GROWING CENTRAL BANK CHALLENGES IN THE WORLD AND JAPAN

Low Inflation, Monetary Policy, and Digital Currency

Sayuri Shirai
Growing Central Bank Challenges in the World and Japan: Low Inflation, Monetary Policy, and Digital Currency

By Sayuri Shirai
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<th>Description</th>
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<tr>
<td>AML</td>
<td>anti-money laundering</td>
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<tr>
<td>BIS</td>
<td>Bank for International Settlements</td>
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<td>BOJ</td>
<td>Bank of Japan</td>
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<td>CBDC</td>
<td>central bank digital currency</td>
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<td>CFT</td>
<td>combating the financing of terrorism</td>
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<td>CME</td>
<td>comprehensive monetary easing</td>
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<td>coronavirus disease</td>
<td>COVID-19</td>
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<td>CPI</td>
<td>consumer price index</td>
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<td>DCEP</td>
<td>digital currency electronic payment</td>
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<td>DI</td>
<td>diffusion index</td>
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<tr>
<td>DLT</td>
<td>distributed ledger technology</td>
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<td>DVP</td>
<td>delivery versus payment</td>
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<td>ECB</td>
<td>European Central Bank</td>
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<td>ETF</td>
<td>exchange-traded fund</td>
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<td>EU</td>
<td>European Union</td>
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<td>FDI</td>
<td>foreign direct investment</td>
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<td>FINMA</td>
<td>Swiss Market Financial Supervisory Authority</td>
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<tr>
<td>fintech</td>
<td>financial technology</td>
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<tr>
<td>FOMC</td>
<td>Federal Open Market Committee</td>
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<td>G7</td>
<td>Group of Seven</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>GPIF</td>
<td>Government Pension Investment Fund</td>
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<tr>
<td>HICP</td>
<td>Harmonized Index of Consumer Prices</td>
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<td>HKMA</td>
<td>Hong Kong Monetary Authority</td>
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<tr>
<td>ICO</td>
<td>initial coin offering</td>
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<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>IT</td>
<td>information technology</td>
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<tr>
<td>JGB</td>
<td>Japanese government bond</td>
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<td>J-REIT</td>
<td>Japanese real estate investment trust</td>
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<td>LSAP</td>
<td>large-scale asset purchase</td>
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<td>MAS</td>
<td>Monetary Authority of Singapore</td>
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<td>MMT</td>
<td>modern monetary theory</td>
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<td>NIRI</td>
<td>non-inflationary rate of inflation</td>
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<tr>
<td>NISA</td>
<td>Nippon Individual Savings Account</td>
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<td>PELTRO</td>
<td>pandemic emergency longer-term refinancing operation</td>
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<td>PCE</td>
<td>personal consumption expenditure</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>PRC</td>
<td>People’s Republic of China</td>
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<tr>
<td>QQE</td>
<td>quantitative and qualitative easing</td>
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<tr>
<td>ROE</td>
<td>return on equity</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>SDR</td>
<td>special drawing right</td>
</tr>
<tr>
<td>TLTRO</td>
<td>targeted longer-term refinancing operation</td>
</tr>
<tr>
<td>TOPIX</td>
<td>Tokyo Stock Price Index</td>
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<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USC</td>
<td>utility settlement coin</td>
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<tr>
<td>YCC</td>
<td>yield curve control</td>
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Central banks are facing growing challenges posed by aging, low productivity, new technology, and innovation especially after the global financial crisis triggered by the collapse of Lehman Brothers in 2008. The challenges that are under the spotlight globally can be grouped into two issues: (i) low inflation and related impacts of unconventional monetary policy, as well as policy coordination including fiscal stimulus, and (ii) the wide range of recent issues related to central bank money (cash), private money (bank deposits), emergence of private crypto assets, and threats posed by Facebook’s Libra plan, as well as the prospect of a central bank digital currency.

The first challenge is related to persistently low inflation observed in some developed economies even after various unconventional monetary easing tools have been adopted for many years when short-term interest rates have fallen into the effective lower bound. Employment conditions have improved remarkably, stock and real estate prices have risen, and currency depreciation has occurred in some economies. Nonetheless, inflation has remained below the numerical inflation target for most of the time since the 2008 financial crisis. Inflation underperformance has been prevalent in the euro area, Japan, and, to a lesser extent, the United States. Various unconventional monetary easing tools—such as large-scale asset purchases, forward guidance, negative interest rate, yield curve control, stock exchange-traded fund (ETF) purchases—have been experimented with by several central banks. It appears that many central banks prefer forward guidance and large-scale asset purchases to a negative interest rate. Yield curve control (stabilizing the short-term policy rate and a 10-year yield), adopted by the Bank of Japan since 2016, is receiving attention from some central banks. The Reserve Bank of Australia followed the Bank of Japan in March 2020 by attempting to stabilize a shorter 3-year yield. The United States Federal Reserve has been discussing the possible adoption of yield curve control focusing on a shorter maturity like the Reserve Bank of Australia. ETF purchases are so far conducted only in Japan. It is uncertain how long unconventional monetary easing will continue in the low inflationary environment although various adverse impacts are growing. Given the weak outcomes of unconventional monetary policy tools to raise inflation, furthermore, alternative monetary frameworks—such as average inflation targeting and price-level targeting—and policy coordination using fiscal stimulus have been intensively discussed in
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Moreover, the weaker relationship between unemployment and inflation—called a “flattened Phillips curve”—has invited various arguments. The Phillips curve also applies to the relationship between the output gap (namely, the difference between actual and potential output or, simply, the supply-demand balance) and inflation. Some central banks claim that the flattened Phillips curve indicates the successful outcome of flexible inflation targeting since inflation has become less reactive to changes in the unemployment gap (the gap between the current rate of unemployment and the natural rates of unemployment) and more reactive to long-term inflation expectations. However, persistent inflation underperformance calls into question whether this view remains valid. It may suggest that inflation expectations have dropped and are no longer well-anchored at around the inflation target. The flattened Phillips curve might also mean the relationship between unemployment and inflation has weakened. If this is true, this generates a challenging environment for some central banks since they may find it difficult to provide accurate inflation forecasts.

The second challenge this book deals with is issues related to money, crypto assets, and central bank digital currency. Cash demand (beyond nominal gross domestic product [GDP]) grew after the global financial crisis of 2008–2009 in some developed economies—including the euro area, Japan, the Republic of Korea, Singapore, the United Kingdom, and the United States—despite cashless payment tools gaining popularity. This heightened cash demand may undermine the effectiveness of monetary policy through reduced money creation (lending and depositing) activities and the weakened impacts of the negative interest rate policy caused by cash substitution. Meanwhile, demand for cash in many emerging economies—such as Brazil, Indonesia, Malaysia, and the Russian Federation, as well as India with the exception of a temporary drop caused by the 2016 demonetization currency reform—has been roughly consistent with nominal GDP. A unique feature is observed in the case of the People’s Republic of China, which has seen a secular declining trend since the early 2000s. This may reflect a shift in the form of money held by the general public from cash to bank deposits and/or electronic money (e-money) payment tools (pre-paid instruments such as Alibaba’s Alipay or Tencent’s WeChat Pay)—in line with the deepening of the banking system partly because Alipay and WeChat Pay require bank cards and bank account information for users to obtain payment services. Cash is safe money and the most liquid one issued by central banks, but growing competition has emerged from e-money and crypto assets issued by private financial technology (fintech) firms
as a result of innovation and online trading platforms. Especially, crypto assets including global stablecoins like Facebook’s Libra, if used widely by the general public, might erode the effectiveness of monetary policy and promote substantial depreciation in some emerging (developing) economies, possibly leading to foreign debt crises. There is also a risk of promoting illegal and terrorist activities and a risk of violating privacy due to inadequate consumer protection rules. Partly reflecting these concerns with the aim to reduce the cost of handling cash, some central banks in developed and emerging economies—such as the euro area; Cambodia; Canada; Hong Kong, China; Japan; the People’s Republic of China; Singapore; and Thailand—have examined or even performed pilot projects on issuing central bank digital currencies (CBDCs). This book thoroughly reviews these recent events.

The book has two parts. Part I, “Low Inflation and Monetary Policy Challenges,” focuses on the first challenge described above by paying attention to three developed economies: the euro area, Japan, and the United States, where inflation has been persistently low since the global financial crisis. Part I contains five chapters. Chapter 1 provides an overview of inflation performance and long-term inflation expectations. The chapter also covers various related discussions such as factors contributing to low inflation, Japan’s unique movements of inflation expectations, and the issue of raising/lowering the inflation target from the current level. Chapter 2 reviews the main unconventional monetary easing tools adopted by the developed economies facing the effective lower bound on short-term interest rates. United States dollar liquidity swap arrangements between the Federal Reserve and other central banks are also touched upon as measures to help mitigate global financial instability. Chapter 3 highlights a unique unconventional monetary easing tool, stock ETF purchases conducted by the Bank of Japan. As a comparison, the case of short-lived stock market intervention by the Hong Kong Monetary Authority is discussed. Chapter 4 summarizes recent discussions of new monetary policy frameworks that might become alternatives to existing “flexible inflation targeting,” such as (i) average inflation targeting, (ii) price-level targeting, (iii) nominal GDP targeting, and (iv) nominal wage targeting. Chapter 5 reviews discussions of policy coordination including expansionary fiscal policy, helicopter money (monetization of fiscal deficit), and modern monetary theory (MMT). Whenever applicable, Part I also provides implications for Asia-Pacific economies other than Japan.

Part II, “Cash, Crypto Assets, and Central Bank Digital Currency,” sheds light on the second challenge. Part II contains three chapters. Chapter 6 focuses on cash, which is the oldest and most useful instrument for small purchases and payment for goods and services and
other transactions. While cashless payment methods have increasingly become prevalent in the world, cash in circulation has been growing in many economies. This chapter focuses on the movements of cash in circulation for developed and emerging economies and examines factors contributing to the trends. Chapter 7 looks at the contemporary monetary system equipped with central bank money like cash and private money like bank deposits (bank money). It describes the concepts and features of central bank money and private money, as well as crypto assets that have emerged as private money. The discussion emphasizes that while cash is growing, bank money has grown significantly relative to cash since it provides diverse payment methods such as account transfers, ATM cards, and debit cards. Bank money can be used to pay credit card debt and gain access to various e-money payment tools (such as Alipay and WeChat Pay). Bank money is denominated in legal tender and thus relatively stable if central banks successfully control inflation. It is safer than crypto assets due to tight banking regulations and deposit insurance systems. Chapter 7 also highlights crypto assets that include various types of stablecoins and Facebook’s Libra plan announced in June 2019, as well as recent views expressed by regulatory authorities. Chapter 8 summarizes CBDC proposals. These proposals can be divided into retail CBDC targeting the general public and wholesale CBDC targeting financial institutions. A CBDC issued to the general public could be a new alternative to cash payments, but it may threaten commercial banks though a loss in retail deposits.

When the draft of this book was almost complete, the coronavirus disease (COVID-19) outbreak emerged in the People’s Republic of China in late 2019, spreading first to Asia in January 2020 and further to Europe, the Middle East, the United States, and other regions in February–March 2020. What will COVID-19 mean for the issues explored in this book if the impact continues longer than expected (for example, until the end of 2020)? First, the sharp global economic slowdown caused by the new virus spreading and the countermeasures undertaken by various economies (such as quarantine and mobility restriction policies, closure of schools, and prohibition or discouragement of events and gatherings) has prompted central banks to add substantial monetary easing and governments to provide massive fiscal stimulus in March 2020. As a result, a growing number of central banks have faced the effective (or zero) lower bounds or approached them on their policy rates. Central banks in Australia, Canada, New Zealand, and the United Kingdom faced the effective lower bound in March 2020 and initiated various unconventional monetary easing tools. A similar situation may be observed in the near future in some Asian economies—such as Malaysia; the Republic of Korea; Taipei, China; and Thailand—due to a sharp
decline in short-term interest rates or a decline in inflation to low levels. Thus, it is worthwhile for central banks in the world to examine the pros and cons of various unconventional monetary easing tools to prepare for such an event by learning from the experiences of other economies. This book provides useful, insightful information to many central banks in the world through a thorough introduction to the experiences of the euro area, Japan, and the United States.

Second, the COVID-19 spread may be promoting cashless payments that avoid person-to-person contact. For example, contactless payment tools—namely, credit cards based on near-field communication or radio frequency identification technology—enable people to make payments by waving a card near a reader. The impact arising from such a change in preference among various payment tools could become greater than that of cash demand spurred by reduced interest rates if it takes longer for the world to recover from the COVID-19 crisis. The Bank of Korea (the central bank of the Republic of Korea) announced on 6 March 2020 that banknotes would be quarantined for 2 weeks to remove any traces of the new virus and some of them would be burnt. In Greece, Ireland, Malta, Poland, Turkey, and the United Kingdom, furthermore, the banking, finance, and payment industries and/or governments have raised the spending limit for contactless card payments in March–April 2020. This is to help consumers to do shopping with high speed and convenience, but also to meet consumers’ demand to use such payment tools to avoid the coronavirus inflection. In April, the Bank of Thailand (the central bank of Thailand) announced that the general public who are concerned about the contamination of banknotes with the novel coronavirus could wash banknotes with mild detergent or soapy water. The World Health Organization, the Bank of England, the European Central Bank, and other central banks emphasized that there is no scientific evidence about an increased evidence of spreading the coronavirus through the use of cash. Whether the novel coronavirus pandemic will have a long-term impact on the general public’s preference toward cashless payment tools without person-to-person contact is yet to be seen.

This book incorporates new developments on the COVID-19 outbreak up to the end of April 2020. I sincerely hope that this book will deepen readers’ understanding of the challenges that central banks are facing.

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PART I
Low Inflation and Monetary Policy Challenges
Since the global financial crisis triggered by the collapse of Lehman Brothers in 2008, major central banks in developed economies, led by the Federal Reserve in the United States, have used bold accommodative monetary policy to stabilize prices, improve employment, and encourage economic growth. This policy decision has been based on a consensus that (i) maintaining a stable rate of inflation at or close to 2% is equivalent to achieving price stability and (ii) anchoring long-term inflation expectations at around 2% is essential to achieve price stability. While monetary policy helped to avoid deep recession and deflation spirals after the 2008 Lehman shock in developed economies, inflation has not risen to a satisfactory level. This chapter takes an overview of inflation performance and long-term inflation expectations in the euro area, Japan, and the United States, as well as points out various related discussions.

### 1.1 Adopting 2% or Close to 2% as an Inflation Target

The inflation (or price stability) target for major central banks in developed economies has converged to around 2% as a part of comprehensive efforts to make the conduct of monetary policy more transparent. Central banks have chosen this numerical value with the belief that a sufficient buffer against inflation is needed in order to avoid deflation, since deflation is more harmful to the economy than high inflation is. In addition, central banks find it necessary to achieve at least 2% inflation in order to avoid the effective lower bound on short-term interest rates, a point at which there is no room for a further decline in the policy interest rate.
1.1.1 Numerical Inflation Targets Set by Major Central Banks

Among three major central banks in developed economies—the European Central Bank (ECB), the Bank of Japan (BOJ), and the United States Federal Reserve—the ECB was the forerunner in setting a numerical goal to define price stability long before the global financial crisis of 2008–2009. The Federal Reserve and the BOJ did so only after the crisis. The numerical inflation objective is called the “inflation aim” in the euro area, the “price stability target” in Japan, and the “inflation goal” in the United States. Throughout this book, “inflation target” and “price stability target” are used interchangeably for the sake of simplicity.

- The ECB initially defined price stability in 1998, at the time of establishing the central bank, as an average annual increase in the price level for the euro area of “below 2% over the medium term.” It was then clarified further with the expression “below, but close to, 2% over the medium term” in May 2003, as measured by the Harmonized Index of Consumer Prices (HICP) for the euro area.
- The BOJ adopted the 2% price stability target in terms of the consumer price index (CPI) in January 2013 at the Monetary Policy Meeting. At the same time, the government and the BOJ released a joint statement to reveal their intentions to strengthen their policy coordination in order to overcome deflation and achieve sustainable economic growth.
- The Federal Reserve specified the longer-run goal for inflation as 2%, as measured by the personal consumption expenditure (PCE) deflator in its statement on longer-run goals and policy strategy, released every January since 2012.

The HICP, CPI, and PCE deflators all track movements of consumer prices in goods and services. Central banks generally focus on the rate of inflation or the year-on-year rate of change in these indicators. The HICP is published by Eurostat, the statistical office of the European Union (EU), where a consumer price index is compiled according to a methodology harmonized across EU countries, so that the HICP is somewhat different from the consumer price index compiled by each member economy. Japan's CPI is published by the Statistics Bureau of the Ministry of Internal Affairs and Communications. The Federal Reserve uses the PCE price index issued by the Bureau of Economic Analysis, rather than the CPI for all urban consumers published by the Bureau of Labor Statistics. This is partly because the PCE price index takes care of the “substitution effect” more properly than the CPI does. The
substitution effect often creates an overestimation of price developments as consumers tend to reduce purchases of expensive goods and services and increase purchases of cheaper goods and services. This effect is less problematic for the PCE deflator since it uses a new basket of goods and services that accounts for consumers’ shift in consumption from more to less expensive goods and services while the CPI uses the same basket as before.

In the euro area, the definition of “below 2%” was initially chosen as a non-inflationary rate of inflation (NIRI) for the euro area partly because the NIRI that has been adopted in Germany by the Bundesbank (the central bank of Germany) was reduced from 2% to 1.75% in 1997–1998 (European Parliament 1999). As this definition was found ambiguous, the ECB subsequently included “close to 2%” in 2003 to express that the NIRI lies in a range with an upper bound of “below 2%” and a lower bound of greater than zero. From this modified definition, it is widely understood that the reference rate of NIRI is about 1.5%. In the case of Japan, the BOJ used to express a price stability “goal” before 2013. Namely, the price stability “goal” in the medium to long term was expressed as being in a “positive range of 2% or lower.” The expression “1% for the time being” was also added. While these ambiguous expressions were used to cover diverging views of the Policy Board members, the word “goal” (especially the connotation of the related term “medo” adopted in the Japanese version) and the ambiguous references to the inflation range conveyed nuances of passiveness. Against this background, the clear 2% target was adopted in 2013 to eliminate the ambiguity. In the United States, the 2% numerical target was chosen partly because of the shift in the preference by the Federal Open Market Committee (FOMC) from around 1.5% to around 2% after the global financial crisis (Shapiro and Wilson 2019). Between 2000 and 2007, the FOMC members generally expressed their preferred inflation target as around 1.5% even though both average PCE inflation (about 1.8%) and survey measures of longer-run PCE inflation expectations (over 2%) were higher. Their preferences shifted sharply afterwards, with the consensus moving up to 2% and leading to the announcement of the long-run goal in January 2012. This shift may have been a reaction to the abrupt decline in inflation during the global financial crisis and the federal funds rate hitting its effective lower bound.

1.1.2 Symmetric Interpretation of the Inflation Target

Under a flexible inflation-targeting framework or similar framework, many central banks allow a temporary deviation of actual inflation from the inflation target. The deviation is permissible as long as there is a
natural tendency for actual inflation to converge to around 2% over time or as long as long-term inflation expectations remain anchored at around 2%, as explained in Section 1.3. This is to avoid an economic downturn being caused by a central bank attempting to achieve the inflation target too quickly, especially by sharply tightening monetary policy.

Japan and the United States have adopted the 2% inflation target by attempting to achieve it in a “symmetrical” manner, that is, achieving inflation on average at around 2% by allowing some temporary deviations above and below the target in a similar manner. However, people often misunderstand this symmetric interpretation and regard it as a ceiling rather than an average. Because actual inflation has been below the 2% target for some time recently, the general public has become used to low inflation and thus has begun to view the inflation target as a ceiling stopping inflation from exceeding 2%.

Meanwhile, the ECB’s definition of price stability has invited various arguments because the definition often gives the impression that the target is asymmetric, forming a ceiling, and that the ECB prefers lower inflation than other central banks do. To deny such an impression, Mario Draghi, the then president of the ECB, stressed in 2019 that the numerical expression implies pursuing inflation close to 2% in a “symmetric” fashion so that inflation can go above and below this level at times—therefore, the ECB neither accepts persistently low inflation nor imposes a cap on inflation at 2% (Draghi 2019a). In other words, the ECB is equally ready to adjust monetary policy without hesitation when inflation falls short of the level or when inflation is above the level. Draghi also emphasized that the symmetry interpretation has always been embedded in the ECB’s price stability definition, but the ECB needed to emphasize its commitment to symmetry because of inflation having been below 2% for a long period. Among the ECB members, concerns were raised that the general public may misunderstand that inflation well below 2% (e.g., 1%) is acceptable to the ECB since the “close to” expression does not provide a precise numeric anchor for long-term inflation expectations.

