experience. Speech at Columbia University in New York. 13 April. https://www.boj.or.jp/en/about/press/koen_2016/data/ko160414a1.pdf.
- . 2022. *Toward Achieving the Price Stability Target in a Sustainable and Stable Manner Accompanied by Wage Increases*. Speech at the Meeting of

- Councillors of Keidanren (Japan Business Federation) in Tokyo. 26 December.
https://www.boj.or.jp/en/about/press/koen_2022/ko221226a.htm.
- Kuttner, K. 2014. *Monetary Policy During Japan's Great Recession: From Self-Induced Paralysis to Rooseveltian Resolve*. Williams College. May 30.
https://www.spfusa.org/wp-content/uploads/2015/01/Paper_Monetary-Policy-during-Japan%E2%80%99s-Great-Recession_Kuttner-20140530.pdf.
- Maeda, E., B. Fujiwawa, A. Mineshima, and K. Taniguchi. 2005. Japan's Open Market Operations Under the Quantitative Easing Policy. Bank of Japan Working Paper Series No. 05-E-3 April.
<https://www.ecb.europa.eu/events/pdf/conferences/mpimp/maeda.pdf>.
- Nakaso, H. 2016. *Japan's Economy and the Bank of Japan: Yesterday, Today, and Tomorrow*. Speech at the Economic Conference in Tokyo Co-Hosted by Keio University and Bocconi University to Commemorate the 150th Anniversary of Diplomatic Relationship between Italy and Japan. 23 May.
https://www.boj.or.jp/en/about/press/koen_2016/data/ko160523a1.pdf.
- . 2017. *Evolving Monetary Policy – the Bank of Japan's Experience*. Speech by Mr. Hiroshi Nakaso, Deputy Governor of the Bank of Japan, at the Central Banking Seminar, hosted by the Federal Reserve Bank of New York, New York City, 18 October. <https://www.bis.org/review/r171020d.htm>.
- Nardi, B. G., N. Chukwuma, and J. Meaning. 2018. The Term Funding Scheme: Design, Operation and Impact. *The Bank of England Quarterly Bulletin* Q4 2018. <https://www.bankofengland.co.uk/-/media/boe/files/quarterly-bulletin/2018/term-funding-scheme-web-version.pdf>.
- National Institute of Population and Social Security Research. 2023. Population Projections for Japan: 2021 to 2070 (With long-range Population Projections: 2071 to 2120), April (in Japanese). https://www.ipss.go.jp/pp-zenkoku/j/zenkoku2023/pp_zenkoku2023.asp.
- OECD Economic Survey for Japan. 2021. [OECD Economic Surveys: Japan 2021 | OECD iLibrary \(oecd-ilibrary.org\)](https://www.oecd-ilibrary.org/economic-surveys/japan-2021).
- Orphanides, A. 2004. Monetary Policy in Deflation: The Liquidity Trap in History and Practice. *North American Journal of Economics and Finance* 15(1): 101–24. <https://www.federalreserve.gov/econres/feds/monetary-policy-in-deflation-the-liquidity-trap-in-history-and-practice.htm>.
- Roubini N. 2022. *From Great Moderation to Great Stagflation*. Project Syndicate, <https://www.project-syndicate.org/commentary/great-stagflation-has-replaced-great-moderation-by-nouriel-roubini-2022-08?barrier=accesspaylog>.
- Sato, T. 2009. *Global Financial Crisis: Japan's Experience and Policy Response*. Asian Economic Policy Conference Panel Discussion, the Federal Reserve Bank of San Francisco, pp. 285–289. https://www.frbsf.org/wp-content/uploads/sites/4/Panel_Sato.pdf.
- Shirai, S. 2018. *Mission Incomplete: Reflating Japan's Economy* (second edition), Asian Development Bank Institute. May.
<https://www.adb.org/publications/mission-incomplete-reflating-japan-economy>.

- . 2020. *Growing Central Bank Challenges in the World and Japan: Low Inflation, Monetary Policy, and Digital Currency*, Asian Development Bank Institute. June. <https://www.adb.org/publications/growing-central-bank-challenges-world-japan-low-inflation-monetary-policy-digital-currency>.
- . 2023a. Incoming BOJ Head Kazuo Ueda's Vision for Balancing Easing and Exit. *Diamond Online*. 15 February. <https://diamond.jp/articles/-/317714> (accessed 01 05 2023).
- . 2023b. Will the New BOJ Chief Choose to Maintain the Status Quo? *The Japan Times*, Opinion. 23 March. <https://www.japantimes.co.jp/opinion/2023/03/23/commentary/japan-commentary/ueda-monetary-policy/> (accessed 01 05 2023).
- Smaghi, L. B. 2009. Conventional and Unconventional Monetary Policy. *Keynote lecture at the International Center for Monetary and Banking Studies (ICMB)*. Geneva. 28 April. <https://www.ecb.europa.eu/press/key/date/2009/html/sp090428.en.html2>.
- Sommer, M. 2009. Why Has Japan Been Hit So Hard by the Global Recession?" IMF Staff Position Note SPN/09/05. Prepared by the Asia and Pacific Department (Martin Sommer), International Monetary Fund, 18 March. <https://www.imf.org/external/pubs/ft/spn/2009/spn0905.pdf>.
- Stock J. H., and M. W. Watson. 2003. *Has the Business Cycle Changed? Evidence and Explanations*, Prepared for the Federal Reserve Bank of Kansas City Symposium, "Monetary Policy and Uncertainty," Jackson Hole, Wyoming. August 28–30, 2003. https://www.princeton.edu/~mwatson/papers/jh_2.pdf.
- Vollmer, U., and R. Bebenroth. 2012. The Financial Crisis in Japan: Cases and Policy Reactions by the Bank of Japan. *The European Journal of Comparative Economics* 9(1): 51–77. <https://ejce.liuc.it/18242979201201/182429792012090103.pdf>.
- Westelius, N. 2020. Twenty Years of Unconventional Monetary Policies: Lessons and Way Forward for the Bank of Japan. International Monetary Fund Working Paper WP/20/226 November. <https://www.elibrary.imf.org/view/journals/001/2020/226/001.2020.issue-226-en.xml>.
- Wakatabe, M. 2022. The Future of Monetary Policy: Lessons from the History of Monetary Economics. *Keynote Speech at the 38th Annual Meeting of the Japan Association of Business Cycle Studies*. 3 December. https://www.boj.or.jp/en/about/press/koen_2022/ko221222a.htm.
- Yardeni E., D. Johnson, M. Quintana, Central Banks: Fed, ECB & BOJ Weekly Balance Sheets. 27 April 2023. [Fed, ECB & BOJ Weekly Balance Sheets \(yardeni.com\)](https://yardeni.com/Fed_ECB_BOJ_Weekly_Balance_Sheets).

APPENDIX

**Table A1: Chronology of Events in Japan Since the Plaza Accord
in September 1985**

Date	Events
17.12.1984	Satoshi Sumita became 25th BOJ Governor
22.09.1985	Plaza Accord: G-5 decided to undertake action to mastermind US dollar's depreciation
30.01.1986	BOJ cut its Official Discount Rate from 5.0% to 4.5%