However, this symmetry interpretation apparently hasn’t been shared equally by all the previous central bankers and senior officials in the euro area. For example, six senior former policy makers—Helmut Schlesinger (former president of the Deutsche Bundesbank); two former members of the ECB’s Executive Board from Germany, Otmar Issing and Jürgen Stark; Nout Wellink (former governor of the Netherlands Bank), Klaus Liebscher (former governor of the National Bank of Austria); Hervé Hannoun (former first deputy governor of the Banque de France); and Jacques de Larosière (former governor
of the Banque de France)—published a joint memorandum heavily criticizing the ECB’s symmetric interpretation as well as the monetary easing decision made in September 2019 (Bloomberg News 2019). On the price stability definition, they claimed that the ECB had de facto altered the definition in the past few years by considering an inflation rate of around 1.5% as no longer acceptable and interpreting the expression as a “point [higher] target.” Moreover, they stressed that defining the 2% threshold as a “symmetrical” inflation interpretation represents a clear departure from a policy focused on price stability. Thus, the ECB’s current monetary easing by justifying the obligation to fulfill its price stability mandate in the face of persistent low inflation rates would not be accurate.

These criticisms indicate that the price stability interpretation is not clearly shared in the euro area. By stressing symmetry, the current members of the ECB may want to set the price stability target closer to that of the BOJ, the Federal Reserve, the Bank of England, and other major central banks. Moreover, the ECB may feel that monetary easing is necessary because economic growth slowed down in the euro area in 2019 and the output gaps (or domestic demand-supply balance) have remained negative in some peripheral economies including Greece, Italy, and Portugal. The ECB may also feel that some justification for further monetary easing would be necessary given that fiscal expansionary policy is constrained by the 1998 European Union Stability and Growth Pact and the Fiscal Stability Treaty strengthened in 2012.

1.1.3 Public Awareness of the Numerical Inflation Target

The general public may not be aware of the inflation target despite central banks’ greater efforts to improve communication strategies about the price stability mandate and associated conduct of monetary policy. In the United States, surveys of firms and households conducted in April 2018 asked respondents what inflation rate the Federal Reserve was trying to achieve in the long run (Coibion et al. 2018). The results showed that firms selecting the “do not know” option accounted for over 60% while around 25% correctly selected 2% and most of the remaining respondents picked inflation above 2%. As for households, around 35% chose the “I do not know” option while about 15% picked 2% correctly and most of the remaining respondents chose inflation above 2%. The results indicate a low level of recognition about 2% itself. However, households might be more knowledgeable than firms with regard to the existence of the numerical inflation target and many believe that the target is at least above 2%.
In the case of Japan, the quarterly *Opinion Survey on the General Public’s Views and Behavior* compiled by the BOJ asks about the awareness of the 2% price stability target. With consistent data available from the September 2013 survey, the ratio of respondents choosing the “know about it” option dropped to about 24% in the latest survey in December 2019, from the highest percentage (about 37%) in the September 2013 survey. This reflects that the media’s focus on the BOJ’s monetary policy and the 2% target has declined significantly in recent years. Moreover, the percentage of respondents with the “have read or heard of it, but do not know much about it” option dropped from about 51% in September 2013 to about 29% in the latest survey. As a result, the ratio of respondents with the “have never heard of it” option rose from about 22% in the September 2013 survey to 46% in the latest survey. These results suggest that the BOJ needs to improve communications about its monetary policy objectives to the general public. This is a challenging task because achieving the 2% inflation target means raising inflation from the current low level and households tend to dislike inflation. Also, the young generation aged below 30 years old has never experienced persistent inflation moving at around 2%—except some exceptional circumstances such as a temporary increase to more than 2% in 2008 due to a sharp oil price hike and in the fiscal year 2014 (from April 2014 to March 2015) due to the consumption tax hike from 5% to 8%, as explained in detail below. Thus, it is difficult for many Japanese people to imagine higher inflation.

### 1.2 Inflation Performance in the Euro Area, Japan, and the United States

To assess whether the inflation target is met, central banks track movements of consumer prices in goods and services, namely the year-on-year rate of change in the overall consumer price index as well as that in the core index excluding volatile items.

#### 1.2.1 Struggling to Achieve Inflation after the Global Financial Crisis

Since the global financial crisis, the ECB and the Federal Reserve have not achieved the 2% or near 2% inflation target in a stable manner. Figure 1.1 shows the overall consumer price developments for the period 2000–2020. Since the global financial crisis, the average rate of inflation in the United States has been fluctuating due to volatile oil prices and has remained around 2% except in 2019 when weak oil prices caused
underperformance in inflation. While overall inflation performance in the United States has been better than in other developed economies, the Federal Reserve has not been satisfied with the results. This is due to somewhat weaker inflation performance in most of the period since the 2% inflation target was introduced in 2012. In the euro area, inflation weakened persistently after the global financial crisis and has mostly remained well below the price stability target.

Japan has been the worst performer among the three economies as inflation has almost never approached the 2% price stability target except during the fiscal year 2014 when the consumption tax hike from 5% to 8% raised the rate of inflation by around 2 percentage points and thus brought actual inflation well above 2% during the first implementation year. However, this hike was unrelated to demand-driven inflation and inflation expectations and thus the BOJ’s policy. In line with this view, the BOJ attempts to monitor inflation by mechanically excluding the direct impact of the consumption tax hike (about 2 percentage points) and also makes projections on its “core” inflation (excluding fresh foods, as explained below) by excluding the direct impact of the tax hike. Thus, the temporary rise in inflation by the tax hike shown in Figure 1.1 should be ignored. The consumption tax hike starting from October 2019 (until September 2020) from 8% to 10% created more complex problems for the BOJ’s core inflation. The direct impact of the tax hike for the first implementation year was an increase in core inflation of about 0.8% mainly due to the exemption of food and beverages from the hike as a part of the government’s mitigation measures to support consumers. As the implementation period spans 2 fiscal years this time, the annual rate of inflation incorporates half of the 0.8 percentage point increase each year. Meanwhile, the government introduced a permanently free preschool education program in October 2019. From April 2020, the entrance and tuition fees are to be waived or reduced permanently for university students whose parents’ incomes are below a certain threshold. These education subsidization programs have collectively pushed core inflation down during the first implementation year—a decline of about 0.2 percentage points in fiscal year 2019 and another 0.3 percentage points in fiscal year 2020. Thus, the upward pressure from the consumption tax hike is almost entirely offset by the downward pressures generated by the education subsidization programs. The BOJ monitors inflation movements by mechanically excluding the direct impacts of the consumption tax hike and the education subsidization programs, and also makes projections on its core inflation in fiscal years 2019 and 2020 using these measures. This is why actual inflation from October 2019 does not show a sharp increase with the consumption tax hike in sharp contrast to the case of the 2014 consumption tax hike.
As compared with these developed economies, inflation performance in Canada, Norway, Sweden, and the United Kingdom has been superior. For these economies, the “muted inflation” often mentioned by the Federal Reserve has not been a serious concern. Canada and Sweden achieved inflation at around 2% in 2018 consistent with their price stability target and achieved about 2.3% and 1.7% respectively, in 2019. Inflation in Norway has been around or above 2% in recent years partly because of strong demand driven by investment in the oil and gas industry. Norway’s government announced a cut in the central bank’s inflation target in March 2019 to 2%, down from the target of 2.5% adopted in 2001, to align with the central banks in neighboring European economies including the United Kingdom, Sweden, and the euro area. Meanwhile, the United Kingdom achieved about 2% inflation in 2017–2018 mainly because of the depreciation of the pound sterling in 2017 triggered by the 23 June 2016 Brexit referendum and the greater-than-expected resilient economic and employment performance in 2018. Inflation was slightly below 2% in 2019 as the exchange rate stabilized.
1.2.2 Core Inflation Weaker than Headline Inflation

The rate of inflation based on the overall consumer price indicators—often called the rate of “headline” inflation—tends to be volatile due to fluctuations of oil and food prices, which are often determined in the international commodity markets. This makes it difficult for central banks to trace underlying inflation trends and properly conduct monetary policy. Therefore, instead of focusing on the headline inflation rate, many central banks focus on the rate of change in general consumer prices excluding food, energy, and some other volatile products—the rate of “core” inflation. The ECB defines core inflation as the rate of change in all items in the HICP excluding energy, food, alcohol, and tobacco. The Federal Reserve uses the rate of change in the PCE excluding energy and food.

In the case of Japan, the choice of a core inflation indicator is more complicated than in other economies. The BOJ traditionally defines the core CPI as the “CPI excluding fresh food” because many vegetables and fruit are produced in Japan and their prices are volatile due to weather conditions. The BOJ continues to make medium-term projections on prices using this core indicator. As the second important core indicator, the BOJ has begun to pay attention to the rate of change in the “CPI excluding fresh food and energy” after the sharp oil price plunge in the middle of 2014. However, these two indicators include “other food” items, which are mostly imported and have volatile prices due to frequent changes in the international commodity prices and exchange rate movements. Since these factors do not reflect the output gap in the economy, it may be appropriate for the BOJ to look at inflation excluding all food and energy, like the ECB and Federal Reserve. On this front, the BOJ is able to use the relevant existing CPI indicator compiled by the Statistics Bureau of the Ministry of Internal Affairs and Communications in Japan: the CPI excluding all food, alcohol, and energy. While CPI and three types of core indicators are compiled by the Statistics Bureau, the Ministry emphasizes only the first three indicators by placing them on the headline new data release section of its website in line with the BOJ’s choices. The relevant indicator measuring underlying inflation (the CPI excluding food, alcohol, and energy) is reported in a detailed data booklet. Because this data takes time to find, the media hardly reports on it and thus the general public does not know about the underlying inflation defined in a similar manner to that adopted in other economies.

Figure 1.2 presents the rate of change in the CPI excluding food, alcohol, and energy in Japan to make a comparison with the core HICP in the euro area and the core PCE price index in the United States.
Japan’s inflation has been substantially lower than that of the euro area and the United States except for the temporary increase driven by the consumption tax hike of April 2014. The inflation increased slightly after the BOJ launched massive monetary easing in April 2013 although the rate has remained close to 0%. Figure 1.3 exhibits Japan’s three types of core indicators (the CPI excluding fresh food, the CPI excluding fresh food and energy, and the CPI excluding food and energy). Figure 1.3 shows that the first two inflation indicators have risen more sharply than the third indicator after massive monetary easing. This means that Japan’s inflation has risen mainly due to the increase in oil and food prices and a sharp depreciation of the yen—not necessarily due to an increase in services and less volatile products. This may imply that the assessment using the BOJ’s current preferred core inflation indicator might lead to an overestimation of underlying inflation. In other words, once oil and food prices decline and the yen appreciates, the three indicators exhibited in Figure 1.3 could easily go in the opposite direction.

In the euro area, Figure 1.2 indicates that the rate of change in core HICP has declined since 2012 after the global financial crisis

\[\text{Figure 1.2: Core Inflation in the Euro Area, Japan, and the United States (\%)}\]

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Note: The core price indices used are the harmonized index of consumer prices (HICP) excluding food, energy, alcohol, and tobacco, in the euro area; the consumer price index (CPI) excluding food, energy, and alcohol in Japan; and the personal consumption expenditure (PCE) excluding energy and food in the United States. A sharp increase in Japan’s inflation from April 2014 to March 2015 was due to a consumption tax hike (see detailed explanation in the text).

Source: CEIC. CEICdata.com.
and the European debt crisis, while core inflation in the United States is more stable and higher than the rates in the other two economies. Core inflation has fluctuated at around 1.8% and close to 2% before and after the global financial crisis. Comparing the overall PCE inflation between the previous expansion period (January 2002 to December 2007) and the current expansion period (July 2009 to May 2019) in the United States, however, Chien and Bennett (2019) point out that the inflation rate was almost 1 percentage point lower in the current period than in the previous period. This lower rate was attributable to the declines in the services inflation contribution (−0.58 percentage points) and the nondurable goods inflation contribution (−0.48 percentage points). Out of the nondurable goods inflation contribution (−0.48 percentage points), the reduction came almost entirely from energy (−0.42 percentage points), which includes utilities and gasoline. This suggests that inflation excluding energy was, on average, not as low as headline inflation, suggesting that core inflation is a suitable measure for underlying inflation. The paper points out that the energy inflation rate could be reduced because of the lower cost of oil and natural gas.

Notes: The price indices used are the consumer price index (CPI) in Japan. A sharp increase in Japan's inflation from April 2014 to March 2015 was due to a consumption tax hike (see detailed explanation in the text).

Source: CEIC. CEICdata.com.
production as a result of hydro-fracking technology being adopted in the United States over the past decade.

### 1.2.3 Possible Factors Contributing to Low Inflation

Despite divergent rates of inflation, the central banks in the euro area, Japan, and the United States have not been satisfied with inflation performance. These central banks have been puzzled by their inability to achieve the inflation target in a stable manner even though unemployment rates have declined steadily from the peak recorded after the global financial crisis. In Germany, Japan, and the United States, these rates have declined further to levels below the pre-crisis levels. Inflation declined to below 2% in 2019 in the euro area and United States and has remained persistently low in Japan. What was surprising to these central banks was that inflation did not achieve the inflation target even with aggressive and diverse unconventional monetary easing tools. This clearly indicates that some factors, possibly structural ones, have given rise to low inflationary pressures in developed economies. At least three main factors have been pointed out. These are discussed below.

#### Globalization Leading to Low Inflation

First, one of the common features leading to low inflation in the world could be globalization and deepened economic integration among economies. With the growing impact from the global economy, domestic inflation is affected not only by the domestic output gap but also increasingly by the “global output gap” (the difference between current global output and potential global output). The negative global output gap after the global financial crisis might be attributable to downward pressures on global inflation through cross-border trade and production networks of global value chains. Auer, Borio, and Filardo (2017) find that the growing links through global value chains have contributed to the reduced impact of the domestic output gap on domestic inflation and the increased impact of the global output gap on domestic inflation. Nonetheless, inflation remains diverse across economies despite globalization, and global value chains have taken place commonly. Therefore, other factors must be contributing to low inflation in some developed economies.

#### Aging Population Leading to Low Inflation

Second, the aging population, especially the aging of baby boomers, appears to be related to low inflation in developed economies. A prominent line of argument in this respect is that the current trends of declining population and aging might drive down inflation, for example, through an increase in saving propensity (Summers 2014; Callejas-
As aging is structural and difficult to stem, this argument implies that low inflation could be persistent. Using the panel data of 22 developed economies from 1870 to 2016, Juselius and Takáts (2018) find a systematic relationship between age structure and inflation; that is, an increase in the share of the dependent population was generally associated with higher inflation, whereas an increase in the working age population had the opposite effect. However, the elderly population had an ambiguous effect because the effect was positive for most elderly cohorts but was sharply negative for the last open-ended age cohort (those 80+ years old)—the cohort most strongly affected by longevity. The researchers also find that the age structure effects captured the majority of inflation trends at both the country-specific and global levels. In the case of the United States, for example, the age structure effects accounted for around a 7-percentage-point increase in inflation from the 1950s to the mid-1970s and a similarly sized decline thereafter.

Regarding Japan, several studies demonstrate that aging is related to persistent low inflationary pressures. Bullard, Garriga, and Waller (2012) focus on the effect of demographics on the optimal inflation rate. Young workers prefer inflation because wages are their main source of income due to their limited assets while older workers prefer low inflation because of their higher income from assets. Since older cohorts have more influence on economic and redistribution policies, relatively low inflation is the outcome. Katagiri, Konishi, and Ueda (2014) find that aging caused by an increase in longevity is deflationary since the growing number of pensioners would pressure the government to lower inflation and maintain the real value of their savings and pensions. In sharp contrast, aging driven by a decline in birth rates can be inflationary because a smaller tax base reflecting a falling birth rate might encourage the government to raise inflation to erode its debt and stay solvent. The researchers conclude that the deflationary effect of higher longevity dominates. Fujita and Fujiwara (2014) focus on the age of workers by paying attention to human capital depreciation and productivity. They find that the increase in the share of older and, thus, more experienced workers in the labor force initially contributes to increased output and inflation. However, the decline in fertility eventually results in negative labor force growth and hence prolonged deflation.

Japan has the most rapidly aging population in the world; people over 65 years old currently account for nearly 30% of the population. Many people in Japan worry about their life in old age. According to the annual Public Opinion Survey on Households’ Financial Assets and Liabilities conducted by the Central Council for Financial Services Information and its related organizations (secretariat located at the BOJ), for example, the percentage of households responding that they...
“worry about life in old age” was around or above 80% from 2000 to 2018. This ratio suggests that the general public is largely concerned about life after retirement. Interestingly, the ratio has been higher for “working age households,” whose heads (most likely to be men in Japan) are under 60 years old, than for all households whose heads include those both above and below 60 years old. This indicates that the working-age generation has been more concerned about life in old age as compared with elderly households. Concerns about the sustainability of the social security system, including the public pension system, elderly care insurance, and medical insurance, are major reasons working age households worry about post-retirement life. Moreover, many working age people recognize that their pension benefits will be smaller than those of the current pensioners because Japan’s pension system is based on a pay-as-you-go system where the benefits of current pensioners are financed primarily by the contributions of current workers. In addition to an expectation of lower public pension benefits, the lack of full-fledged indexation amplifies younger workers’ concerns. As a result, the general public is willing to save more rather than consume to prepare for the longevity risk. Pensioners tend to prefer low inflation to maintain the real value of pension benefits and thus may express such a preference through actively voting during elections in line with Katagiri, Konishi, and Ueda (2014). As people live longer and their planning horizon becomes longer, their savings position is likely to change: young workers are more willing to borrow, while the retired tend to accumulate more savings to maintain the same consumption pattern over a longer time horizon. In this environment, a change in the interest rate may have different implications for the young and the elderly: lower interest rates imply a reduced cost for the young who are indebted and thus stimulate residential investment and consumption of durable goods, while the elderly may hardly react to lower interest rates due to reduced demand for credit. Monetary easing may be more effective in an economy with an ample younger population than in an economy with a growing aging population.

**Technological Progress and Shift to Digital Platforms Leading to Low Inflation**

Third, upward inflationary pressures may be limited due to technological progress related to information technology (IT). The use IT has enabled people to compare prices of goods and services easily among retailers and has contributed to booming e-commerce transactions that offer convenience and frequently below-retail prices. The sharing economy is also promoted by innovative IT firms such as Airbnb and Uber. While it is not easy to grasp the impact of IT development, e-commerce, and
the sharing economy in the official productivity statistics, they appear to have improved productivity by allowing otherwise idle goods and services to be utilized, which has led to the reduction in prices (Sánchez and Kim 2018). Zervas, Proserpio, and Byers (2017), for example, demonstrate the impact on hotel revenue of the introduction of Airbnb, a pioneer in shared accommodations, in the Texas hotel market. The study demonstrated that each additional 10% increase in the size of the Airbnb market (rooms) resulted in about a 0.4% decrease in hotel room revenue of local hotels through reduced room prices as a result of intensified competition. This substitution effect suggests that Airbnb provides a viable alternative for certain traditional types of overnight accommodation—especially for lower-end hotels and hotels not catering to business travelers.

1.3 Long-Term Inflation Expectations in the Euro Area, Japan, and the United States

As actual inflation has exerted limited upward pressures in developed economies especially after the global financial crisis, central banks must assess whether there is a tendency for actual inflation to converge to their inflation target. Central banks generally check this tendency by paying attention to (medium-term and) long-term inflation expectations. If these expectations remain stable at around the 2% inflation target, for example, central banks tend to judge that inflation expectations are successfully anchored at around 2%. As long as economic entities such as households, firms, and market participants expect that inflation in the long run will be at around 2%, such expectations are likely to be reflected in their economic behavior and resultant actual inflation. Thus, actual inflation is likely to converge to around 2%—even if actual inflation currently fluctuates due to various temporary factors and deviates from the inflation target. In this environment, wage negotiations and firms’ price-setting behavior are more likely to be determined based on expectations of approximately 2% inflation. In terms of monetary policy, longer-term inflation expectations are regarded as more important than shorter-term inflation expectations (such as 1 year or less than 1 year). This is because long-term inflation expectations tend to be more stable and less reactive to daily price changes while short-term inflation expectations are influenced more heavily by actual inflation and volatile commodity and food prices. Indicators used to measure long-term inflation expectations are (i) survey measures (generally collected at a monthly or quarterly frequency from firms, households,
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and professional forecasters) and (ii) measures from financial markets (collected at a higher daily or monthly frequency, such as the inflation swap rate or the breakeven inflation rate).