10.03.1986	BOJ cut its Official Discount Rate from 4.5% to 4.0%
17.03.1986	USD/JPY fell to all time low below ¥176 till date
21.04.1986	BOJ cut its Official Discount Rate from 4.0% to 3.5%
23.04.1986	USD/JPY fell to all time low below ¥170 till date
01.11.1986	BOJ cut its Official Discount Rate from 3.5% to 3.0%
05.11.1986	After having fallen to ¥152 in September 1986, USD/JPY regained briefly levels above ¥164
22.02.1987	Japan was a signatory of the Louvre Accord Later it was revealed that the reference rate for USD/JPY was ¥153.5
23.02.1987	BOJ cut its Official Discount Rate from 3.0% to 2.5%
24.03.1987	USD/JPY hit another all-time low till date, falling below ¥150
April 1987	The reference point for USD/JPY established as a part of the Louvre Accord was rebased from ¥153.5 to ¥146
31.05.1989	BOJ started to tighten its policy by raising its rates from 2.5% to 3.25%
04.01.1988	USD/JPY fell to all time low till date, below ¥121
June 1989	After having fallen to an all-time low of ¥121 in early 1988, USD surged close to ¥150 as a result of Fed tightening. The Fed Funds rate was approaching 10%
11.10.1989	BOJ raised the Official Discount Rate from 3.25% to 3.75%
17.12.1989	Yasushi Mieno became 26 th BOJ Governor
25.12.1989	BOJ raised the Official Discount Rate from 3.75% to 4.25%
29.12.1989	The Nikkei reached an-all time high of 38,915 points
End of 1989	The so-called "Bubble Burst"
20.03.1990	BOJ raised its Official Discount Rate from 4.25% to 5.25%
17.04.1990	USD/JPY surged to ¥160
30.08.1990	BOJ raised its Official Discount Rate from 5.25% to 6.0%
01.10.1990	Yields on 10-year JGBs reached a level above 8.27%
June 1991	Abolishment of the Window Guidance
01.07.1991	BOJ cut its Official Discount Rate from 6.0% to 5.5%
14.11.1991	BOJ cut its Official Discount Rate from 5.5% to 5.0%
30.12.1991	BOJ cut its Official Discount Rate from 5.0% to 4.5%
January 1992	Inflation fell below 2% for the first time (since March 1989)
01.04.1992	BOJ cut its Official Discount Rate from 4.5% to 3.75%
27.07.1992	BOJ cut its Official Discount Rate from 3.75% to 3.25%
September 1992	Tensions in European ERM pushed the yen briefly below all-time low USD/JPY 120 (till date)
November 1992	Inflation fell below 1.0% to 0.7%
January 1993	The Clinton administration took office with its tough approach regarding the trade dispute with Japan
04.02.1993	BOJ cut its Official Discount Rate from 3.25% to 2.5%
19.02.1993	USD/JPY fell below to another all-time low, till date, below ¥119 and subsequently resumed its downward trend
21.09.1993	BOJ cut its Official Discount Rate from 2.5% to an all-time low of 1.75% till date
21.09.1993	Yields on 10-year JGBs fell below 4.0%
29.06.1994	USD/JPY fell for the first time below the mark of ¥100
July 1994	Inflation fell below 0% to minus 0.2%