1.3.1 Divergent Movements among the Measures of Inflation Expectations

These indicators of long-term inflation expectations (the outlook over more than 1 year) often show different movements and do not necessarily provide a consistent movement. Divergence and dispersion are commonplace in many economies. This reflects that (i) each indicator entails various, specific biases, and (ii) some indicators target different price indexes. As for issue (i), for example, households’ inflation expectations tend to be biased upward as compared with general price inflation and other inflation expectation indicators since households tend to form inflation expectations based on daily goods, food, and gasoline. Coibion et al. (2018), focusing on several developed and emerging economies, find that households tend to be inattentive to inflation dynamics in the absence of much aggregate variation in inflation. Instead, they tend to become more sensitive to the prices of goods frequently purchased (i.e., gasoline and food) to make inferences about broader price movements. Their inflation expectations tended to be more volatile due to the volatility in these prices and divergent importance of these goods in their expenditure baskets, as compared with more informed professional forecasters and market participants. Benoît Cœuré, then member of the Executive Board of the ECB, stressed that there is convincing evidence that households may overestimate the current level of inflation, but they have a fairly good understanding of changes in the trend of current inflation, and that these changes are likely to inform their expectations about future inflation (Cœuré 2019a). Regarding issue (ii), some surveys ask about the inflation outlook referring to firms’ sale prices or the prices of goods and services purchased by households, while other surveys explicitly refer to general consumer prices such as the CPI when asking about prices. Moreover, various market-based indicators include the inflation expectation component and the premium component so that the movements do not fully capture changes in inflation expectations. In the euro area, Japan, and the United States, there is a visible difference in the level of inflation expectations between survey measures on the one hand and measures from financial markets on the other (Figures 1.4, 1.5, 1.6).

The euro area, as shown in Figure 1.4, includes two market-based indicators (the 5-year, 5-year forward inflation swap rate in the euro area and the 10-year breakeven inflation rate in Germany) and the inflation...
Figure 1.4: Long-Term Inflation Expectation Indicators in the Euro Area (%)

Note: The inflation swap rate refers to the 5-year, 5-year forward rate; the breakeven inflation rate refers to the 10-year rate in Germany; and professional forecasters’ inflation expectation refers to the outlook of 5 years forward.


Figure 1.5: Long-Term Inflation Expectation Indicators in Japan (%)

Note: The inflation swap rate refers to the 5-year, 5-year forward rate; the breakeven inflation rate refers to the 10-year rate; firms’ inflation expectation refers to the 5 years forward general price outlook; and households’ inflation expectation refers to the outlook over the next 5 years.

expectation for 5 years ahead reported in the survey of professional forecasters compiled by the ECB. Long-term inflation expectation indicators related to firms and households are not available. Figure 1.4 indicates that professional forecasters’ inflation expectations have been quite stable, while market-based indicators declined from 2014 and dropped further in 2019. The declining trend from 2014 reflects a sharp decline in oil prices. This means that market-based indicators are affected heavily by short-term price movements and thus may not reflect long-term inflation expectations.

In the case of Japan, Figure 1.5 shows the movements of two market-based indicators (the 5-year, 5-year forward inflation swap rate and the 10-year breakeven inflation rate), households’ inflation expectations over the next 5 years, and firms’ inflation expectations for 5 years ahead. The data on inflation expectations related to households and firms are from quarterly surveys conducted by the BOJ. There is a stark difference between households’ inflation expectations and other measures. Households’ inflation expectations have remained stable and appear to be biased upward relative to actual inflation as well as other

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**Figure 1.6: Long-Term Inflation Expectation Indicators in the United States (\%)**

- Inflation swap rate
- Breakeven inflation rate
- Professional forecasters
- Firms
- Households

Note: The inflation swap rate refers to the 5-year, 5-year forward rate; the breakeven inflation rate refers to the 10-year rate; professional forecasters’ inflation expectation refers to the outlook over the next 5 years; firms’ inflation expectation refers to business inflation outlook over the next 5–10 years, and households’ long-term inflation expectation refers to the outlook over the next 5 years.

indicators. By contrast, market-based measures rose during 2013–2014, but thereafter declined and are now near 0%. Market-based measures appear to reflect the movements of oil prices and import prices driven by exchange rates.

Firms’ inflation expectations tend to be low and appear to be influenced by production cost and oil prices even though the survey asks firms about the general price outlook. These expectations may also suggest that firms are pessimistic about their price environment. On this front, the BOJ survey also asks firms about the price level at which the firms expect to sell 1 year ahead and 5 years ahead relative to the current level. In the case of their sale price level 1 year ahead, about 70% of firms chose the “around 0%” option. As for their sale price level 5 years ahead, around 30% chose the “0%” option and another 40% chose the “do not know” option. Kitamura and Tanaka (2019) find that while firms’ inflation expectations were pushed up by the BOJ’s adoption of the 2% inflation target and by the expansion in the output gap amid the quantitative and qualitative easing (QQE) policy, “rational inattention” and “information stickiness” have slowed the pace of the rise in firms’ inflation expectations. The rational inattention hypothesis, proposed by Sims (2003) and Mackowiak and Wiederholt (2009), focuses on agents’ limited capacity to process information as the source of information rigidity. Under this condition, it is rational for economic agents to allocate that capacity mainly to information that has high relevance to their decision making. The sticky information hypothesis, proposed by Mankiw and Reis (2002), emphasizes the presence of costs in acquiring new information. Due to these costs, agents do not always update their information sets, so it takes some time for new information to be fully woven into their inflation expectations. Maruyama and Suganuma (2019) estimate an “inflation expectations curve”—a term structure of inflation expectations combining forecast data of various agents—and find that inflation expectations at all horizons rose in the mid-2000s and from late 2012 to 2013, after the downward trend from the early 1990s to the early 2000s. Particularly, short-term inflation expectations tended to shift upward since QQE although those expectations were affected by fluctuations in the import price (through depreciation of the yen). The researchers also find that inflation expectations in Japan were largely “adaptive,” meaning their formation is affected by actual inflation rates, not by inflation expectations. Overall, the BOJ’s adoption of the 2% target and subsequent massive monetary easing do not appear to have exerted lasting impact on various expectation indicators. A convergence among various measures of inflation expectations toward 2% has not emerged either. Japan’s inflation expectations are clearly not yet anchored at around 2%.
With regard to the United States, various long-term inflation expectation indicators are available. Figure 1.6 shows the movements of two market-based indicators (the 5-year, 5-year forward inflation swap rate and the 10-year breakeven inflation rate), professional forecasters’ inflation expectations over the next 5 years compiled by the Federal Reserve Bank of Philadelphia, firms’ inflation expectations over the next 5–10 years compiled by the Federal Reserve Bank of Atlanta, and households’ inflation expectations over the next 5 years compiled by the University of Michigan. While professional forecasters’ inflation expectations have remained relatively stable, they showed a declining trend between 2009 and 2016 before rising moderately. Among the market-based indicators, the breakeven inflation rate has been more volatile than the inflation swap rate; however, both have shown declining trends since 2014. Households’ inflation expectations have also indicated a moderate decline in 2014–2019. While decline trends are worrisome, most of these indicators have remained above 2% with the exception of the 10-year breakeven inflation rate. Inflation expectation indicators are more resilient than those of the euro area and Japan. It is also noted that firms’ inflation expectations have been higher than households’ inflation expectations in the United States—the opposite pattern to the case of Japan. This may indicate that firms are more prone to adjusting their sale prices upward and more optimistic about the pricing environment.

Comparing the three economies based on Figures 1.4, 1.5, and 1.6, there is a common trend that inflation expectations from market data show declining trends, while their survey-based measures have remained rather stable. The fall in market-based inflation expectations has raised concerns among monetary policy makers about the risk of de-anchoring inflation expectations, especially in the euro area and the United States. These concerns have contributed to the ECB’s decision to cut the deposit facility rate (one of the three policy rates) in September 2019 and the Federal Reserve’s decision to cut the target on the federal funds rate in July, September, and October 2019. Some policy makers emphasize that the decline in these market-based indicators might not be worrisome since it may merely reflect falling risk premia embedded in the measures (such as inflation risk premium) rather than falling inflation expectations. Inflation expectations may be stable since the movement of survey-based indicators remain relatively stable (Cœuré 2019a). In addition, market-based indicators in the euro area and the United States appear to make similar movements; this suggests that the movements may reflect the same global investors’ investment strategies rather than inflation expectations. Nonetheless, there is a growing divergence among various indicators of inflation expectations after
the global financial crisis and particularly in recent years in the three economies. This indicates that it is important for these central banks to better understand factors contributing to different behavior of various measures of inflation expectations.

Taking an overview of various indicators, nevertheless, the ECB and the Federal Reserve claim that their inflation expectations have been anchored at around their inflation targets. The Federal Reserve attempts to justify this view by stressing that inflation has become less responsive to economic slack measured by the unemployment gap or output gap and more responsive to inflation expectations. The Federal Reserve and the ECB believe that an apparent disconnect between inflation and economic slack (such as the output gap or unemployment gap) does not imply that the Phillips curve has disappeared; rather, it means that the Phillips curve has flattened partly because long-term inflation expectations have become successfully and credibly stabilized at the inflation targets (Bullard 2018). It is true that the Phillips curve can be flattened if inflation has become more responsive to inflation expectations rather than to changes in aggregate demand or economic slack. For example, Jordà et al. (2019) demonstrate that fluctuations in labor market conditions have been largely offset by appropriate interest rate changes conducted by the central bank. Under this circumstance, the influence of past inflation has weakened, and inflation expectations have gravitated toward the inflation target so that inflation appears stable at all levels of labor market slack. Jordà et al. (2019) stress that the Phillips curve remained at work since lower inflation could be explained by monetary policy that successfully offsets fluctuations in slack to maintain inflation. It is stressed that a successful implementation of flexible inflation targeting and the operational independence of central banks from the government have contributed to anchoring long-term inflation expectations, thereby making actual inflation less sensitive to past inflation. Alesina and Summers (1993) empirically demonstrate a negative relationship between inflation and central bank independence by showing that more independent central banks had lower inflation without suffering any output or employment penalty.

On the other hand, persistent inflation underperformance calls into question whether this view remains valid. It may suggest that inflation expectations have dropped and are no longer well-anchored at around the inflation target. The flattened Phillips curve might also mean the relationship between unemployment and inflation has weakened. If this is true, this generates a challenging environment for some central banks since they may find it difficult to provide accurate inflation forecasts. Inflation forecasts conducted by central banks in developed economies have often turned out to be overestimated,
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and these central banks have thus found it inevitable to adjust their outlook downward. Particularly, the ECB and the BOJ often find themselves in this position. The Federal Reserve conducted an unwinding of unconventional monetary easing—by raising the short-term interest rate and subsequently reducing the amount of asset holdings—with the outlook that the inflation target would be achieved eventually in a sustainable manner. However, contrary to the outlook, the performance of inflation and inflation expectations has not been as satisfactory as it hoped. This may suggest that the use of the Phillips curve for the inflation forecast is becoming challenging. The recent movements of inflation expectation indicators may also suggest that they are no longer anchored to the inflation target, making the conduct of monetary policy even more challenging. Limited experience with unconventional monetary easing tools and resultant uncertainty about the effectiveness of those tools on inflation also contribute to an overestimation of central banks’ inflation outlooks. In other words, central banks find it necessary to make monetary policy decisions in a very uncertain economic and monetary environment.

1.3.2 Japanese Households’ High Inflation Expectations

Regarding households’ long-term inflation expectations, it was pointed out that households tend to perceive inflation as being higher than what the statistics on general prices indicate and higher than other inflation expectation indicators. Figure 1.7 indicates that in Japan, households’ perceived rate of inflation (the median of the respondents’ rates of current perceived price change as compared to 1 year ago) is volatile. While the indicator sometimes moved in the same direction as the rate of actual inflation, it has remained higher than the rate of actual inflation most of the time. With regard to households’ inflation expectations over the next 5 years, the level has remained stable and generally much higher than actual inflation. When actual inflation jumped due to the consumption tax hike in fiscal year 2014, perceived inflation reacted to the tax hike, but long-term inflation expectations remained stable. Moreover, long-term inflation expectations have remained stable before and after the massive monetary easing conducted by the BOJ since 2013. Long-term inflation expectations remained high even when the rate of actual CPI-based inflation turned negative for most of 2009–2012 and 2016. The difference between actual inflation and long-term inflation expectations is high and persistent. This upward bias is higher than in other economies.

Japan's high inflation expectation may be related to age. Although focusing on shorter inflation expectations (1 year ahead), Diamond,
Watanabe, and Watanabe (2019) used a new micro-level dataset to find that inflation expectations tend to increase with age. Specifically, the level of expected inflation expectations for the common basket of goods tends to be constant until age 40–44 and then begins to rise thereafter. Diamond, Watanabe, and Watanabe subsequently found that individuals’ inflation expectations are strongly correlated with the inflation rate experienced by the same generation over their lifetimes. This probably means that older people formed higher inflation expectations than younger people did because of the experience of higher inflation periods until the 1980s before the economic bubble collapsed.

With regard to perception about price hikes, the majority of Japan’s household respondents consistently held an unfavorable view of price increases before and after massive monetary easing was adopted in April 2013. According to the BOJ’s Opinion Survey on the General Public’s
Views and Behavior, the percentage of respondents choosing “prices have gone up significantly” or “prices have gone up slightly” compared with 1 year ago rose to 70% in the latest survey in September 2019—from 54% in the June 2006 survey (the first survey conducted by mail after it had previously been done in person) and 46% in the March 2013 survey (just before QQE was adopted). The percentage rose to the peak of 86% in 2015 after the consumption tax hike in fiscal year 2014 and the sharp depreciation of the yen. In addition, around 80% of the respondents who had perceived there to be a price increase over the past year commented that such price rises were “rather unfavorable.” There was no substantial difference in this ratio before or after 2013.

The substantially high levels of households’ inflation expectations and of price perceptions of price hikes as unfavorable appear to reflect sluggish real household income, which has not risen much since the early 2000s. According to the Monthly Labor Survey compiled by the Ministry of Health, Labor and Welfare, the year-on-year change in total cash earnings per employee (that is, nominal wages) rose from –0.4% in 2013 to 0.4% in 2014, but thereafter registered an unimpressive 0.1% in 2015, 0.5% in 2016, and 0.4% in 2017. It rose to 1.4% in 2018 but then turned negative and fell to –0.3% in 2019 due to poor performance in the manufacturing and retail sectors. More importantly, the level of real wages in Japan remained even more stagnant than nominal wages, suggesting that nominal wage growth did not catch up with an increase in consumer prices. The rate of annual real wage growth in 2013–2016 averaged –0.6%. After turning positive to 0.2% in 2018, the rate of real wage growth turned negative again and was recorded at –0.9% in 2019.

In line with actual wage performance, the wage outlook of households has remained sluggish. For example, the Opinion Survey on the General Public’s Views and Behavior, compiled by the BOJ, indicates that more than half of the respondents always reported that income expected 1 year ahead would not change from the present level. The diffusion index on the income outlook—the difference between the ratio of respondents choosing the option “will increase” and the ratio choosing the option “will decline”—remained negative despite a moderate improvement in 2013–2017. Due to the tight household budgets and their sluggish income outlook, households appear to feel that prices have gone up and will continue to go up. The growing participation of the elderly in the labor market has contributed to pushing average wages down. A growing proportion of the elderly population has postponed retirement in recent years to preserve purchasing power. This trend reflects the longevity risk caused by increasing life expectancy as well as a growing demand for low-wage workers in the face of a growing shortage of younger workers. An increase in the labor market participation of such elderly
workers has led to a rise in part-time or nonregular employment. The value of elderly workers in the labor market is generally lower than that of younger workers because the older workers have fewer remaining years to earn and some of their skills may no longer be useful, so they have less incentive than younger workers do to search for higher-paying jobs. This supply of older workers willing to work for less money is what pushes wages down (Mojon and Ragot 2019). A labor shortage is likely to grow in the next 5–10 years when the baby boomer generation workers reach 75 years old or above; wages are likely to be pushed up from around this time. Until this phase takes place, downward pressures on wages may continue. During the current period, therefore, the rate of unemployment cannot be a comprehensive indicator of labor market slack since unemployment is likely to be below the non-accelerating inflation rate of unemployment level.

Sluggish wage growth is consistent with the fact that households’ spending has been very sensitive to the prices of daily goods and services. Therefore, households’ strong upward bias in inflation expectation and perception is likely to reflect weak consumption as well. Figure 1.8 exhibits the real consumption level by setting the first quarter 2000 level

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equal to 100. The annual growth rate of real GDP averaged 1.0% in 2013–2019 under the BOJ’s Governor Haruhiko Kuroda’s massive monetary easing. However, this growth rate is not very different from the growth rate of 0.9% recorded in the entire period of 2000–2019. In terms of real consumption, the average growth rate was just 0.3% in 2013–2019, which was even lower than the average growth rate of 0.7% recorded in 2000–2019. This suggests that almost no consumption growth took place over the past 6 years. In terms of housing, it is very difficult to even recover to the 2000 level mainly due to the declining population despite a sharp fall in the mortgage interest rate. This trend is associated with aging and the declining number of young households. Households’ overall sluggish spending over the past 20 years is associated with sluggish wage performance and low expectations on the wage outlook, as well as concerns about post-retirement life as mentioned earlier.

Japan’s persistently sluggish income outlook is very different from the United States, where household views about future income have been more optimistic and have improved since 2012. According to the Surveys of Consumers compiled by the University of Michigan, the majority of respondents anticipated an increase in future (nominal) income. Regarding the question about the expected change in household nominal income during the next year, the median of the responses rose from less than 0.5% in 2009–2011 to around 1.5% in 2015–2016 and further to around 2% or above since 2018. Japan’s increase in the number of low-income households may also contribute to the preference for low inflation. Japan’s relative poverty ratio—defined as the ratio of the population whose income falls below half the median household income of the total population—reached about 16%, getting closer to that of the United States (18%) and making Japan’s poverty ratio one of the highest among Organisation for Economic Co-operation and Development economies.

1.4 Various Views on the Adjustment of the Inflation Target

In Japan, the general public overwhelmingly supports the view that the BOJ should lower the inflation target or eliminate it entirely. The number of the elderly and low-income households is growing, and these people generally prefer low inflation. In addition, having low, stable inflation has a benefit of reducing tax distortions for the economy without full-fledged indexation on tax systems by making real values of taxes and spending neutral (Yun 2005). Nonetheless, lowering the inflation target is challenging for central banks, especially for the BOJ,
since abandoning the 2% target may promote the view that the BOJ publicly acknowledged the limited impact of unconventional monetary easing and is unwilling to continue monetary easing. Given that this may trigger speculative moves toward the appreciation of the yen and the decline in stock prices, it is challenging for the BOJ to do. A more likely scenario is that the BOJ might adopt an inflation target range such as 1%–3% with the midpoint set at 2%. With the inflation target range, the BOJ does not need to abandon the 2% target but can in practice aim at a 1% figure that would be acceptable to the general public. The Riksbank (the central bank of Sweden) adjusted a ±1% target range into a 2% target in 2017. However, the BOJ still needs to find the right timing to make a change by considering the Federal Reserve’s stance on monetary policy, United States economic and stock performances, and global investors’ risk appetite.

The idea of lowering the inflation target in the context of other economies is rarely expressed in the world. In its periodical inflation-control target review held in 2011, the Bank of Canada examined the possibility of lowering the inflation target (Bank of Canada 2011). The review concluded that the risks associated with low inflation and the zero lower bound on short-term interest rates exceeded the prospective benefits such as (i) reducing uncertainty related to price movement; (ii) mitigating price dispersion caused by firms’ slow adjustment of sale prices, allowing a more efficient allocation of resources; (iii) reducing the real value of tax obligations caused by higher inflation, thus increasing investment; and (iv) lowering the cost on holdings of highly liquid assets (such as currency), thus providing greater incentive to the general public to increase transaction balances and facilitating trade. Until the benefits of lowering the inflation target can be confidently pursued, the Bank of Canada concluded that central banks must find a way to limit the probability of hitting the zero lower bound and to manage monetary policy more effectively when the bound has been hit.

Meanwhile, Jacques de Larosière, a former chief economist at the International Monetary Fund (IMF), was one of the few economists outside Japan supporting the option of lowering the inflation target in the general context (de Larosière 2019). He argued that equilibrium inflation—the level that gives a sufficient margin to avoid deflation risk and hyperinflation dynamics—has declined from 2% to 1% due to structural factors including aging, declining unionization, technological advances, and globalization. Therefore, central banks’ current attempts to anchor long-term inflation expectations above the equilibrium inflation level by monetary easing have generated excessive monetary accommodation and serious distortions. He pointed out that central banks’ desire to achieve the 2% target despite a failure to do so has
contributed to forming the general public's belief that interest rates would remain very low for a very long time. This in turn has led to the flattening, or even reversal, of the long-term yield curve and thus pessimistic sentiment. Moreover, firms might be encouraged to buy back their shares by borrowing at nearly 0% rather than making real business investments. To mitigate these problems, he claimed that central banks should lower the inflation target to 1% and maintain actual core inflation at around 1% on average. This would help consumers to avoid losing purchasing power and maintain their spending demand.

In sharp contrast, there is a view that the inflation target should be raised from the current 2%. In 2010, Olivier Blanchard, the then chief economist of the IMF, together with other IMF economies, proposed that inflation target be raised to around 4% in the United States since it would enable the Federal Reserve to maintain a higher nominal policy interest rate in normal times and to have sufficient room for a cut in the short-term interest rate in a recessionary phase, thereby anchoring long-term inflation expectations at around the new target level (Blanchard, Dell’Ariccia, and Mauro 2010). In addition, John Williams, the then president of the Federal Reserve Bank of San Francisco and currently the president of the Federal Reserve Bank of New York, proposed raising the inflation target to offset the deleterious effects of an equal-sized decline in the neutral rate of interest—the r-star. Given that the United States economy had faced the effective lower bound since the global financial crisis, he stressed that the United States economy might benefit with higher average inflation since resultant higher short-term nominal interest rates would mitigate the drop in output and deterioration of fiscal positions during the downturn phase (Williams 2016b). Despite these suggestions, the option of raising the inflation target has lost traction recently in the central banking circle for fear of de-anchoring inflation expectations.

Thus, many central banks in developed economies increasingly believe that the current inflation target of around 2% should be maintained since it is not certain that long-term inflation expectations can be anchored at the new, higher inflation target. For example, Stanley Fischer, the then vice chairman of the Federal Reserve, expressed hesitation about raising the inflation target in 2016 because high levels of inflation may also be associated with higher inflation variability, and the welfare costs of high and variable inflation could be substantial. More variable inflation would make long-run planning more difficult for households and businesses. In addition, higher and more variable inflation would likely also lead to higher levels of indexation in the economy over time that, in turn, would make it more difficult for central banks to achieve their inflation goals (Fischer 2016).
1.5 Conclusions on Inflation Target and Low Inflation

The euro area and Japan, and to a lesser extent the United States, have been struggling to achieve the inflation target in a stable manner. There is a common trend that inflation expectations from market data show declining trends in these economies. The fall in market-based inflation expectations has raised concerns about the risk of de-anchoring inflation expectations especially in the euro area and the United States. Also, there is a growing divergence among various indicators of inflation expectations particularly in recent years. This situation indicates that it is important for central banks to better understand factors contributing to behavior of various measures of inflation expectations—although the ECB and the Federal Reserve claim that their inflation expectations have been more or less anchored at around their inflation targets. In addition, the Phillips curve has flattened commonly in these economies. While central banks claim that the Phillips curve still exists, inflation forecasts conducted by central banks have often turned out to be overestimated, and the banks have thus found it inevitable to adjust their outlook downward. This may suggest that the use of the Phillips curve for forecasting inflation may be becoming challenging. Limited experience with unconventional monetary easing tools and thus the effectiveness of those tools on inflation is another factor contributing to an overestimation of central banks' inflation outlooks. In other words, central banks find it necessary to make monetary policy decisions in a very uncertain economic and monetary environment. If massive monetary easing has not been able to generate satisfactory inflation, central banks may need to consider whether relatively low inflation comes from more structural factors. For Asian economies other than Japan, some—such as Malaysia; the Republic of Korea; Singapore; Taipei, China; and Thailand—have faced a decline in inflation to low levels in recent years. If many economies persistently face lower inflation trends, it may be worthwhile to explore whether the current inflation targets remain appropriate.
Since the global financial crisis of 2008–2009, economies such as Europe, Japan, and the United States (US) faced the effective lower bound on short-term interest rates (policy rates). This has prompted their central banks to adopt various unconventional monetary easing tools. These economies also share a consensus that the neutral rate of interest—the real rate of interest that prevails when an economy’s output is at its potential level and inflation is kept constant at around the central bank’s inflation target—has shown a declining trend over the past decades and the decline has become sharper after the global financial crisis. The declining trend appears to be persistent in other developed economies too, suggesting a high likelihood that other central banks will reach their effective lower bound soon once an economic downturn or recession occurs in the future—such as the case being experienced since the coronavirus disease (COVID-19) outbreak. This global trend implies that unconventional monetary easing tools are likely to become more conventional and widely used in developed economies. This chapter will take an overview of unconventional monetary easing tools in the euro area, Japan, and the United States. Special focus is given to the case of the Bank of Japan (BOJ), which has been a front-runner in adopting those tools since the late 1990s and has been aggressive in the scale and diversity of the tools adopted since April 2013. US dollar liquidity swap arrangements conducted by the Federal Reserve with other central banks are also explained as measures to help mitigate financial instability in the world.

2.1 Unconventional Monetary Easing in the Euro Area, Japan, and the United States

Central banks in these developed economies adopted various unconventional monetary easing tools, which led to a sharp decline in risk-free long-term interest rates (i.e., government bond yields). While
the sequence, scale, and variety of the tools adopted differ among these central banks, unconventional monetary easing tools generally refer to large-scale purchases of financial assets (“quantitative easing”), forward guidance indicating the future direction of monetary policy, and negative interest rate policy. Conditional long-term lending has also been used by some central banks as a measure to enhance the monetary easing stance.

2.1.1 Large-Scale Asset Purchases (Quantitative Easing)

The most important tool of unconventional monetary policy is large-scale asset purchases, which all the three central banks adopted. This monetary easing tool differs substantially from the “conventional” monetary policy, in which monetary easing was conducted mainly through a reduction in a very short-term nominal interest rate, thereby indirectly influencing long-term interest rates. Quantitative easing directly pushes long-term interest rates down as central banks purchase long-term financial assets (such as government bonds) from the market and thus reduce the supply of such assets in the market. This action creates an accommodative monetary environment by exerting downward pressure on longer-term interest rates, which remain in positive territory. Since yields on government bonds often function as a benchmark for measuring the long-term interest rates related to corporate loans, corporate bonds, and mortgages, direct downward pressure on government bond yields is likely to reduce funding costs not only for governments, but also for firms and households. This reduced cost, in turn, may encourage firms to increase business investment and households to increase residential investment and consumption of durable goods such as cars. The increased spending leads to higher prices of such assets. This policy was proven successful in lowering long-term interest rates or government bond yields and also lowering lending rates applied to firms and individuals. It also helped to lower the financing cost through corporate bond issuance. Theoretically, the main transmission channel of government bond purchases is the portfolio rebalance effect, where investors with preferred habitats—reflecting specialized expertise, transaction costs, regulations, or liquidity preference—might shift their portfolios as a result of a central bank’s bond purchases and thus the relative prices of various types of securities (Vayanos and Vila 2009). Namely, a central bank’s bond purchases lower duration risk from the government bond market. Thus, investors are prompted to demand longer-term government bonds and close substitutes (such as corporate bonds), raising the prices of those securities or lowering their yields. In addition, asset purchases could be viewed by the market and the general
public as a central bank’s commitment to maintaining policy rates at a low level for an extended time—an outcome called a “signaling effect.”

While many central banks adopted quantitative easing after the global financial crisis, the exception was Japan, which had already experimented with small-scale asset purchases mainly focusing on shorter-term assets in 2001–2006 immediately after the dot-com bubble burst in 2000. Starting in 2013, the BOJ dramatically increased the amount of asset purchases and extended the maturity of assets purchased. The Federal Reserve was the first central bank that announced quantitative easing in late 2008 after the policy rate declined to nearly zero following the global financial crisis. The European Central Bank (ECB) adopted large-scale quantitative easing in March 2015—much later than the other two central banks—after having adopted a negative interest rate. These central banks purchased long-term government bonds but also purchased several other financial assets. Other financial assets purchased by the ECB included covered bonds, corporate bonds, asset-backed securities, bonds issued by regional and local governments, and bonds issued by recognized agencies. Other assets purchased by the BOJ included treasury bills, stock-related exchange-traded funds (ETFs), and Japanese real estate investment trusts (J-REITs). The details of the case of Japan will be described separately in Section 2.3. The Federal Reserve purchased agency mortgage-backed securities and agency bonds.

The Federal Reserve conducted quantitative easing through a series of rounds: the first large-scale asset purchase (LSAP1) was announced in late 2008 and continued until late 2009 with the total amount purchased reaching about $1.7 trillion; LSAP2 was announced in late 2010 and continued until June 2011 with the total amount purchased reaching $600 billion; the Maturity Extension Program was announced in September 2011 and extended further in June 2012 until late 2012 (lengthening the average maturity of the Federal Reserve’s portfolio by selling off short-term treasury securities and buying the same amount of longer-term government bonds); and finally, LSAP3 was announced in September 2012 and continued until October 2014. The net asset purchases totaled $3.5 trillion. The LSAP3 period included the period when the monthly net purchase amount was reduced gradually in 2014. The Federal Reserve terminated asset purchases in October 2014 and reduced the amount of asset holdings beginning in October 2017. However, it began to purchase treasury bills in monthly amounts of about $60 billion beginning in October 2019 to cope with a surge in short-term interest rates in the previous month. In the face of the rapidly deteriorating economy caused by the coronavirus disease (COVID-19) crisis, this operation was extended on 15 March 2020 to the purchase
of longer-term financial assets in the amount of at least $700 billion ($500 billion on government bonds and $200 billion on agency mortgage-backed securities) over the coming months. On 23 March 2020, the Federal Reserve decided to purchase these securities without specifying the specific amount and without limit. Several sources in the literature demonstrate that the Federal Reserve’s LSAPs worked well based on the scale of the 10-year yield decline in response to the announcement, but find that the impact was greater in early rounds such as LSAP1, or the impact died off quickly even in LSAP1 (Kuttner 2018; Vissing-Jorgenson and Krishnamurthy 2011; Wright 2011). Some of these views are denied by Gagnon (2018) and Bernanke (2020), which find that a limited effect in later rounds could be attributable to the calmer market conditions, or alternatively, the impact was already reflected in the financial market before the announcement because market participants became accustomed to the central bank’s reactions and were thus able to anticipate the forthcoming measures.

The ECB purchased a small amount of covered bonds in 2009–2012 and government bonds issued by the government in the peripheral economies in 2010–2012 to cope with the global financial crisis and the European debt crisis. Since the middle of 2014, the ECB began a relatively comprehensive monetary easing package including the purchase of asset-based securities and covered bonds. A large-scale asset purchase program including government bonds and other bonds was launched in March 2015. The ECB discontinued net asset purchases at the end of 2018 with the total amount of holdings reaching €2.6 trillion. However, the ECB ended up resuming asset purchases in November 2019 with the monthly asset purchases of about €20 billion. To cope with the economic slowdown induced by the COVID-19 crisis, the ECB announced additional asset purchases of €120 billion on 12 March 2020, which will be flexibly conducted until the end of 2020. On 18 March 2020, moreover, the ECB introduced the Pandemic Emergency Purchases Programme of about €750 billion to purchase Greek bonds and other assets until the end of 2020 by temporarily deviating from the capital key of the national central banks. Gambetti and Musso (2017) show that the ECB’s asset purchase program since 2015 had a significant positive impact on real gross domestic product (GDP) and inflation through the portfolio rebalancing channel, the exchange rate channel, the inflation re-anchoring channel, and the credit channel. In addition, Hammermann et al. (2019) point out that the asset purchase program in 2015–2019 proved to be an adaptable and effective instrument to ease monetary and financial conditions, foster economic recovery, counteract disinflationary pressures, and anchor inflation expectations, thereby supporting a sustained adjustment in the path of inflation toward
price stability. Zhou (2019) also shows that the asset purchase program stimulated economic growth and inflation through the portfolio balance channel, both at the aggregate euro area level and at the disaggregated country-specific level. The portfolio balance channel worked at the aggregated level through greater international price competitiveness, easier conditions on capital markets, and higher asset prices. At the disaggregated level, there was evidence for the stimulation of bank lending through the portfolio balance channel in the core countries. In addition, a hike in stock prices was mainly concentrated in the richer member countries.

Figure 2.1 shows the total amount of financial assets owned by the three central banks converted into US dollars. The amount reached about $14.7 trillion in 2019. Figure 2.2 shows the amount of financial assets as a percentage of nominal GDP owned by these central banks. While the amount of financial assets does not differ significantly between the central banks, the BOJ’s holdings of financial assets as a percentage of nominal GDP (about 103%) has been overwhelmingly larger than that of the ECB (40%) and that of the Federal Reserve (19%). The highest ratio recorded in the case of the Federal Reserve was 26% in 2014 when the net asset purchases under the LSAP were stopped in October. Japan’s relatively high share reflects that Japan’s nominal GDP has been much smaller than those of the euro area and the United States—in
In 2019, Japan’s nominal GDP was about $5 trillion, whereas the amount was $14 trillion in the euro area and $21 trillion in the United States. This discrepancy suggests that the BOJ’s monetary easing relative to the economic size has been disproportionately large, resulting in a greater scale of monetary easing.

2.1.2 Forward Guidance Related to the Direction of Monetary Policy

The ECB, the BOJ, and the Federal Reserve have used forward guidance extensively to inform the general public and market participants about the expected duration of ongoing monetary easing tools or the conditions under which they plan to unwind those tools. Forward guidance relies on the expectations theory of the term structure of interest rates; a central bank moves medium- and long-term interest rates by influencing expectations of future short-term rates (Blinder 2018). Forward guidance was used deliberately as an accommodative monetary easing tool, especially for central banks facing the effective lower bound, aimed at generating downward pressure on long-term interest rates. The idea is similar to the “Odyssean forward guidance” referred to by Campbell et al. (2012), where a central bank commits to
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a longer duration of accommodative monetary policy than is generally anticipated by the markets and the public. This commitment to a longer accommodative monetary policy is needed to compensate for the period constrained by the effective lower bound; thus, a central bank must maintain its already-promised accommodative stance even after economic recovery strengthens and whatever shocks take place in the future. However, there is a trade-off between greater effectiveness and higher flexibility regarding the conduct of future monetary policy. In practice, it is not realistic for a central bank to make a strong commitment because of the time-inconsistency issues. That is, it is difficult for a central bank to commit to a current accommodative monetary policy in the long term without considering that an excessive rise in inflation may de-anchor long-term inflation expectations. A similar concern is often raised about the impacts of a strong commitment on excessive financial instability and asset price bubbles when a policy of low interest rates is sustained for too long. Therefore, “conditional commitment” or the use of expressions that reduce the degree of commitment is a form generally undertaken by central banks. With regard to expression, John Williams took an overview of forward guidance in the United States and other economies and concluded that forward guidance would be most effective when it is simple and explicit. Vague hints about future policy are ineffective because the general public pays only so much attention to central bank messaging. Strongly worded forward guidance could be a powerful tool when it is needed although care needs to be taken when and where it is used (Williams 2016a).

Forward guidance was officially applied to the policy interest rate in the case of the Federal Reserve and the ECB for some time. The BOJ officially adopted forward guidance applied to the policy interest rates (the “yield curve control” policy explained in Section 2.3) only in July 2018 although it had already been actively using various forms of quasi-forward guidance on asset purchases since April 2013 and on the yield curve control since September 2016. The Federal Reserve actively experimented with various forms of forward guidance on the federal funds rate beginning in December 2008. It began with using various forms of “calendar-based” expressions related to the period or duration of the current low target range on the federal funds rate—such as keeping the policy rate low “for a considerable period” in 2003–2004, “at least through mid-2013” in August 2011, and “at least through mid-2015” in September 2012. The forward guidance was then replaced in December 2012 by threshold-based (or state contingent-

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1 See a description about the timeliness of the federal funds rate: US Federal Reserve Board. 2019. (See also Davies 2020).
based) forward guidance using the unemployment rate and inflation projected between 1 and 2 years ahead—specifically, not considering raising the policy rate until unemployment had fallen at least to 6.5% and as long as inflation and inflation expectations remained moderate. The Federal Reserve strengthened this statement further a year later by indicating that there would be no rate hike until “well past the time” that unemployment declined below 6.5%. While calendar-based guidance is easy to understand, state-contingent guidance could be superior because market expectations about the policy rate can be adjusted endogenously to incoming information bearing on the outlook (Feroli et al. 2017). Bernanke (2020) shows that the increasingly explicit forward guidance in 2011 and 2012 had the desired effect of lowering market interest rate expectations.

The threshold-based forward guidance was subsequently transformed to a statement linking the timing to end asset purchases and the period to continue the current low interest rate. In other words, the Federal Reserve clarified that an interest rate hike would happen after completing the asset purchase program. Therefore, the Federal Reserve changed the forward guidance on the federal fund rate by indicating that it “can be patient in beginning to normalize the stance of monetary policy” in December 2014—after completing the asset purchase program in October 2014. After that, the forward guidance was adjusted gradually to help market participants to prepare for the first interest rate hike and the subsequent hikes.

Beginning in 2019, however, the Federal Reserve reversed its monetary policy stance to continue normalization as pointed out below in detail. In January 2019, it removed the expression “some further gradual increases will be consistent with sustained expansion of economic activity, strong labor market conditions, and inflation near the 2% inflation target.” Instead, the Federal Open Market Committee (FOMC) introduced the expression that it “will be patient as it determines what future adjustments to the target range … may be appropriate to support these outcomes.” After that, the federal funds rate was lowered three times (July, September, and October) in 2019. Since the beginning of the COVID-19 spread in 2020 and enhanced volatility in the financial markets, the federal funds rate has been lowered twice: 50 basis points on 3 March and 100 basis points on 15 March to 0–0.25%—the same level maintained before the first hike of 25 basis points implemented in late 2015. Thus, the Federal Reserve is back to the effective lower bound and forward guidance now plays an essential role to communicate about the duration or the conditions with regard to continuing the current low policy target. The forward guidance in the 15 March statement on monetary policy is neither calendar-based nor threshold-based: it
is rather vague, stating that the current low federal funds target range is set “until it is confident that the economy has weathered recent [COVID-19] events and is on track to achieve its maximum employment and price stability goals.” The statement also described the timing and size of future [rate] adjustments as being assessed based on “realized and expected economic conditions relative to its maximum employment objective and its symmetric 2% inflation objective.”

The ECB maintained forward guidance on key ECB interest rates—namely, the interest rate on the main refinancing operations, the interest rate on the marginal lending facility, and the interest rate on the deposit facility—using the expected timing to continue. For example, the forward guidance as of June 2019 stated that the present levels of key interest rates would be maintained at least through the first half of 2020, and in any case for as long as necessary to ensure the continued sustained convergence of inflation to levels that are below, but close to, 2% over the medium term. After strengthening the forward guidance by adding “lower” to the levels of key interest rates, the ECB reformed the forward guidance in September 2019 by omitting the calendar-based expression and linking more closely to achievability of the price stability target. Specifically, the revised guidance states that the key interest rates are expected to remain at their present or lower levels until the inflation outlook robustly converges to a level sufficiently close to, but below, 2% within its projection horizon, and until such convergence has been consistently reflected in underlying inflation. The ECB also linked the asset purchase program—to purchase €20 billion monthly, announced in September 2019 and taking effect in November 2019—with the policy interest rates by indicating that net purchases will end shortly before the ECB starts raising the key interest rates.

The BOJ, meanwhile, indicated its intention to continue quantitative and qualitative easing (QQE) as a package from the beginning without officially naming it as forward guidance. Under QQE, the main operating target for money market operations was the monetary base from April 2013 to September 2016, and various assets—among which Japanese government bond (JGB) purchases were the main operational tool—were purchased under the specified target set on the annual pace of increase in the monetary base. The BOJ did not adopt a policy rate like the Federal Reserve had at that time, so the statement on monetary policy released in April 2013 said that QQE would continue aiming to achieve the price stability target of 2%, as long as it was necessary for maintaining that target in a stable manner. This is a kind of forward guidance referring the continuation of QQE. In September 2016, the BOJ abandoned the monetary base control and switched to yield curve control (YCC) using the negative interest rate (−0.1%) adopted in January 2016 and adding a
new 10-year yield target (around 0%). The BOJ called the new framework “QQE with yield curve control” and continued to use the same forward guidance just by switching from QQE to QQE with yield curve control. In the same month, the BOJ added an “overshooting commitment” that would expand the monetary base until the rate of increase in the core consumer price index, or core CPI (all CPI items less fresh food in the BOJ’s definition of core CPI, as described in Chapter 1) exceeds 2% and stays above the target in a stable manner—another kind of forward guidance presumably signaling to the market that the quantity element of monetary easing was not given up. In July 2017, moreover, the BOJ officially adopted forward guidance for the short-and long-term policy rates in addition to the existing de facto two types of forward guidance as explained above. The new forward guidance stated that the policy rates would be expected to remain at their present levels as long as it was necessary to pay close attention to the possibility that the momentum toward achieving the price stability target would be lost. The BOJ further strengthened this expression in October 2019 by adding “lower,” hinting at the possibility of deepening the negative interest rate and/or the 10-year yield. Thus, the current forward guidance says that policy rates are expected to remain at their present or lower levels as long as it is necessary to pay close attention to the possibility that the momentum toward achieving the price stability target will be lost.

Conducting a survey of central banks in 2017, Blinder (2018) reports that 72% of central banks believe forward guidance remains attractive even after economic conditions return to normal. These central banks chose the survey response that forward guidance would remain a potential monetary policy instrument or in modified form, while 28% chose the “too early to judge” option. Looking at the effectiveness of forward guidance, on the other hand, Blinder (2018) observes forward guidance critically and stresses that no valid empirical evidence supports the belief that forward guidance should work in practice—since the expectations theory with rational expectations failed miserably as an empirical matter.