Table A1 *continued*

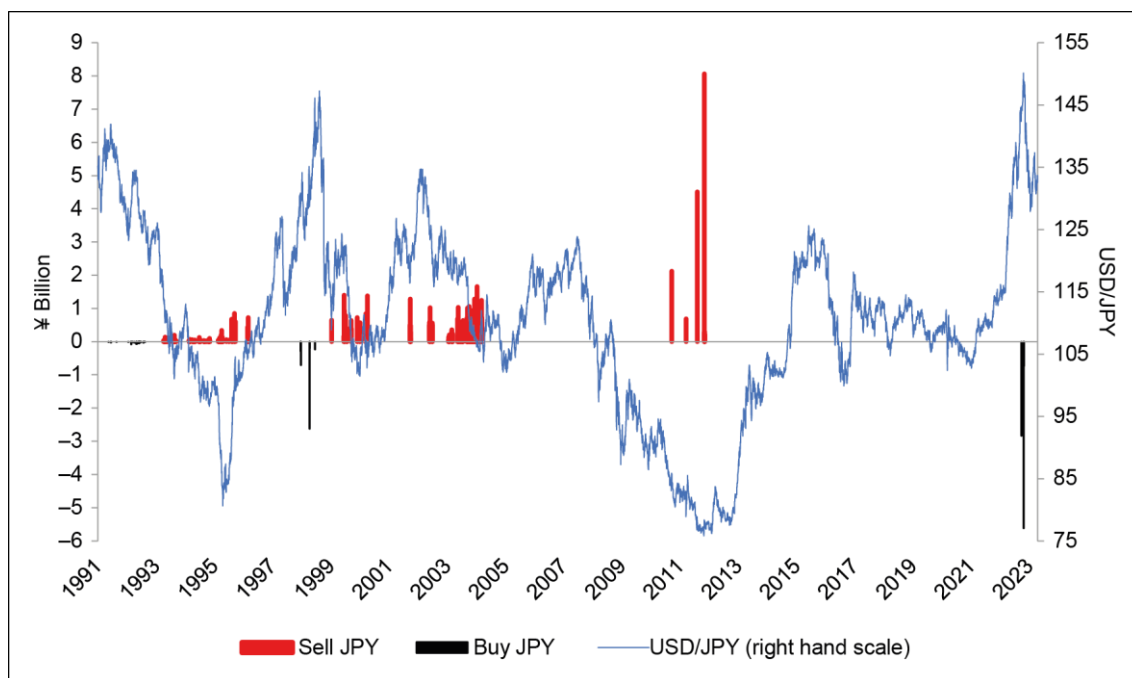
Date	Events
17.12.1994	Yasuo Matsushita became 27th BOJ Governor
31.03.1995	BOJ introduced a guidance of market interest rates
14.04.1995	BOJ cut its Official Discount Rate from 1.75% to a record low, till date, of 1.0%
19.04.1995	USD/JPY fell to another all-time low of ¥79.75 till date
30.05.1995	The yield on 10-year JGBs fell below 3.0%
02.08.1995	Largest FX intervention on track record till date. BOJ sold ¥675.7 billion. USD/JPY rises from ¥88.09 to above ¥91.0
15.08.1995	Coordinated FX intervention as result of which USD rose from ¥93.63 to almost ¥98 BOJ bought USD worth merely ¥48.2 billion
08.09.1995	BOJ bought USD worth ¥857.6 billion. The level of USD/JPY at ¥100 was regained
08.09.1995	BOJ cut its Official Discount Rate from 1.0% to another record low, till date, of 0.5%
End of 1995	Throughout the whole of 1995, BOJ bought USD worth almost ¥5 trillion
February 1996	BOJ bought USD worth ¥1.6 trillion, Dollar rose well above ¥105
1996-1997	A gradual depreciation of the JPY against dollar (Eisuke Sakakibara "Mr.Yen" guidance)
11.03.1997	The Bill for the new Bank of Japan Act
18.06.1997	A promulgation of the new Bank of Japan Act
02.07.1997	The Asian crisis started
06.10.1997	The yield on 10-year JGPs fell below 2.0%
05.12.1997	USD/JPY surged above ¥130
17.12.1997	BOJ intervened for the first time in more than 5 years to support the yen against USD
March 1998	BOJ achieved operational independence under the New Bank of Japan Act
20.03.1998	Masaru Hayami became 28th BOJ Governor
09.04.1998	BOJ started to intervene again in order to defend the value of the yen. It sold dollars worth ¥195.7 billion
10.04.1998	BOJ sold USD worth ¥2.62 trillion
08.06.1998	USD/JPY surged above ¥140
17.06.1998	Coordinated FX intervention as result of which USD fell from above ¥143 to ¥137 BOJ sold USD worth merely ¥231.2 billion
September 1998	Collapse of Long-Term Capital Management L.P. (LTCM) in the US
09.09.1998	BOJ encouraged the uncollateralized O/N call rate to move on average around 0.25%
Sep. 1998	A reversal of anti-JPY sentiment
11.09.1998	The 10-year yield on JGP fell below 1.0%
07.10.1998	The yen surged against the US dollar (from levels above ¥130 to ¥121)
November 1998	JGBs started to fall and subsequently their yields began to rise
12.01.1999	BOJ resumed a sale of yen. On this day, it sold ¥656.3 billion
03.02.1999	The yield on 10-year JGBs rose above 2.4%
12.02.1999	BOJ started Zero Interest Rate Policy (ZIRP)
14.06.1999	BOJ intervened by selling ¥1.406 trillion. Largest FX daily intervention till date
Nov. 1999	Inflation fell to a record low of -1.2% till date
11.08.2000	BOJ ended ZIRP and raised rates by encouraging the uncollateralized overnight call rate to move on average around 0.25 %.
04.01.2001	Official Discount Rate cut from 0.75% to 0.50%
13.02.2001	Official Discount Rate cut from 0.50% to 0.35%
01.03.2001	Official Discount Rate cut from 0.35% to 0.25%
19.03.2001	BOJ started Quantitative Easing Policy (QEP)
18.09.2001	Official Discount Rate cut from 0.25% to 0.10%
September .2001	BOJ's current account surpassed ¥12 trillion
September 2001	Following the 9/11 attacks, BOJ purchased both EUR and USD. Record monthly purchase of foreign currencies worth ¥3.21 trillion