### 2.1.3 Negative Interest Rate Policy

When central banks adopt a negative rate, it applies to all or part of excess reserves while the banks apply no interest (0% rate) to required reserves set under the reserve requirement system. This means that financial institutions holding reserve balances with the central bank now must pay interest for maintaining excess reserves—shifting from the general practice where the central bank pays interest to financial institutions under a positive rate policy. Because this shift increases
financial institutions’ costs like additional taxes, financial institutions might be encouraged to promote lending to the private sector and might thus stimulate economic growth. Since the negative rate also contributes to lowering long-term yields and thus lending rates applied to the private sector, credit demand could be stimulated under this policy. Meanwhile, the negative rate policy narrows the margin between the lending rate and deposit rate since financial institutions find it difficult to pass the increased cost (i.e., interest payment to the central bank) to retail deposits by charging a negative rate on retail deposits while lending rate drops. Some banks in Europe could manage to charge negative interest rates on large corporate customers, but not on the general public. Banks in Japan have so far found it difficult to charge a negative rate on any deposits in the face of intensified competition in the banking sector. Thus, the policy generally harms the profits of financial institutions unless a declined lending rate could promote demand for credit. As such a policy is prolonged, concerns could be raised over the soundness of financial institutions, thus eventually undermining lending incentives and dampening the economy.

The negative nominal interest rate was adopted by the ECB and the BOJ, as well as some other central banks in Europe. It is applied to excess reserves although the level remains moderate—with the ECB setting the rate at −0.5% and the BOJ setting it at −0.1%. In the case of the Federal Reserve, the internal calculation made in 2010 was around −0.35% (Bernanke 2016). The ECB introduced a negative rate policy on all excess reserves in June 2014, lowering its deposit facility rate to −0.1% in the face of sluggish economic growth, low inflation, and the appreciation of the euro. The negative rate was subsequently deepened to −0.2% in September 2019, to −0.3% in December 2015, to −0.4% in March 2016, and to −0.5% in September 2019. In the euro area, excess reserves are maintained largely by large financial institutions in Germany and other core economies, so complaints frequently emerged from the banking system in these economies. To reduce the burden on these financial institutions, the ECB adopted a “tiering” system in September 2019 when the negative rate was deepened from −0.4% to −0.5%. The tiering system uses two interest rates applied to excess reserves—that is, a deposit facility rate (currently −0.5%) and 0%. Under the two-tier system, the volume of excess reserves that is exempt from the deposit facility rate (namely, excess reserves being subject to 0%) is determined as a multiple (currently 6) of a commercial bank’s minimum reserve requirements. Only the remaining volume of excess reserves is subject to −0.5%. This approach is like the mechanism adopted by the Swiss National Bank although its multiplier was 20. The BOJ adopted the tiering system using three interest rates (−0.1%,
0%, and 0.1%) from the beginning when the negative rate (−0.1%) was introduced in 2016, as explained in Section 2.3. The BOJ reduced further the amount of excess reserves to which the negative rate is applied in 2018. Currently, only 6% of total reserves is subject to the negative rate.

The central banking circle is intensely debating whether the negative interest rate policy should be included in the monetary policy toolbox, while quantitative easing and forward guidance are clearly included in the toolbox. Strong criticisms—especially from commercial banks, insurance firms, and pension funds—have been raised in Japan and Europe (especially in Germany) objecting to the negative interest rate. Using confidential balance sheet data, the ECB made the defense that the transmission mechanism of monetary easing continued to prevail even after adopting the negative interest rate policy (Altavilla et al. 2019). The researchers demonstrate that sound banks were more inclined to charge negative rates on their clients’ deposits; banks charging negative rates on deposits did not experience a decline in deposits; banks passing negative rates on to depositors were able to increase lending—while admitting that the zero lower bound may exist for household deposits. Nonetheless, the financial sector has remained dissatisfied with the policy because of the continued low profitability arising from squeezed margins and low returns on financial assets such as bonds.

The adverse impact of the negative interest rate has been widely recognized as Brunnermeier and Koby (2017) demonstrate the presence of a “reversal rate” of interest, below which the adverse effects of the negative rate on bank capital and lending could make it economically contractionary. Meanwhile, Ben Bernanke—former chairman of the Federal Reserve—views this policy favorably (Bernanke 2016). He stressed that this policy could work through the same channels as more standard monetary policies by putting downward pressure on the interest rates most relevant to borrowing and spending decisions. Bernanke (2016) explained why the policy is not necessarily taken positively by explaining discussions conducted internally at the Federal Reserve in August 2010 from the perspective of legal constraints and the adverse impact on money market funds. First, legal constraints refer to the ambiguity as to whether the Federal Reserve has the authority to impose a negative interest rate. This is because the 2006 law that allows the Federal Reserve to pay interest directly to banks states only that depositors “may receive earnings” and does not contemplate the charging of fees—seemingly suggesting the ruling out of the negative interest rate (see also Davis [2020]. While the law can be revised, it is widely understood that the Federal Reserve might be concerned that active debate on the policy in Congress might
eventually lead to more congressional oversight of rate decisions and reduce the flexibility of monetary policy. As for the money market funds, the case of Japan demonstrated that the negative rate severely damaged the industry (Shirai 2018a). The US money market fund manages large financial assets (about $4 trillion)—much bigger than Japan—and “breaking the buck” (failure to meet the promise that investors could withdraw at least the full amount invested) caused by the 2008 Lehman shock generated substantial stresses. While the 2014 reform made breaking the buck no longer an issue with the adoption of the floating net asset value system, not all funds need to adopt the new approach and thus the negative interest rate might generate instability. Bernanke concluded that the negative interest rate appeared to have modest benefits with manageable cost so that it would be worthwhile for the Federal Reserve to conduct further analysis. Meanwhile, the negative rate was denied by Jerome Powell, the current chairman of the Federal Reserve, who stressed at a 15 March 2020 press conference that the negative rate would be unlikely to be an appropriate policy response in the United States.

2.1.4 Conditional Long-Term Lending

The ECB and the BOJ have actively used conditional long-term lending facilities. The ECB adopted targeted longer-term refinancing operations (TLTROs) to provide long-term cheap financing to banks. Lower interest rates are applied to banks that have increased their lending to firms and households. TLTROs were introduced to reinforce the ECB's monetary easing stance and strengthen the transmission of monetary policy to the real economy. The latest TLTRO (TLTRO III) was announced in March 2019 and is being implemented on a quarterly basis between September 2019 and March 2021. The maturity is 3 years while under the previous two TLTROs the maturity was 4 years, but banks can borrow from the ECB at lower rates under TLTRO III than under the previous two rounds. In March 2020, the ECB decided that the interest rate on TLTRO III could be as low as 25 basis points below the average deposit facility rate (currently –0.75%) during the period from June 2020 to June 2021 for banks that have maintained or increased their credit level. This means that the ECB provides subsidies to a wide range of banks by paying them to borrow money. The interest rate was further cut by 50 basis points below the average interest rate (currently –1%) in April 2020. Although not conditioning loans terms to banks' lending, the ECB also introduced seven pandemic emergency longer-term refinancing operations (PELTROs) in April 2020 to support banks at an interest rate of 25 basis points below the
average rate applied in the main refinancing operations (currently –0.25%). Commencing in May until the end of September 2021, banks benefit from the collateral easing measures. The degree of subsidies that the ECB provides to banks through paying them to borrow under TLTRO III and PELTROs is substantial.

In Japan, a loan support program was adopted to encourage commercial banks to lend to innovative growth-oriented sectors in 2010 and to stimulate lending against eligible collateral with an unlimited amount in 2012. The maturity is within 4 years and the interest rate on loans is 0.1%. Although not conditioning loan terms on banks’ lending, the BOJ has provided liquidity support to banks in 2011 with the maturity within 1 year at the interest rate of 0% or 0.1% in disaster areas against eligible collateral. Disaster areas include the areas affected by the Great East Japan Earthquake in March 2011 and the Kumamoto Earthquake in April 2016. The maximum total amount of loans applied to each area is set at ¥1 trillion and ¥300 billion, respectively. As compared with the euro area, where some banks in the peripheral economies may face funding pressures, Japan’s banks have ample deposits and limited demand for credit from the private sector. While these facilities help to improve funding cost for banks, they have not stimulated credit growth in the private sector. To cope with the COVID-19 crisis, the BOJ modified this facility in March 2020 by extending the maturity from within 1 year to within 2 years and setting the interest rate uniformly at 1.0%. The facility will begin from July 2020. In March 2020, moreover, a new fund-raising operation with the maturity within 1 year (mostly 3 months) at the interest rate of 0% was introduced to facilitate banks’ lending to firms affected by the COVID-19 (until September 2020), as pointed out in Section 2.3. This is also a facility that does not condition loan terms on banks’ lending.

2.2 Recent History of the Monetary Policy Stance in the United States and the Euro Area

This section takes a brief overview of the change in the monetary policy stance recently adopted by the Federal Reserve and the ECB.

2.2.1 Case of the United States

During LSAP3, the Federal Reserve faced market turbulence called the “taper tantrum” in 2013 when it began to suggest the possibility of a decline in net monthly asset purchases, causing a hike in long-term yields by nearly a percentage point. This turbulence occurred partly
because the market associated the slowdown in the monthly purchase of financial assets with a policy rate hike. As pointed out above, the Federal Reserve managed to reduce the net monthly asset purchase amount during LSAP3 in 2014 and terminated the asset purchase program with the continuation of the reinvestment strategy in October 2014. The interest rate normalization on the federal funds rate was initiated in December 2015 with a hike of 25 basis points, followed by eight additional 25 basis point hikes (once in December 2016, three times in 2017, and four times in 2018). While interest rate normalization continued, a reduction in the outstanding amount of financial assets held (balance sheet normalization) was attempted from October 2017.

In the fall of 2018, financial markets became unstable. The United States bond markets increasingly signaled anxiety over an economic slowdown or possible recession in the country in the near future. This anxiety was reflected in the flattened inverse yield curve of the United States treasury securities caused by long-term yields (such as 10-year yield) rising at a slower pace than shorter-term yields (such as 3-month yield) that rose steadily reflecting the policy rate hikes. Thus, the inversion of the yield curve created by higher shorter-term yields relative to longer-term yields became feasible; this change drew a lot of attention because the inversion had signaled upcoming recessions in the United States economy about 1 to 1.5 years later in the past recessionary phases. United States President Donald Trump began to criticize the Federal Reserve in the summer of 2018 for having raised the federal funds rate excessively in 2018. The Federal Reserve’s balance sheet normalization was also criticized by President Trump. Many market participants agreed with these views. In December 2019, a sharp stock sell-off took place as a negative reaction to the communication made by Federal Reserve Chairman Jerome Powell at the press conference following the FOMC about the plan to continue the policy rate hikes and the scheduled shrinkage of the balance sheet in the following year. The negative market reactions reflected disappointment about the FOMC’s stance and a call for terminating monetary policy normalization due to growing concerns about a global economic slowdown driven partly by the trade conflicts between the United States and the People’s Republic of China.

Given this background, the Federal Reserve shifted its monetary policy stance toward a dovish bias in early 2019 by signaling a termination of policy rate normalization and a completion of the balance sheet normalization earlier than initially envisaged. As factors leading to the change in its policy stance, the Federal Reserve stressed muted inflation, declining long-term inflation expectations, and downside risks related to the domestic economic growth outlook in the face of growing
global uncertainties. In March 2019, the Federal Reserve decided to speed up the timing to end the balance sheet normalization from the end of 2019 to the end of September 2019. In July 2019, this plan was further shortened to the end of July 2019, when the decision was made to cut the federal funds rate by 25 basis points to 2.0%–2.25%—the first cut since 2008. This meant that the amount of financial assets held by the Federal Reserve remained higher than initially planned. President Trump intensified his criticism against the Federal Reserve because of the small scale of the rate cut and demanded a cut of 100 basis points. In September and October 2019, subsequently, the Federal Reserve cut the federal funds rate by 25 basis points each month to 1.5%–1.75% and signaled that no further cuts would be considered for now.

Since the COVID-19 outbreak in the People’s Republic of China beginning in late 2019 and its spread to the United States and the world in March 2020, the Federal Reserve had three FOMC meetings in March 2020 to cut the federal fund rates by a cumulative 150 basis points to 0%–0.25% and resume large-scale asset purchases, as pointed out above. (Unscheduled meetings took place on 3 March and 23 March, while the meeting scheduled for 17–18 March was moved up to 15 March.) Although the Federal Reserve did not call the asset purchases a resumption of LSAP or quantitative easing, the unlimited amount of purchases is bold and unprecedented in the post-World War II era. A commercial paper funding facility and a prime dealer credit facility—which had been adopted in 2008—were also adopted again. The Money Market Mutual Fund Liquidity Facility—similar to the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility established in 2008—was also introduced. On 23 March and 9 April 2020, furthermore, extraordinary new monetary easing measures were announced to support firms, individuals, and states and municipalities with the total amount of $2.3 trillion (nearly 10% of nominal GDP). Those measures include (i) new lending to banks that finance small firms under the government’s Paycheck Protection Program; (ii) the Main Street Lending Program, which purchases about 95% of eligible 4-year loans targeting small and medium-sized firms that were in good financial standing before the COVID-19 crisis from financial institutions; (iii) the purchase of new and existing corporate bonds issued by firms rated investment grade (BBB−) as of 22 March and rated at least BB− afterward; (iv) the reintroduction of the Term Asset-Backed Securities Loan Facility, which provides loans taking asset-backed securities backed by student loans, auto loans, credit card loans, as well as the AAA-rated tranches of both outstanding commercial mortgage-backed securities and newly issued collateralized loan obligations; and (v) the Municipal Liquidity Facility, which enables lending to states and municipalities. The Federal Reserve
finances a special purpose vehicle established by the Department of the Treasury and the Federal Reserve Bank of New York, which in turn engages in operations (ii)-(iv) mentioned above. The Department of the Treasury provides over $200 billion of equity and credit protection to the special purpose vehicle with funds allocated from the economic relief package totaling over $2 trillion under the Coronavirus Aid, Relief, and Economic Security Act passed by Congress on 27 March 2020.

### 2.2.2 Case of the Euro Area

In the euro area, meanwhile, the ECB conducted monetary easing after the global financial crisis and used a series of innovative unconventional monetary easing moves especially beginning in 2014—including a negative interest rate policy, targeted longer-term refinancing operations (TLTRO I and II), and a large-scale asset purchase program. The ECB terminated the asset purchase program at the end of December 2018, as pointed out above, announced a continuation of the reinvestment strategy to maintain the outstanding amount of asset holdings, and presented a plan to conduct the first hike on policy rates within 2019. However, economic slowdown in the region and declines in the rates of inflation and inflation expectations forced the ECB to shift its monetary policy stance from a move toward normalization to a move toward accommodation beginning in early 2019. Therefore, the ECB postponed its plan to raise policy rates to 2020 and adopted the new TLTRO III—although the borrowing period was just 2 years rather than 4 years and the interest rate was set at the level of the main refinancing operation, both of which turned out to be less favorable than TLTRO II—in March 2019, taking effect in September 2019.

In September 2019, furthermore, the ECB presented a package of additional monetary easing in which it would (i) deepen the deposit facility rate by 10 basis points to −0.50% with the adoption of the tiering system (while maintaining the interest rate on the main refinancing operations at 0% and the rate on the marginal lending facility at 0.25%) and (ii) resume net asset purchases at a monthly pace of €20 billion beginning in November 2019. The asset purchases will continue as long as necessary to reinforce the accommodative impact of its policy rates, and to end shortly before it starts raising the key policy interest rates. The interest rate policy was strengthened further with an introduction of open-ended forward guidance that indicates maintaining present or lower interest rates until the inflation outlook robustly converges to a level sufficiently “close to, but below, 2%” within its projection horizon. Similarly, the ECB would conduct the asset purchase program to reinforce the accommodative impact of policy interest rates without
specifying the time span by indicating the intention to end shortly before raising the key policy interest rates. At the same time, the ECB decided to preserve favorable bank lending conditions for TLTRO III by charging the interest rate in each operation at the level of the main refinancing operations or lower (up to the deposit facility rate) if borrowing banks extended credit to the private sector beyond a benchmark. The maturity of the operations was also extended from 2 to 3 years. In March 2020, the interest rate charged under TLTRO III was lowered by 25 basis points, so banks could borrow from the ECB at as low as –0.75% if they maintain at least their credit amount.

In the face of the sharp slowdown in economic activities caused by the COVID-19 outbreak, the ECB presented another monetary easing package on 12 March 2020, including TLTRO III operations with more favorable terms until June 2021 as well as additional net asset purchases of €120 billion until the end of 2020 (in addition to ongoing net asset purchases at a monthly pace of €20 billion since November 2019). However, the policy rates remained unchanged, so the negative interest rate remains –0.5%. Asset purchases were expanded further on 18 March 2020. The Pandemic Emergency Purchase Programme makes purchases of €750 billion of all eligible assets (including commercial papers) as well as securities issued by Greece until the end of 2020. This means that the ECB decided to purchase securities of peripheral economies (such as Italian government bonds) beyond the maximum amount set by the capital key of the national central banks in the euro area. In addition, Greek government bonds, which are not eligible for the ECB’s asset purchase programs, are now eligible under the Pandemic Emergency Purchase Programme. For example, Standard & Poor’s credit rating for Greece stands at BB− with a positive outlook—non-investment grade. This is an exceptional and temporary measure that continues until the end of 2020. This facility helps to prevent the yields of peripheral economies from rising sharply. On 12 March 2020, the ECB also introduced longer-term refinancing operations temporarily to provide immediate liquidity support to banks at the interest rate equal to the average rate on the deposit facility with full allotment. This facility provides liquidity at favorable terms to bridge the period until the TLTRO III operation in June 2020.

Additional monetary easing was conducted on 30 April 2020. In addition to increasing subsidies to the interest rate on the TLTRO III as explained in Section 2.1, the ECB adopted seven PELTROs, commencing in May 2020 and maturing between July and September 2021. Banks can borrow funds from the ECB at an interest rate of 0.25% below the average rate on the main refinancing operations (currently –0.25%). This is another type of subsidized loan provided by the ECB to banks.
This facility was created to support liquidity conditions in the financial system and contribute to preserving the smooth functioning of money markets by providing an effective backstop after the expiry of the bridge longer-term refinancing operations that have been conducted since 12 March 2020. Following the Federal Reserve, the ECB’s monetary easing stands out in terms of the scale and diversity and reveals its strong determination to support the ailing economy.

2.3 Recent History of the Bank of Japan’s Quantitative and Qualitative Monetary Easing and Transition

Before introducing massive monetary easing in April 2013, the BOJ had conducted monetary easing called comprehensive monetary easing (CME) beginning in 2010 through the asset purchase program under the BOJ’s Governor Masaaki Shirakawa at that time. The assets purchased included Japanese government bonds (with maturity up to 3 years), treasury bills, ETFs, and J-REITs. Nonetheless, the impact of macroeconomic performance and financial markets had been limited. While long-term yields had dropped moderately, mild deflation had persisted. The yen had continued to appreciate against major currencies as a “safe haven” currency. It had appreciated against the US dollar from around ¥84 in September 2010 to around ¥76 immediately after the Great East Japan Earthquake and Tsunami of 11 March 2011. This had led to coordinated intervention in the foreign exchange market on 18–19 March 2011 by the Ministry of Finance of Japan with the Bank of England, the Federal Reserve, the Bank of Canada, and the Swiss National Bank with the total amount of intervention reaching about ¥800 billion (of which Japan had contributed about ¥693 billion or 87% of the total amount). The yen had again appreciated against the US dollar to around ¥76 on 4 August 2011, which led to another intervention in the foreign exchange market, but this time it was conducted solely by the Ministry of Finance of Japan on a massive scale of ¥4.6 trillion. However, the yen had continued to appreciate below ¥80, which led to further interventions on 31 October 2011 with an amount of ¥8.7 trillion and on 1–4 November 2011 with an amount of around ¥1 trillion. After that, the Ministry of Finance had stopped intervening in the foreign exchange market. The criticism had then intensified from the media, the government, and market participants against the BOJ for not providing sufficient monetary easing and consequently allowing the overvaluation of the yen. The yen had remained at around or below ¥80 against the US dollar until October 2012. The BOJ’s CME had generated a decline
in JGB yields and an accommodative monetary environment, but this decline had been offset by the yen’s sharp and continuous appreciation and sluggish stock prices until the end of 2012. The economy had remained sluggish.

2.3.1 Features of the Quantitative and Qualitative Monetary Easing Adopted in April 2013

Beginning in late 2012, the financial market showed a remarkable turnaround with rising stock prices and the depreciation of the yen against the US dollar. This turnaround reflected anticipation of massive monetary easing that was expected to be introduced by the next BOJ governor to be appointed by the newly elected Prime Minister Shinzo Abe, who had become the prime minister after a decisive victory in the general election held in December 2012. Therefore, the yen began to depreciate vis-à-vis the US dollar starting in late 2012 even before the new governor was nominated. The yen began to depreciate to around ¥84 in December 2012 and further to ¥95 in March 2013 just before the introduction of QQE. The yen’s nominal effective exchange rate also depreciated. Moreover, the Nikkei Stock Average began to rise from around ¥9,500 to around ¥12,400 over the same period, and the Tokyo Stock Price Index (TOPIX) from around 780 points to around 1,000 points. In January 2013, the BOJ, led by the BOJ’s Governor Masaaki Shirakawa at the time, introduced its 2% price stability target. However, it was believed widely that CME was not strong enough to achieve the target.

In April 2013, under the new BOJ’s Governor Haruhiko Kuroda, the BOJ adopted massive and various monetary easing tools to achieve the target under QQE. The QQE was not comparable to any of these previous monetary easing measures taken by the BOJ in terms of boldness (see Shirai 2018a for details). The BOJ adopted QQE in April 2013 to achieve the price stability target of 2% as quickly as possible, with a time horizon of about 2 years. QQE was introduced as an extension of the previous CME with an increase in the scale of various asset purchases and a lengthening of the maturity of JGBs to the maximum 40 years. The “quantitative” dimension of QQE referred to the expansion of the monetary base at an annual pace of ¥60–¥70 trillion—monetary base targeting (or monetary base control). The “qualitative” dimension of QQE referred mainly to the guidelines for asset purchases, which were (i) net JGB purchases at an annual pace of about ¥50 trillion (i.e., excluding the amount of reinvestment), (ii) the average remaining maturity of JGB purchases of about 7 years (namely, 6 to 8 years) by purchasing JGBs all up to the maximum 40 years, and (iii) annual
purchases of about ¥1 trillion in ETFs and about ¥30 billion in J-REIT. To demonstrate its intention to achieve 2% inflation in about 2 years, the BOJ announced that it would double the monetary base and the amounts outstanding of JGBs and ETFs held in 2 years, and it would more than double the average remaining maturity of JGB purchases. At the same time, the BOJ adopted the kind of forward guidance that QQE would continue aiming to achieve the price stability target of 2% as long as necessary for maintaining that target in a stable manner, as already mentioned above. The holdings of commercial papers and corporate bonds were maintained at about ¥2.2 trillion and ¥3.2 trillion each and were purchased under CME using reinvestment strategies. The BOJ did not increase net purchases of commercial papers and corporate bonds, mainly because of the small size of markets and high demand for these assets. Among risk assets purchased, the market regarded ETF purchases as more important than J-REIT purchases due to the size of the market and the relatively large amount of purchases.

Monetary base control was the most important element of QQE; it indicated a shift of the main operating target for money market operations from the uncollateralized overnight call rate adopted previously to the monetary base. One of the major tasks of the BOJ’s operational department was to meet the operating target as closely as possible. This operating target differed from that of the Federal Reserve where the objective for open market operations continued to be specified as the federal funds rate (short-term policy rate). The Federal Reserve maintained this target even when quantitative easing was adopted. This difference symbolizes the BOJ’s priority given to “quantity,” while the Federal Reserve treated asset purchases as a supplement to the federal funds rate. To achieve this scale of monetary base expansion, JGBs were the most important financial assets purchased. The BOJ’s purchases of longer-term JGBs would result in a decline in the net supply of these bonds circulating in the markets, so that the average remaining maturity of JGBs transacted in the markets would be shortened. This would lead to a decline in the term premium, providing additional room for investors to take more risk and promoting portfolio rebalancing.

About one and a half years after the initiation of QQE, the BOJ made the second round of expansion by increasing the annual pace of increase in the monetary base from about ¥60 trillion–¥70 trillion to about ¥80 trillion in October 2014. The main reason was a sharp decline in household spending after a consumption tax hike in April 2014. Another factor leading QQE was a decline in long-term inflation expectations due to weakened domestic demand and an oil price drop from the middle of 2014. To achieve this monetary base targeting, the amount outstanding of JGB holdings was increased from about ¥50 trillion to about ¥80 trillion.
To encourage a further decline in interest rates across the entire yield curve, moreover, the BOJ extended the average remaining maturity target of JGB purchases from about 7 years (precisely, 6–8 years) to about 7–10 years. In addition, 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 for ETFs and from about ¥30 billion to about ¥90 billion for J-REITs. The average remaining maturity of JGB purchases was extended further from about 7–10 years to about 7–12 years in December 2015.

Kimura and Nakajima (2016) demonstrate that QQE lowered long-term interest rates, improved the output gap, and raised inflation—although admitting that there was a great deal of uncertainty about the estimation results. In addition, Miyao and Okimoto (2017) find that monetary policy shocks generated by QQE led to a persistent rise in real output and inflation in Japan. Meanwhile, Koeda (2019) empirically demonstrates that boosting the size of the BOJ’s balance sheet alone did not robustly increase inflation and output.

2.3.2 The Negative Interest Rate Policy Announced in January 2016

In January 2016, the BOJ surprised the general public and the markets when it announced a negative interest rate on part of excess reserves, taking effect 16 February 2016. The announcement was a surprise because the possibility of adopting the policy had been rejected by the BOJ for many years and by the governor prior to the decision. The BOJ’s explanation for introducing the policy was that a negative interest rate would expand aggregate demand and inflation expectations, thereby accelerating the path toward 2% inflation. The negative interest rate policy is applicable to current accounts that financial institutions hold at the BOJ. Since adopting a complementary deposit facility in October 2008, the BOJ initiated payment of positive interest on the current account balances and maintained 0.1% until adoption of a negative interest rate.2 Out of the current account balances, no interest rate (zero interest rate) is applied to required reserve balances. The negative interest rate policy gave rise to the complicated three-tier system where the outstanding current account balance was decomposed into three

2 The BOJ introduced the positive (0.1%) interest rate on the current account balance in 2008 as a floor to the interest rate corridors. This practice is adopted by major central banks including the Federal Reserve, the European Central Bank, and the Bank of England as well. The floor could be established because no banks should be willing to lend at a rate below this one.
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... types to which a positive 0.1%, 0%, and –0.1% is applied (see Shirai 2018a for details).

Thereafter, the BOJ announced that monetary easing would be pursued by making full use of possible measures in three dimensions by adding interest rate to the existing quantitative and qualitative dimensions—called “QQE with a negative interest rate.” On the quantitative dimension of QQE, the BOJ stressed again a willingness to expand the monetary base since it could technically continue to purchase JGBs from the markets given that their holdings accounted for only 30%–40% of the outstanding amount issued. The BOJ also rephrased the quasi-forward guidance that it would continue with QQE with a negative interest rate, aiming to achieve the price stability target of 2%, as long as it is necessary for maintaining that target in a stable manner.

The negative interest rate policy contributed to a temporary expansion of residential investment and a greater issuance of longer-term corporate bonds. Honda and Inoue (2017) find that the negative interest rate effectively stimulated private residential investment. However, those developments are not impressive if actual residential investment movements are observed from 2016 to 2019. Residential investment demand has been limited by demographic changes. Yoshino, Taghizadeh–Hesary, and Miyamoto (2017) point out that banks did indeed withdraw excess reserves from the BOJ, but lending to the corporate sector did not increase due to the vertical shape of the investment-savings curve—reflecting factors including the aging population, a shrinking labor force, low participation of women in the workforce, a conservative banking system, less productive local governments, low levels of technological development, slow growth in small and medium-sized enterprises and start-up businesses, and low levels of marginal productivity of capital.

About the impact on stock prices and the exchange rate of the yen, Miyao (2017) points out that the impact was limited despite a decline in both short- and long-term interest rates. Meanwhile, the negative interest rate policy flattened the entire yield curve and resulted in reducing longer-term yields to a significant degree. Koeda (2019) finds that the negative interest rate policy left limited room for additional stimulus—even though the term spread fell into a negative range.

While the BOJ initially emphasized a decline in interest rates as a result of its successful monetary policy, the negative interest rate policy raised concerns about side effects. Adverse impacts can be classified into four issues: (i) a decline in the profitability of the financial sector and a rise in potential financial instability risk, (ii) promotion of cash substitution (a shift in preference from bank deposits to cash) and a deterioration in households’ sentiments, (iii) a decline in liquidity and weakened functions of the JGB markets, and (iv) the BOJ’s operational...
challenges and balance sheet risk (Shirai 2018a). These adverse effects may be exceeding the benefits.

First, the negative interest rate policy further squeezed the spreads between lending and deposit interest rates, contributing to a deeper decline in banking sector profitability (Figure 2.3). Banks found it difficult to charge a negative deposit interest rate to both retail and large depositors for fear of losing customers in the overcrowded banking sector. This adverse impact is severe, as the loan-to-deposit ratio has remained below 70% and declined further because deposit growth has consistently exceeded credit growth. Banks also received a smaller amount of interest income from JGB holdings due to lower coupon rates. Banks enjoyed unrealized valuation gains from JGB holdings or capital gains from selling them when interest rates dropped. Nevertheless, they found it difficult to reinvest JGB redemptions or cash obtained after selling JGBs in an extremely low-interest-rate environment. Banks raised concerns about the risk of undermining financial intermediation in the case that current monetary policy would continue for a long time. As for institutional investors such as life insurance firms and pension funds, an excessive decline in yields on long-term and super-long-term

![Figure 2.3: New Lending Rate and Deposit Rate in Japan (\% )](image)

JGBs (with remaining maturity of over 10 years) made it difficult to maintain sufficient returns from these managed assets. Lower yields also increased future pension benefit obligations through a lower applied discount rate. Institutional investors began to express concerns over the future viability of their business models. Many insurance companies stopped providing savings-type insurance plans due to limited returns, while others raised premiums for new clients.

Second, household behavior and sentiment appear to have been adversely affected by the negative interest rate policy. There was a rapid increase in notes in circulation until around September 2016 due to conversion from individual deposits into cash holdings in safety boxes at home or in banks (namely, cash substitution). The growth rate on notes in circulation exceeded 5% until September 2016 while the growth rate on individual deposits dropped to around 1.2% in 2016 from 2.5% in 2014–2015. The ratio of notes in circulation to nominal GDP rose to about 20% in 2016, one of the highest among developed economies, as focused on in Chapter 6. The increase in cash holdings reflected households’ renewed recognition of a very low retail deposit rate. Given that households’ deposits were about three times as large as their loans, households experienced an adverse effect in terms of the net impact of the negative interest rate. To mitigate households’ concerns, the BOJ Governor, Haruhiko Kuroda repeated several times at the national Diet committee that retail deposits would not turn negative with the negative interest rate. The rush from retail deposits to cash gradually stopped as understanding about Governor Kuroda’s explanation came to be shared widely. However, this treatment of retail deposits means that the BOJ assumed that banks would have to bear the cost of the negative rate and thus face losses. The BOJ’s view does not envisage a natural continuation that should be present when short-term rates are cut, for example, from 0.1% to −0.1%, as pointed out by Bernanke (2016).

Third, massive purchases of JGBs under QQE have deteriorated the liquidity and functioning of the JGB markets by reducing the number of market participants. The negative interest rate policy exacerbated these conditions as a greater number of traditional market participants refrained from actively transacting in the market to avoid the negative interest rate. The scarcity of JGBs also led to a shrinkage of related monetary market activities. The BOJ has conducted a quarterly bond market survey of eligible institutions (currently, 67) on bond market functioning since February 2015. The survey reported the degree of bond market functioning. This is the diffusion index (DI)—defined as the difference between the percentage of respondents rating the functioning as “high” and that of respondents choosing “low.” The negative DI indicates that bond market participants on the whole believe that the
market functioning is low. The DI deteriorated significantly after the negative interest rate policy in 2016 (Figure 2.4). The degree of market functioning has since improved but has remained low.

Fourth, the negative interest rate policy generated a more challenging environment for the BOJ’s continuation of its JGB purchase program as the policy was not fully consistent with JGB purchases. It is important to recognize that applying a positive rate on the current account balance contributed to sustaining a smooth operation of the asset purchasing program by encouraging banks to sell JGBs to the BOJ. The banking sector remains dominant in the financial sector in Japan with ample deposits from retail customers so that securities markets (such as corporate bonds and asset-backed securities) are rather small. For example, corporate bonds as a share of nominal GDP made up for a mere 10% in 2019. The asset-backed security market and private sector residential bond market are almost non-existent. Thus, JGBs are the main financial assets purchased by the BOJ from banks and other financial institutions in order to steadily expand the monetary base

![Figure 2.4: Degree of Bond Market Functioning in Japan (percentage points)](image)

Note: The degree of bond market functioning is the diffusion index derived from the difference between the ratio of respondents choosing “high” and that of respondents choosing “low.” The negative diffusion index indicates that bond market participants on the whole believe that the degree of functioning is low.

while such banks need to hold JGBs mainly to fill the gap between retail deposits and loans extended to the private sector. Large or mega banks are more willing to sell JGBs to the BOJ to avoid potential interest rate risk; and they could do so due to the ability to earn revenue from actively investing or extending credit abroad. By contrast, most regional banks and credit unions have only limited alternative or foreign investment opportunities due to limited skills and knowledge so that they prefer investing in JGBs or domestic assets. These banks examined whether they should sell their holdings of JGBs to the BOJ and earn an interest rate on excess reserves for newly increasing current accounts held with the BOJ or, alternatively, should hold their JGBs until maturity to earn a positive coupon rate. The positive rate of 0.1% on excess reserves, thus, had provided the incentive for banks to sell the JGBs to the BOJ so that the BOJ's expansion of the monetary base and an associated increase in asset purchases used to be consistent with the positive 0.1% interest rate.

In addition to these side effects, the negative interest rate generated unique market reactions in Japan. The January 2016 announcement had been initially received by the markets with a positive surprise, but this lasted for only 2 working days. If the market reaction to this surprise action had led to the yen's depreciation and resultant higher Japanese stock prices after the announcement, it could be concluded that market participants regarded the policy change as additional monetary stimulus (a more dovish monetary policy stance) and thus reacted positively to the announcement. Indeed, the yen had depreciated against the US dollar from around ¥118.7 to around ¥121 and the Nikkei Stock Average had risen from around ¥17,164 to around ¥17,518. Thereafter, however, the exchange rate of the yen against the US dollar rapidly appreciated from around ¥119 in early February to below ¥110 in April and further to below ¥105 in mid-June. It appreciated to ¥99.08 temporarily on 24 June in response to the surprise Brexit referendum result in the United Kingdom. Thereafter, the yen vis-à-vis the US dollar fluctuated in the range of ¥100–¥106. Similarly, the Nikkei Stock Average dropped below ¥17,000 in early February, and since then the stock prices have moved mostly in the range of ¥16,000 to ¥17,000. The reversal of the market movements could be interpreted to mean that market participants did not support the negative interest rate policy. This might be partly because the BOJ did not expand the quantity and quality elements of QQE despite repeatedly emphasizing their willingness for further expansion in both elements.

2.3.3 Yield Curve Control Announced in September 2016

The BOJ's communication strategy after the negative interest rate policy was to emphasize its intention to expand monetary easing in three
dimensions (quantity, quality, and a negative interest rate) if necessary. Nevertheless, the BOJ expanded monetary easing in July 2016 only by increasing ETF purchases to about ¥6 trillion from ¥3 trillion. This rather limited action risked disappointing the markets, but the BOJ skillfully avoided this by suggesting its plan to consider a new but different action that would help to achieve the 2% stability target at its next monetary policy meeting in September. This suggestion contributed to market anticipation that the BOJ would revise its framework thoroughly by avoiding a further decline in yields and by reducing the burden borne by financial institutions—without giving an impression of a more hawkish monetary policy stance.

Yield curve control (YCC)—fixing a 10-year target at around 0% with an existing negative interest rate (−0.1%) on the current account balance adopted earlier—was enacted in September 2016. This action was not consistent with the BOJ’s communication strategy due to the failure to fulfill the commitment to expanding monetary easing in the three dimensions. The idea of YCC seems to have been brought from the experience of the Federal Reserve in 1942–1951, which was aimed at reducing government financing cost by pegging short-term Treasury bills at 0.375% and capping the yields on all other Treasury securities at 2.5%. Another action by the BOJ in September 2016 was an official abandonment of guidelines on average remaining maturity of JGB purchases—one of the major pillars included in the qualitative dimension. Abandonment of the guidelines naturally resulted in fewer long-term JGB purchases by the BOJ. Indeed, the BOJ began to reduce the JGB purchases steadily from September 2016 to the present—despite leaving its remark on the continuation of about ¥80 trillion in the statement on monetary policy. The amount of annual purchases dropped steadily and has been below ¥50 trillion since March 2018, below ¥30 trillion since July 2019, and below ¥20 trillion by early 2020.

In a press conference following the June 2017 monetary policy meeting, the BOJ’s Governor Haruhiko Kuroda admitted that the annual pace of net JGB purchases is endogenously determined since the 10-year yield is now an official guideline for market operations, suggesting a decline from around ¥80 trillion is reasonable. As the BOJ finds it increasingly challenging to increase JGB purchases by ¥80 trillion annually, it is clear that YCC was a device for the BOJ to reduce the purchase amount. The statement continued to point out JGB purchases of about ¥80 trillion until the April 2020 monetary policy meeting as described below. At the same time, the new monetary framework under yield curve control introduced the inflation-overshooting commitment—continuing to increase the monetary base until the rate of increase in core CPI (CPI excluding fresh foods) exceeds the 2% target and stays above
the target in a stable manner. The inflation-overshooting commitment appears to have been inserted to reassure market participants that quantity would not been given up completely and to remind them of the BOJ’s firm determination to achieve the 2% target. The markets took the commitment as an assurance for continuing asset purchases for a very long time.

Yield curve control initially did not receive support, so its impact on the exchange rate and stock prices was limited. Only after the unexpected victory of Donald Trump in the United States presidential election in November 2016 did global investors suddenly increase their risk appetite in anticipation of higher economic growth and inflation in the United States driven by substantial tax cuts, deregulation, and infrastructure investment. This led to a rapid rise in long-term yields, stock prices, and an appreciation of the US dollar against almost all major currencies. Driven by global investors’ enthusiasm, the BOJ’s yield curve control looked effective as market participants began to pay greater attention to a widening of interest rate differentials with the United States—rather than the relative size of the monetary base between the United States and Japan. It should be noted that noncommercial investors in the International Money Market of the Chicago Mercantile Exchange shifted the yen’s net positions from long positions seen in late 2015 to short positions in December 2016. Since this market has been dominated by short-term-oriented investors such as hedge funds, the change means that their speculation shifted from the yen’s appreciation to its depreciation. The yen vis-à-vis the US dollar depreciated to around ¥117 by the end of December 2016, thereby contributing to higher stock prices in Japan.

One advantage of YCC is that the BOJ was able to reduce JGB purchases while the 10-year yield is fluctuating at around 0%. However, this happened because the BOJ purchased nearly half of the outstanding government bonds. Since other debt securities markets (such as corporate bond and asset-backed security markets) remain too small, the JGBs available to life insurance firms and pension funds have been limited. Some have increased foreign investment but have incurred high hedging costs or exchange rate risks. Since these institutional investors continue to demand JGBs, the BOJ’s massive purchases have resulted in scarcity of JGBs. The BOJ’s holdings of JGBs have become so massive that excess demand for the JGBs has prevailed in the BOJ. This has put the BOJ in a situation where the annual amount of JGB purchases must be reduced substantially from ¥80 trillion unless there is a further deepening of the yields in the negative territory—something the BOJ wants to avoid to mitigate adverse impacts on the financial sector. Moreover, the relatively stable yields mean limited activities and liquidity among market players.
in bond markets, possibly distorting the bond market beyond what the negative interest rate has done to the bond market. Most importantly, YCC has not helped to raise aggregate demand, demand for credit, inflation, or inflation expectations. One challenge is the difficulty related to the exit. Once the market and the public grow accustomed to the stable interest rates, the exit may generate a lot of disruption in the bond markets and cause severe damage to investors and financial institutions.