Table A1 *continued*

Date	Events
December 2001	BOJ's current account surpassed ¥15 trillion
February 2002	Inflation reached an all-time low of -1.6%
March 2002	BOJ's current account surpassed ¥27 trillion
20.03.2003	Toshihiko Fukui became 29th BOJ Governor
March 2003	BOJ's current account surpassed ¥30 trillion
September 2003	BOJ's current account surpassed ¥34 trillion
The end of 2003	The BOJ intervened heavily in the FX markets throughout the entire year It purchased foreign currency worth ¥20.43 trillion
March 2004	BOJ's current account surpassed ¥36 trillion
March 2004	The BOJ intervened heavily in the FX markets throughout the entire Q1 2004 It purchased foreign currency worth ¥14.83 trillion—the largest quarterly purchases ever
April 2004	BOJ ceased to intervene in the FX markets
March 2006	QEP came to the end
14.07.2006	Basic Loan Rate raised to 0.4% and overnight call loan rate set at 0.25%
January 2007	The BOJ's current account fell below ¥80 trillion
21.02.2007	Basic Loan Rate raised to 0.75% and target for uncollateralized overnight call loan rate raised to 0.5%
09.04.2008	Masaaki Shirakawa became 30th BOJ Governor
31.10.2008	Basic Loan Rate cut to 0.5% and the target for uncollateralized overnight call loan rate raised to 0.3%
19.12.2008	Basic Loan Rate cut to 0.30% and the target for uncollateralized overnight call loan rate raised to 0.1%
15.09.2010	After more than 6-year-long absence, the BOJ resumes FX interventions and purchased USD worth almost ¥2.13 trillion
October 2010	Comprehensive Monetary Easing (CME) started
11.03.2011	East Japan Earthquake and Fukushima Disaster
16.03.2011	USD/JPY fell to all time low, till date, below ¥79.6
18.03.2011	Coordinated FX intervention with Fed, ECB, Bank of England and Bank of Canada. BOJ purchases USD worth ¥692.5 billion
03.08.2011	USD/JPY fell to another all-time low of ¥77
04.08.2011	BOJ purchased USD for an amount of ¥4.51 trillion
05.08.2011	S&P's downgrade of the US economy from AAA triggered a search for safe havens
27.10.2011	Sovereign crisis in euro area escalation prompted demand for safe havens further. USD/JPY fell below ¥76
31.10.2011	Largest FX daily intervention on record. BOJ sold ¥8.07 trillion. USD/JPY reversed earlier losses and surged above ¥78
November 2012	BOJ balance sheet reached a record high of ¥156.36 trillion
December 2012	Shinzo Abe won general elections
January 2013	Price stability target of 2.0%
20.03.2013	Haruhiko Kuroda became 31st BOJ Governor
04.04.2013	Quantitative and Qualitative Monetary Easing (QQE) started
August 2013	BOJ balance sheet reached a record high of ¥200 trillion
July 2014	BOJ balance sheet surpassed 50% of nominal GDP
31.10.2014	Upgrade of QQE
31.12.2014	BOJ balance sheet surpassed ¥300 trillion
29.01.2016	BOJ announced the negative interest rates policy (NIRP), which was introduced in the following month
09.02.2016	The yield on 10-year JGBs fell below 0%
February 2016	BOJ balance sheet surpassed ¥400 trillion
13.07.2016	The yield on 10-year JGBs fell to as low as -0.285%

Table A1 *continued*

Date	Events
21.09.2016	Yield Curve Control (YCC) announced
May 2017	BOJ balance sheet surpassed ¥500 trillion
Spring 2017	BOJ purchases started to slow down
31.07.2018	Tolerance band within YCC raised to +/-20 basis points
May 2019	BOJ balance sheet surpassed 100% of GDP
March 2020	Outbreak of COVID-19 pandemic
March 2020	Announcement of the Special Funds-Supplying Operations to Facilitate Corporate Financing regarding the Novel Coronavirus (COVID-19)
March 2020	BOJ balance sheet surpassed ¥600 trillion
November 2020	BOJ balance sheet surpassed ¥700 trillion. Growth being drive by BOJ loans offered to the banking sector
March 2021	Further easing aimed to encourage credit action & further extension of toleration band within YCC to +/-25 bp.
December 2022	Loans offered by BOJ surpassed 20% of all BOJ assets
24.02.2022	Russian invasion of Ukraine
17.03.2022	Fed started to raise rates. Other major central bank followed Fed, with BOJ being the only noticeable exception
22.03.2012	USD/JPY surged above ¥120 for the first time in more than 6 years
28.04.2022	USD/JPY surged above ¥130 for the first time in more than 20 years
01.09.2022	USD/JPY surged above ¥140 for the first time in more than 24 years
22.09.2022	BOJ bought JPY worth ¥2.84 trillion. The first FX regime during Kuroda's tenure
20.10.2022	USD/JPY surged above ¥150 for the first time in more than 32 years
21.10.2022	BOJ buy JPY worth ¥5.62 trillion
24.10.2022	BOJ bought JPY worth ¥729. 6 billion. The last FX regime during Kuroda's tenure
21.12.2022	Tolerance band within YCC raised to +/-50 basis points
09.04.2023	Haruhiko Kuroda term came to an end and was succeeded by Ueda Kazuo as 32nd BOJ governor

Figure A1: BOJ's Interventions in the FX Markets (¥ Billion)

Source: Prepared by the authors based on the Japanese MoF data.