In the United States, meanwhile, YCC has attracted a lot of attention recently as an additional monetary easing tool. For example, Brainard (2019, 2020), the Federal Reserve governor, points out targeting interest rates in a more continuous fashion as an extension of conventional policy space and in a way that reinforces forward guidance on the policy rate. Brainard calls this concept “yield curve caps.” It is similar to YCC, adopted by the BOJ, but yield curve caps focus on the maximum levels of yields that can be achieved in the bond markets while YCC attempts to stabilize yields at around the 10-year yield target by permitting a deviation of yields above or below the target. Brainard’s idea is to cap government bond yields at the short-to-medium range of the maturity spectrum in tandem with forward guidance on the policy rate that conditions liftoff from the effective lower bound on employment and inflation outcomes. Two reasons are provided as supporting arguments. First, once the policy rate declines to the effective lower bound, the yield curve cap could smoothly move to capping interest rates on the short-to-medium segment of the yield curve and avoid the risk of delays or uncertainty that could be associated with asset purchases regarding the scale and time frame. The interest rate caps would transmit additional accommodation through the longer rates that are relevant for households and businesses in a manner that is more akin to conventional policy and more continuous than quantitative asset purchases. Second, the forward guidance and the yield curve caps would reinforce each other. Setting the horizon on the interest rate caps to reinforce forward guidance on the policy rate would augment the credibility of the yield curve caps and thereby diminish concerns about an open-ended balance sheet commitment. Once target inflation and full employment are achieved and the caps expire, any short-to-medium-term Treasury securities that were acquired under the program would roll off organically, unwinding the policy smoothly and predictably. This approach should avoid some of the taper tantrum dynamics that have led to premature steepening of the yield curve in the United States in 2013. The yield curve caps appear to target shorter maturity (such as 2–5 years) than the BOJ’s YCC does. Bernanke (2020) supports Brainard’s view and stresses that a shorter horizon (i.e., 2 years) could be used to augment the Federal Reserve’s forward guidance.
From an operational perspective, the Federal Reserve might be interested in YCC for shorter maturity for three reasons. First, the Federal Reserve raised anxiety over volatility in the shorter maturity after the surge in the short-term repo market in September 2019. Since then, massive liquidity has been injected to the markets through offering overnight and various term repos and initiating outright purchases of Treasury bills at an initial pace of $60 billion per month. In addition, liquidity in the Treasury securities market deteriorated in March 2020—especially those on “off-the-run” issues, compared with “on-the-run” issues. YCC focusing on shorter maturity could stem the probability of sharp hikes in those interest rates. Second, stabilizing the shorter maturity is easier than stabilizing the 10-year or long-term maturity, partly because the maturity is closer to the maturity of the policy rate, and partly because the Federal Reserve does not need to purchase as many Treasury securities as the BOJ did. Third, the distortionary impacts on the Treasury securities market that have been experienced in Japan could be mitigated. The pros and cons must be carefully examined in the US by investigating the Federal Reserve’s past practice in addition to the BOJ’s experience. The longer YCC is sustained, the harder it is for the central bank to exit without causing disruptions in the market. The potentially large long-term adverse impacts on the liquidity and functions of the world’s largest repo and bond market also need to be taken into account.

2.3.4 Monetary Policy Adjustments Announced in July 2018

The BOJ made a series of moderate adjustments to the monetary easing policy framework in July 2018. While the BOJ asserted that there were no fundamental changes to the framework, it skillfully introduced flexibility and the following elements that could lead toward normalization of the monetary policy. First, the BOJ introduced the upper and lower range (±0.2%) of the 10-year target from the previous target range of ±0.1% (−0.1% to +0.1%). The new target range was not described in the statement on monetary policy and was mentioned by Governor Haruhiko Kuroda at a press conference for the first time. The previous target range of ±0.1% was inferred by market participants based on the levels of fixed rates chosen by the BOJ in conducting unlimited bond purchase operations. This enabled the BOJ to raise the 10-year yield above 0% for a while. However, the yield has become persistently negative since early 2019. The yield deepened and dropped below −0.2% in August–September 2019 at the time of the intensified trade conflict between the United States and the People’s Republic of China;
the yen also appreciated during the same period. The BOJ’s Governor Haruhiko Kuroda raised concerns about the flattened the yield curve and expressed his view that it would be good to have higher yields at the super-long maturity range (over 10 years).

Second, the BOJ officially introduced the forward guidance on policy rates (a 10-year yield and a negative short-term rate) to indicate its intention to continue the current extremely low levels for an extended period by taking into account the effects of the consumption tax hike scheduled for October 2019, as pointed out in Section 2.1. This action does not appear to add monetary easing because the prospect of achieving 2% inflation remains low and the BOJ has to continue the current policy until inflation of around 2% is achieved sustainably. As explained above, the BOJ has been communicating since 2013 by announcing that the quantitative and qualitative monetary easing (with YCC since September 2016) would continue until 2% inflation is achieved. Nonetheless, the BOJ introduced the forward guidance by choosing this headline for a monetary policy statement: “Strengthening the Framework for Continuous Powerful Monetary Easing.” In my view, the intention was to avoid the impression that the adjustments are steps toward monetary policy normalization and hence a setback from the current monetary easing.

Third, the BOJ decided to purchase the ETFs and J-REITs flexibly by buying more than ¥6 trillion and ¥90 billion of each annually when sharp falls occur and less than ¥6 trillion and ¥90 billion of each annually when the stock prices are relatively stable or rising. While the BOJ stressed that the annual purchase amounts of about ¥6 trillion and about ¥90 billion are maintained, respectively, for the ETFs and J-REITs, this enabled the BOJ to reduce the annual purchase amount tacitly. Indeed, the annual pace of J-REITs had already been below ¥90 trillion beginning in April 2018—long before the aforementioned adjustment was made in July 2019. The annual pace of ETF purchases has begun to decline persistently since May 2019, when stock prices were rather stable and rose steadily in the final quarter. In addition, the composition of ETF purchases was adjusted by increasing the purchase amount of TOPIX-related ETFs and reducing the purchase amount of Nikkei Stock Average-related ETFs, explained in Chapter 3.

In October 2019, however, the BOJ increased its dovish bias by modifying the forward guidance on YCC in the face of growing global concerns and in response to growing market expectations over the BOJ’s additional monetary easing after the Federal Reserve and the ECB resumed monetary easing. Specifically, it added “lower” on short- and long-term interest rates in the forward guidance expression in order to signal its intention to lower the negative interest rate from −0.1% and the
10-year yield from around 0% if necessary. While it is widely understood the BOJ would not do so due to concerns about adverse impacts on the financial sector, such an action, though small, was considered necessary out of fear of the appreciation of the yen.

2.3.5 Policy Response to the COVID-19 Spread

Japan’s real GDP growth for the October–December 2019 quarter turned negative (~7.1% on the quarter to quarter, annualized basis) mainly due to a decline in household consumption, residential investment, business capital expenditure, and exports. Weak consumption (and residential investment) was attributable to October’s increase in the consumption tax and bad weather conditions. The lower-than-expected business investments reflected declining demand after the frontloaded increase in investment in software and equipment, ahead of the consumption tax hike and cashless payment equipment (in response to government subsidies for small retail shops, introducing cashless payment methods as of October). The dampened investment was also due to weakened investment in manufacturing caused by sluggish exports and profits triggered by the trade conflict between the United States and the People’s Republic of China and global economic slowdown. New job openings have begun to fall since December 2019, especially in manufacturing, although the labor shortage remains severe in Japan. Due to the COVID-19 spread and the Japanese government’s countermeasures to reduce the spread of the virus by closing schools, discouraging events and gatherings, and imposing quarantines, Japan’s economic activities slumped further from February 2020.

The government responded by increasing spending on infrastructure (mainly for reconstruction in areas affected by natural disasters last year) and other items to mitigate the adverse impact of the consumption tax hike under its large economic stimulus package adopted in December 2019 (about ¥13 trillion or 3% of nominal GDP from the budget, and ¥26 trillion including private-sector related spending). To cope with the economic damage of the COVID-19 crisis, furthermore, the government announced it would provide some support to parents who lost income as they were forced to take on childcare responsibilities due to school closures, subsidize firms to maintain employment, and deploy COVID-19 countermeasures in February and March 2020. Also, the government has announced financing support to affected small and medium-sized enterprises through providing subsidized loans by a policy bank (Japan Finance Corporation) and providing guarantees to loans provided by financial institutions. These government measures amount to about ¥2 trillion or 0.4% of nominal GDP. In April 2020, the government
adopted the large economic rescue package equivalent to about 21% of nominal GDP including budgetary and private-sector related spending. This amount included the unused amount from the December 2019 stimulus package as well as the measures taken in February and March 2020. The April economic package excluding these amounts resulted in about 15% of nominal GDP. Most of the package is comprised of deferment of tax and social security payment for affected firms, as well as provision of subsidized loans and guarantees. Employment adjustment subsidies (wage support) for firms keeping employment are included, but the complexity of the requirements and the slowness related to the approval processes have discouraged many firms from applying. Cash transfers to firms and individuals (about ¥15 trillion or about 3% of nominal GDP) are also included. As for cash transfers to households, the government initially wanted to provide them to targeted households, but it switched to providing them to all the people because complaints emerged due to the complicated requirements and the insufficient capacity for local governments to check all the applications quickly. Cash began to be distributed to individuals from May 2020. The COVID-19 crisis revealed Japan’s government has been too slow to adopt information and communication technologies to provide public services. The lack of electronic government hampers the government from conducting effective and efficient fiscal policy.

Meanwhile, the BOJ twice increased the amount of daily ETF purchases to around ¥100 billion in early March 2020, from the ordinary level of ¥70 billion, in the face of a sharp sell-off of stocks. It also injected ample liquidity into the market three times in early March through exercising repurchase operations of ¥500 billion in each instance—the first time it has used such a practice since 2016. On 16 March 2020, furthermore, the BOJ abruptly moved up its scheduled monetary policy meeting from 18–19 March to respond to an expected appreciation of the yen against the US dollar after the Federal Reserve reduced the federal fund target range by 100 basis points to 0.00–0.25% on 15 March 2020. Within about 2 hours, the BOJ announced its own package of monetary easing. First, it introduced a temporary fund-supplying operation to provide loans at 0% with a maturity of up to 1 year by mitigating collateral requirements and accepting corporate debt (the eligible collateral amounting to about ¥8 trillion). The interest rate was lowered by mere 0.1% from those applied previously to other operations. The facility continues until the end of September 2020. Second, it increased the upper limit for purchases of commercial paper and corporate bonds moderately by ¥2 trillion in total—raising the upper limit of their amount outstanding from ¥2.2 trillion to ¥3.3 trillion, and from ¥3.2 trillion to ¥4.2 trillion—up to the end of September 2020. Third, it expanded the
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annual pace of ETF and J-REIT purchases for the time being with the upper limits of ¥12 trillion and ¥180 billion each.

The package was unimpressive compared with measures adopted by the Federal Reserve and the ECB and demonstrates there is little room left for the BOJ to conduct further monetary easing. As expected, the BOJ did not lower the negative rate (−0.1%) or the 10-year yield target (0%). Since October 2019, the BOJ’s Governor Haruhiko Kuroda has expressed the central bank’s willingness to lower policy rates if necessary. But lowering the policy rate would reduce the profitability of the financial sector, thereby discouraging banks from taking risks by increasing lending to private sector businesses affected by COVID-19. Moreover, the new fund-raising operation lowered the interest rate slightly but did not apply a negative interest rate (namely, a subsidized interest rate), contrary to the TLTRO III scheme unveiled by the ECB in the previous week. It is not clear whether this will promote banks to extent loans to affected small and medium-sized firms. The increase in net purchases of commercial paper and corporate bonds was only up to the end of September and up to the upper limit. These purchases help to support large firms. But some of large firms issue them for precautionary motives. Large firms hold substantial cash and deposits—total corporate holdings amounting to about ¥267 trillion or about 50% of nominal GDP at the end of 2019 according to the flow of funds accounts compiled by the BOJ. The markets for commercial paper and corporate bonds are very small—¥7.3 trillion (1.3% of nominal GDP) and ¥57 trillion (10% of nominal GDP). Given that bank loans are large and dominant (¥331 trillion or 60% of nominal GDP) in Japan, the purchase of such assets will have limited impact on overall corporate financial conditions relative to those in the United States and Europe. The increase in the annual amount of ETF and J-REIT purchases also refers to the upper limit only, and is likely to be temporary, since the BOJ did not change the principle of increasing them at an annual pace of about ¥6 trillion and about ¥90 billion each. While ETF purchases help prevent stock prices from falling persistently, they have small impacts on households’ income since they hold only around 10% of financial assets in the form of stocks. The stock market reaction after the announcement—initially rising sharply, but soon beginning to drop more sharply—and the exchange rate reaction—an appreciation of the yen—reflect this view. The negative market developments resemble those experienced by the ECB and the Federal Reserve in March 2020, perhaps due to the limitation of monetary easing to cope with COVID-19.

The BOJ’s balance sheet rose only by 3% (or ¥20 trillion) at the end of March 2020 relative to the previous month. The increase was mostly attributable to the rapid increase in the US dollar funds-supplying operations, whose US funds were borrowed from the Federal Reserve
using the US dollar liquidity swap line arrangements, as explained in the next Section. This is largely unrelated to the financial conditions of regional banks and credit unions. As for the special fund-supplying operation, only a half of the available amount was used by commercial banks as of 24 April 2020. The maturity of the operation was rather short and concentrated on 3 months. Lack of sufficient demand for the operation suggests adjustments must be made to make it more attractive and usable for banks.

As widely expected, the BOJ added monetary easing in 27 April 2020 through three measures. First, the upper limit of the amount outstanding combining corporate bonds and commercial papers rose from about ¥7.4 trillion to about ¥20 trillion. The remaining maturity of corporate bonds purchased was extended from 1–3 years to 1–5 years. Second, a temporary fund-supplying operation was revised by accepting a wider range of collateral including household debts (eligible collateral amounting to about ¥23 trillion, from about ¥8 trillion) and accepting small credit unions as counterparties. If commercial banks and small financial institutions do not use this operation actively, the BOJ may need to develop new rescue measures targeting financial institutions that extend loans to affected small and medium-sized firms by paying banks to borrow or adopt a scheme similar to the Main Street Lending Program adopted by the Federal Reserve together with the Treasury, as pointed out in Section 2.2. To do so, greater collaboration with the government should be examined including an adoption of a loss sharing mechanism. Third, the BOJ decided to purchase treasury bills and JGBs actively by eliminating “an annual pace of about ¥80 trillion” on the JGB purchases from the statement. By removing the specific purchase amount, the BOJ appeared to give impression that this is a bold approach because of its intension to purchase JGBs unlimitedly like the Federal Reserve. It was good for the BOJ to be able to remove “¥80 trillion” since the amount has not been met anyway since the adoption of YCC in September 2016. The elimination of “¥80 trillion” does not make any material difference from the previous purchasing operational framework. As already explained above, the amount of BOJ’s purchase is endogenously determined from the supply-demand balance at which the 10-year yield remained at around 0%. If the government increases the issuance of JGBs, the BOJ is likely to purchase more JGBs. If the amount demanded by institutional investors grow, however, the BOJ needs to purchase less to achieve the 10-year yield target. Thus, it is not as bold as it looks. Economic growth for the 2019 fiscal year (April 2019 to March 2020) is expected to be slightly negative or around 0%, shifting from 0.3% in the previous fiscal year. The economic growth for the 2020 fiscal year is likely to deteriorate further to around –5%.
2.4 The Resumption of United States Dollar Swap Lines During the COVID-19 Pandemic

The global demand for the US dollar tends to intensify during crises since it remains the key international currency. As a result, the Federal Reserve plays a crucial role in providing US dollar liquidity to central banks in other economies, through which financial institutions obtain support. During the global financial crisis, for example, the Federal Reserve announced in December 2007 an initiation of temporary “US dollar liquidity swap lines” with the ECB and the Swiss National Bank, both in economies where financial institutions faced mounting pressures in their US dollar funding markets. Subsequently, US dollar swap lines were authorized to central banks in Australia, Brazil, Canada, Denmark, Japan, the Republic of Korea, Mexico, New Zealand, Norway, Singapore, Sweden, and the United Kingdom, in addition to those in the euro area and Switzerland. All these arrangements were terminated in February 2010. In response to the re-emergence of strains in short-term US dollar funding markets, however, the Federal Reserve announced in May 2010 that temporary US dollar liquidity swap lines were reintroduced with five central banks (Canada, Japan, Switzerland, the euro area, and the United Kingdom). Meanwhile, the Federal Reserve had announced in November 2009 that temporary “foreign-currency liquidity swap lines” with these five central banks would provide liquidity to US institutions in the currencies of the counterparty central banks. This arrangement is a part of a network of six central bank bilateral swap lines that provide liquidity in each jurisdiction in any of the six currencies (Canadian dollars, pounds sterling, yen, euros, and Swiss francs) should central banks judge that market conditions warrant that action. These temporary US dollar liquidity and foreign currency liquidity swap arrangements among the six central banks became a standing arrangement in October 2013.

While the Federal Reserve is also able to draw foreign currencies, the real purpose of the swap arrangement is to provide US dollars to other major economies since the US dollar is the most demanded international currency. Under the liquidity swap lines in the case of the United States, a foreign central bank draws US dollars on its swap line with the Federal Reserve in exchange for a specified amount of its currency sold to the Federal Reserve at the prevailing market exchange rate. While the Federal Reserve holds the foreign currency in an account at the foreign central bank, the Federal Reserve deposits the dollars in an account that the foreign central bank maintains at the Federal Reserve Bank of New York. The foreign central bank is obliged to buy back its currency on a specified future date at the same exchange rate and pays
interest at a market-based rate to the Federal Reserve. Dollar liquidity swaps have maturities ranging from overnight to 3 months.

The COVID-19 pandemic and resultant countermeasures have severely disturbed global financial markets and caused a sharp economic slowdown in the world. In anticipation of growing demand for the US dollar, the Federal Reserve and five other central banks announced in mid-March 2020 a coordinated action to provide more liquidity via the standing US dollar liquidity swap line arrangements mentioned above. The pricing on these arrangements was cut by 25 basis points to the US dollar overnight index swap rate plus 25 basis points. The Federal Reserve also agreed to offer US dollars weekly in each economy with an 84-day maturity, in addition to the 1-week maturity operations already offered. The new pricing and maturity offerings were to remain in place as long as appropriate to support the smooth functioning of US dollar funding markets. Subsequently, temporary US dollar liquidity arrangements were established between the Federal Reserve and nine other central banks for at least 6 months. Up to $60 billion would be provided to central banks in Australia, Brazil, Mexico, the Republic of Korea, Sweden, and Singapore, and up to $30 billion would be provided to central banks in Denmark, New Zealand, and Norway. These facilities are designed to help lessen strains on global US dollar funding markets, thereby mitigating the effects of these strains on the supply of credit to households and businesses, both domestically and abroad. As for the amount outstanding as of 22 April 2020 released by the Reserve Bank of New York (published with a lag of around 1 week), the BOJ recorded about $196 billion, accounting for more than half the total outstanding amount of $375 billion. It was followed by the ECB with the amount of $140 billion.

2.5 Conclusions on Recent Debates on Unconventional Monetary Policy

In recent years, central bankers and academics have increased attention to declining long-term interest rate trends observed in developed economies since the 1980s. This issue had rarely been under the spotlight before the global financial crisis. Growing interest in the declining trends emerged after the global financial crisis once short-term interest rates (or central bank policy rates) reached the effective lower bound. Central banks having adopted various unconventional monetary easing tools, the long-term government bond yields have reached substantially low levels especially in developed economies, thus exerting downward pressures globally through exports of capital. Government bond yields
of some core European economies and Japan have fallen into the negative territory. Those declining yields have reduced lending rates to firms and individuals and have helped to raise corporate bond prices and equity prices, as well as real estate prices. Nonetheless, these central banks acknowledge that they have not achieved satisfactory inflation performance so far. Low inflation has been prevalent especially in the euro area and Japan. Taking an overview of various empirical studies, Kuttner (2018) concluded that no study of the effects of unconventional policy was definitive and empirical approaches had limitations—although most of the studies showed that quantitative easing and forward guidance succeeded in lowering long-term interest rates. While the benefits of unconventional policy probably outweighed the costs due to a decline in interest rates, Kuttner admitted it is not clear to what extent a decline in interest rates contributed to raising aggregated demand, inflation, and inflation expectations. Given that actual long-term yields have become so low, moreover, central banks find it difficult to add substantial monetary easing, as has been witnessed in the response to the COVID-19 spread.

The Federal Reserve and the ECB resumed monetary easing in 2019 and further during the COVID-19 outbreak—before having completed or launched monetary policy normalization. The BOJ also added monetary easing moderately to cope with the economic downturn caused by the COVID-19 crisis. A high degree of monetary accommodation may remain in these economies for long as the economic growth and inflation rates remain low. While the COVID-19 pandemic has disturbed financial markets, these low interest rates and various extraordinary measures attempt to support real estate and stock prices and the prices of risky and illiquid financial assets including leveraged loans, collateralized loan obligations, and high yield bonds. The return of the Federal Reserve and the ECB toward monetary easing has also lowered the global interest rates by enabling central banks in many emerging economies to lower their policy rates to cope with economic slowdown and the COVID-19 spread.

Meanwhile, the BOJ’s continued inflation underperformance has been disappointing when considering the scale and diversity of the monetary easing tools adopted. While the BOJ’s current tools have helped to sustain the yen at the depreciated level and raise stock and real estate prices, the financial sector has been suffering from adverse impacts. Real estate activities and commercial real estate prices have picked up in major cities and there are some concerns about real estate bubbles in some areas. Considering that Japan’s declining working age population and growing labor shortage are expected to lower potential
economic growth from the current level of around 1% to around 0.5% over the next 5 years, excess supply in offices, hotels, and apartments may arise in the near future. In addition, adverse impacts on financial institutions and deep distortion in the financial and capital markets have become prevalent in Japan. The decline in the functioning of the JGB market is a concern given its disproportionately large size in Japan’s debt securities market and its role of providing a benchmark for pricing corporate bonds and loans. The BOJ’s massive holdings currently account for about 45% of the JGBs outstanding. Some signs suggested that the BOJ attempted to move toward normalization in 2018, but economic slowdown in manufacturing, deteriorating consumer sentiments, and concerns about the global economic slowdown in 2019 have made it difficult to do so. The BOJ added monetary easing in response to the COVID-19 spread. The COVID-19 crisis reduced the number of foreign visitors significantly, making it impossible to achieve the 2020 government target of 40 million foreign visitors to Japan. The 2020 Tokyo Olympic Games were postponed 1 year to 2021, but there is doubt that the huge amount of funds invested by the government and the private sector can be fully recovered in 2021 due to a high degree of uncertainty associated with COVID-19 infections and associated sentiments of the markets and the general public. Those investments include the construction of facilities and stadiums to be used during the games and associated construction and renovation of infrastructure (highways, railroads, airports, etc.), as well as the construction of hotels, shopping centers, and restaurants. As the downward pressures on stock and real estate prices have emerged since the COVID-19 crisis began, the lengthening of the crisis may intensify the downward pressures.

While the effective lower bounds prevail in the euro area, Japan, and the United States, other developed economies including Australia, Canada, New Zealand, Republic of Korea, New Zealand, Norway, and the United Kingdom have currently faced the effective lower bounds or approached them as a result of monetary easing adopted to cope with the economic effects of the COVID-19 crisis. Quantitative easing was adopted by the central banks in Australia, Canada, and New Zealand, and was resumed in the United Kingdom. The central bank in Australia cut the policy rate to a record low level at 0.25% and adopted yield curve control by targeting 0.25% for the yield on 3-year government bonds through purchasing government bonds with various maturities—similar to the BOJ’s yield curve control but with a much shorter horizon. In addition, a 3-year lending facility with an interest rate of 0.25% was announced for banks up to the limit and for banks increasing credit beyond the limit. This includes some elements of conditional lending.
pointed out in this chapter. Approaching the effective lower bound is also observed in some Asian emerging economies such as Malaysia; Taipei, China; and Thailand. Some of these central banks might find it worthwhile to examine the pros and cons of such unconventional monetary easing tools by carefully investigating the experiences gained in the euro area, Japan, and the United States in preparation for unanticipated future outcomes.
Bank of Japan’s Stock Purchases as an Unconventional Monetary Tool

The Bank of Japan (BOJ) has been purchasing Japanese stocks massively since 2013—not directly from stock markets but passively through the purchases of exchange-traded funds (ETFs). Since the contemporary central banking system has been established, very few central banks in the world have attempted stock purchases on this scale and for such a long time as a monetary policy tool. Since this policy has often been under the spotlight as a possible unconventional monetary easing tool, this chapter sheds light on the BOJ’s experience through a brief review of the history of stock purchases conducted in 2002–2010 as well as ETF purchases initiated since 2013 (see Shirai [2018b, 2018c] for details).

3.1 Stock Purchases Conducted as a Prudential Policy in 2002–2010

In Japan, asset price bubbles in stocks and real estate had developed in the second half of the 1980s driven by the government’s economic policies and the BOJ’s monetary easing, which were efforts to cope with a recession in the manufacturing sector driven by a sharp appreciation of the yen after the Plaza Accord of 1985 (Figure 3.1). The Nikkei Stock Average reached ¥38,915 and the Tokyo Stock Price Index (TOPIX) 2,884 points in late 1989, their highest levels ever recorded. Generally, the Nikkei Stock Average and the TOPIX show similar trends. The Nikkei Stock Average is a stock price average produced by Japanese newspaper publisher Nikkei Inc., using a method of calculation like that of the Dow Jones Industrial Average in the United States (US). It has been published since 1950 and is comprised of the 225 stocks of the Tokyo Stock Exchange First Section, which are selected based on high liquidity and taking into account changes in the industry structure and the balance of the sectors in terms of the number of constituents. In contrast, the TOPIX is a capitalization-weighted index of all companies.
listed on the First Section of the Tokyo Stock Exchange (over 2,000) and calculated by the Japan Exchange Group, using a method of calculation like that of the S&P 500 in the United States. The TOPIX has been calculated since July 1969 and assumes that market capitalization as of the base date (4 January 1968) is 100 points. Since the TOPIX is adjusted for free floats and is capitalization-weighted, the indicator is considered superior to the Nikkei Stock Average, although the Nikkei Stock Average is a more well-known and established indicator.

The bubbles collapsed in the early 1990s after the Ministry of Finance had tightened regulations against banks to reduce their lending concentration in the real estate sector and the BOJ had tightened monetary policy. The resultant bursting of the bubbles generated non-performing loans among financial institutions in Japan in the early 1990s. After that, financial conditions deteriorated, eventually leading to a financial crisis starting in 1997 when several securities companies, banks, and insurance firms collapsed and runs occurred on several banks. Under these circumstances, the BOJ bought stocks held by banks for financial system stability purposes, namely as a prudential policy—not as an unconventional monetary easing tool—on two occasions:


In September 2002, the BOJ decided to purchase stocks directly from troubled banks to help them resolve their non-performing loan problems promptly and to ensure the stability of the financial system. The purchase, which began in November 2002, was aimed, therefore, at improving financial system stability. Prior to the decision, banks suffered from mounting non-performing loan problems as a result of the bursting of the asset price bubble and disposed of more than ¥90 trillion worth of assets. Nonetheless, new non-performing loans emerged as a result of banks’ aggressive restructuring efforts. Banks faced low interest margins (the gap between lending and deposit rates) and unrealized losses on the stocks held. For the banking sector crisis to be resolved, banks urgently needed to evaluate non-performing loans more properly and dispose of them as soon as possible to become more profitable. With this background, the BOJ believed that the stocks held by banks had prevented the banks from following these processes smoothly. To reduce banks’ constraints as soon as possible, the BOJ decided to purchase those stocks to reduce banks’ holdings of listed stocks with a credit rating of BBB− and above at the market price. The BOJ set the maximum total amount of stocks it would purchase at ¥2 trillion and said that it would do so until the end of September 2003 (with a possible extension until the end of September 2004 should the cumulative amount of purchased stocks not have reached ¥2 trillion by the September 2003 deadline). The maximum amount of stocks purchased from an individual bank would not exceed an amount exceeding (the lesser of) the bank’s Tier I capital or ¥500 billion. The maximum number of shares per issuer would not exceed 5% of all voting rights or specific amounts applied to the amount of turnover per year and issuers with different credit ratings.

In September 2003, this purchasing program was extended for another year until the end of September 2004 and the maximum total amount of stocks to be purchased was increased to ¥3 trillion. At the end of September 2004, the BOJ decided to discontinue its stock purchasing program after having purchased stocks worth ¥2,018 billion in total. The BOJ also confirmed its intention not to start selling the purchased stocks until the end of September 2007 at the earliest, as well as its plan to complete the disposal at the stock exchanges by the end of
September 2017. The disposal of stocks began in October 2007 according to plan. However, the process was interrupted as the disposal of stocks held by the BOJ was suspended in October 2008 due to unfavorable developments in financial markets at home and abroad caused by the global financial crisis. As a result, the amount of the BOJ’s remaining stock holdings was recorded at ¥1,273 billion on a book value basis at the end of September 2008.

3.1.2 Second Round of the Stock Purchasing Program (February 2009–April 2010)

In February 2009, the BOJ resumed its stock purchasing program in the midst of the deepening global financial crisis and associated stock market instability. While massive losses stemming from non-performing loans were largely associated with financial institutions in the United States and Europe, Japanese financial institutions also faced massive realized and unrealized losses from their stock holdings, even though the amount of stock holdings had been reduced in the first half of the 2000s. The BOJ decided to purchase stocks from banks to reduce their market risk associated with holdings of listed stocks with a rating of BBB− and above at the market price until the end of April 2010. The total amount of ¥1 trillion would be used for (i) banks with stock holdings exceeding 50% of their Tier 1 capital, (ii) banks with total stock holdings exceeding ¥500 billion, or (iii) banks adhering to a capital adequacy ratio based on international standards. The BOJ decided that the maximum amount of stocks purchased from an individual bank would not exceed ¥250 billion, and the disposal of the purchased stocks would not be resumed until the end of March 2012 (with full disposal of all the stocks to be completed by the end of September 2017).

Like the first round of stock purchases, this action was aimed at stabilizing the financial system, not at conducting monetary easing. The purchase continued until April 2010, with the total amount of purchases amounting to ¥388 billion, well below the amount purchased in the first round. With regard to disposal of the purchased stocks, the time at which any disposal could resume was shifted in January 2012 from “the end of March 2012” to “the end of March 2014” due to unfavorable stock market conditions. The timing to complete full disposal was also postponed by 2 years to “by the end of September 2019.” The BOJ made the second delay in December 2013 by postponing the timing to hold off on resuming disposal until the end of March 2016 and the timing to complete full disposal by the end of September 2021, delays of 2 years each. A further delay was made in December 2015 and selling the purchased stocks would resume in April 2016 as scheduled, but the full
disposal timing was postponed from “by the end of September 2021” to “by March 2026.” Thus, the duration of disposing of the purchased stocks was broadened from over 5 years to over 10 years. The stocks held by the BOJ evaluated on a mark-to-market basis were worth about ¥3 trillion in November 2015. Thus, the BOJ decided that a disposal of about ¥300 billion annually would take place over the next 10 years and selling would be conducted through auctions. Since the BOJ has been purchasing ETFs as part of unconventional monetary easing, this disposal was inconsistent with the ongoing purchase program since it would push stock prices down. Therefore, the BOJ decided in March 2016 that the disposal of about ¥300 billion annually would be offset by a roughly equivalent increase in new ETF purchases that would begin as part of an initiative to promote firms’ investment in research and development (R&D) and human capital under a program to support firms proactively investing in physical and human capital, as described in the next section. Hence, this disposal would roughly maintain the neutral impact on stock prices.

3.2 Exchange-Traded Fund Purchases since 2010 as an Unconventional Monetary Easing Tool

3.2.1 Exchange-Traded Fund Purchases under Comprehensive Monetary Easing

The idea of purchasing the ETFs was developed and announced in October 2010 under then BOJ’s Governor Masaaki Shirakawa. The ETFs trace the Nikkei Stock Average and the TOPIX, meaning that the BOJ purchases stocks passively in line with these indices. The BOJ chooses several trust banks (which provide a wide range of banking, financial, and investment-related services) as trustees that would in turn create a money trust and the ETFs would be purchased as trust property. The ETF purchases were part of a monetary easing policy package called comprehensive monetary easing (CME), as described in Chapter 2. The main element of CME was to purchase various financial assets such as the government bonds and ETFs under the Asset Purchase Program. The BOJ aimed at reducing risk premia through purchasing such risk assets.

Lowering risk premia was expected to support risk asset markets and induce a portfolio rebalancing effect. A wealth effect for households was envisaged too. Especially, the BOJ hoped to generate “healthy” risk-taking behavior among individuals, not just among firms and financial institutions, as risk money (such as investment in stocks and real
estate and foreign investment) could energize the Japanese economy and encourage individual investors to diversify their financial assets. Traditionally, individuals had held over half of their financial assets in the form of cash and deposits in Japan. Individuals had been highly risk averse and only around 8% of their financial assets had been invested in stocks in 2012 according to the flow of funds accounts compiled by the BOJ. Firms had also been conservative, keeping over ¥200 trillion (about 20% of their financial assets) in the form of cash and deposits for a long time without actively utilizing them. Banks had also been risk-averse, holding substantial amounts of Japanese government bonds (JGBs) to fill the growing gap between deposits and loans extended to the private sector. Given this background, the BOJ decided to purchase ETFs at market price starting in 2013 to promote portfolio rebalancing as part of quantitative and qualitative easing (QQE).

Even after QQE, however, households remain risk averse as more than 50% of their financial assets continue to be allocated for deposits and cash, and the ratio of stocks in their financial assets rose just from 8% in 2012 to 11% in 2019—much lower compared with around 35% in the United States and about 20% in the euro area in 2019 (BOJ 2019). Firms continue to maintain about 20% of their financial assets in the form of deposits and cash. Banks have shifted from JGB holdings to reserve balances with the BOJ, and some moderate credit growth took place under QQE.

The BOJ initially set the maximum outstanding amount for ETFs at around ¥450 billion under CME. In case of selling the purchased ETFs, the BOJ had set some basic principles, i.e. to avoid, as much as possible, incurring losses and destabilizing the financial markets. ETF purchases were extended and increased thereafter; the amount of ETF holdings by the BOJ reached ¥1.5 trillion by the end of March 2013 just before the BOJ replaced CME with QQE in April 2013. During CME, Japanese stock prices remained stagnant for most of the period. The Nikkei Stock Average rose from around ¥9,367 at the end of November 2010 to over ¥10,000 in December 2010; from March 2011, it remained mostly below ¥10,000. The TOPIX was about 830 points in September 2010 and remained around this level until it dropped to below 800 points from August 2012 to November 2012. After that, the stock market made a remarkable reversal, anticipating massive monetary easing to be taken under the next BOJ governor appointed by Prime Minister Shinzo Abe in 2013. The Nikkei Average Price began to rise on 16 November 2012, when the National Diet was dissolved, from around ¥8,830 to ¥9,446 at the end of November 2012 due to the expectation that the opposition party, the Liberal Democratic Party led by Shinzo Abe, would take over from the ruling Democratic Party of Japan after the general election.
scheduled on 16 December 2012. It was anticipated that the new government would perform massive monetary easing with a clearly defined 2% price stability target. The Nikkei Average Price rose steadily in December 2012, exceeded ¥10,000 after the general election, and reached about ¥12,400 by the end of March 2013.

### 3.2.2 Unprecedented Scale of Exchange-Traded Fund Purchases since 2013

In March 2013, the BOJ, led by new Governor Haruhiko Kuroda launched massive monetary easing under QQE to achieve the 2% price stability target in April 2013. As part of QQE, the BOJ increased the amounts of ETF purchases at an annual pace of ¥1 trillion in April 2013. The amount of ETFs outstanding was projected to double from the end of 2012 to the end of 2014 with the expansion by about ¥1 trillion per year for 2 years. As the economy began to slow down partly due to weakened consumption after a consumption tax hike from 5% to 8% in April 2014 and inflation expectations began to decline in early 2014, the BOJ decided to expand asset purchases in October 2014. The pace of purchases of ETFs was also tripled from ¥1 trillion to ¥3 trillion. In November 2014, the BOJ also included the ETFs that track the JPX–Nikkei Index 400 as eligible for purchase. The JPX–Nikkei Index 400 is calculated based on free float-adjusted market capitalization from common stocks listed in the Tokyo Stock Exchange First Section, Second Section, Mothers, or JASDAQ market. The index is jointly calculated by Nikkei Inc., the Japan Exchange Group, and the Tokyo Stock Exchange. The section of stocks is made based on quantitative information including trading value in the past 3 years, 3-year average return on equity (ROE), and 3-year cumulative operating profit as well as qualitative factors such as corporate governance and disclosure.

In December 2015, the BOJ established a new program for purchasing ETFs. At an annual pace of about ¥300 billion, they would purchase stocks issued by firms that were proactively investing in physical and human capital. In March 2016, the BOJ provided details on the program, called ETFs to Support Firms Proactively Investing in Physical and Human Capital. The new ETFs have portfolios comprising stocks of firms whose (i) capital expenditure or R&D expenditure show an upward trend (investment in physical capital); (ii) expenditure on human capital shows an upward trend as demonstrated by indicators including the number of employees, wages, salary expenses, and spending on career development (investment in human capital); and (iii) investment in physical and human capital is reasonably considered to enhance their growth potential through effective corporate governance,
from the perspective of the firms’ sales, profitability, productivity, corporate value, or other indicators (growth potential). The new program started in April 2016.

In July 2016, the BOJ decided to increase ETF purchases such that their amount outstanding would increase at an annual pace of about ¥6 trillion—almost doubling the previous pace of about ¥3.3 trillion. This was to enhance monetary easing against uncertainties related to the United Kingdom’s vote to leave the European Union and a slowdown in emerging economies and associated volatile developments in global financial markets. Rather than deepening the negative interest rate adopted in January 2016 or increasing the annual pace of the monetary base under the monetary base control (continued before yield curve control was adopted in September 2016), the BOJ chose to increase the amount of ETF purchases for unclear reasons.

3.2.3 Adjustment to the Composition of Exchange-Traded Fund Purchases

In September 2016, moreover, the BOJ decided to modify the composition of ETF purchases—a move expected fully by the markets. This was to reduce the distortions created in the stock market as a result of massive purchases of ETFs that trace the Nikkei Stock Average. Out of an annual increase of ETF purchases of ¥5.7 trillion—excluding ¥300 billion allocated for ETFs to support firms proactively investing in physical and human capital from ¥6 trillion—the BOJ decided to increase the weight given to TOPIX-related ETFs and reduce the weight given to Nikkei Stock Average-related ETFs. Out of ¥5.7 trillion, the BOJ would allocate ¥2.7 trillion annually to TOPIX-related ETFs while the remaining ¥3 trillion would be spread out between ETFs related to TOPIX, the Nikkei Stock Average, and the JPX–Nikkei 400—roughly in proportion to the total market value of each ETF issued. Consequently, the BOJ would allocate about 70% of the ¥5.7 trillion to TOPIX-related ETFs.

Before this adjustment was made, the amount of ETF purchases for each index was roughly proportionate to the total market value of the ETFs issued; thus, the amount of ¥5.7 trillion was nearly split between the TOPIX and the Nikkei Stock Average as the JPX–Nikkei 400 market is relatively small. The modification was in reaction to criticisms growing since early 2016 from market participants that such a composition had distorted stock market prices substantially. Specifically, the BOJ’s proportionate purchase practice had tended to favor stocks included in the price-weighted Nikkei Stock Average as compared with the market value-weighted TOPIX. The TOPIX covers over 2,000 firms listed in the Tokyo Stock Exchange First Section whereas the Nikkei Stock Average
Bank of Japan’s Stock Purchases as an Unconventional Monetary Tool covers only 225 listed firms. As some small-cap firms are included in the Nikkei Stock Average with higher weights due to relatively higher stock prices, the continuation of the BOJ’s purchases tended to generate overvaluation of such stocks. Thus, the BOJ’s action was a necessary move because price-based Nikkei Stock Average-related ETFs had distorted stock prices more heavily than market capitalization-based TOPIX-related ETFs. The stock prices of some small-cap firms included in Nikkei Stock Average firms became higher than the stock prices of other stocks due to a decline in the number of floating shares. A famous example was Fast Retailing Co., owner of well-known apparel chain Uniqlo, whose weight accounted for around 8% of the Nikkei Stock Average while accounting for only 0.3% of the TOPIX at that time. As a result, Fast Retailing Co. had benefited substantially from the BOJ’s purchase of the Nikkei Stock Average since the BOJ owns more than half of Fast Retailing Co.’s free floating stocks (Figure 3.2). The BOJ has already become one of the top shareholders in some firms included in the Nikkei Stock Average Index with fewer floating stocks available in the market. The BOJ’s new action would enable the BOJ to purchase diverse shares and thus to maintain the ETF purchases for longer.

In July 2018, the BOJ made a further adjustment to the composition of ETF purchases. For new purchases, the BOJ would allocate ¥4.2 trillion annually to TOPIX-related ETFs while the remaining ¥1.5 trillion would be spread out between ETFs related to TOPIX,

![Figure 3.2: Tokyo Stock Price Index, Textile and Apparel Index, and the Stock Price of Fast Retailing](image)

**Figure 3.2: Tokyo Stock Price Index, Textile and Apparel Index, and the Stock Price of Fast Retailing**

- Fast Retailing Co. Ltd. (LHS)
- TOPIX (RHS)
- TOPIX textiles and apparel index (RHS)

TOPIX = Tokyo Stock Price Index.

Source: Bloomberg.
the Nikkei Stock Average, and the JPX–Nikkei 400—roughly in proportion to the total market value of each ETF issued. Consequently, the BOJ would allocate over 80% of the ¥5.7 trillion to TOPIX-related ETFs. While this enables the BOJ to reduce the purchases of small-cap firms included in the Nikkei Stock Average index, it symbolizes the stresses generated by the massive ETF purchases. This means that the BOJ’s purchases exert distortionary impact on stock prices.

### 3.2.4 Adjustment to the Amount of Exchange-Traded Fund Purchases and COVID-19 Impact

Another important adjustment was made at the same time to ETF purchases. Namely, the BOJ made monthly adjustment more flexible by purchasing more when risk premium rises while keeping an annual purchase pace of about ¥6 trillion, as pointed out in Chapter 2. This means that the BOJ would purchase ETFs more flexibly by buying more when sharp falls occur and less when stock prices rise or fall mildly. While the BOJ stressed that the annual purchase amount of about ¥6 trillion would be maintained, the adoption of flexibility could be viewed as the BOJ’s attempt to conduct the “stealth tapering” or tacit reduction of the amount of the ETF purchases. Such a tacit reduction is the case with JGBs—the BOJ reduced the annual pace of JGB purchases to well below ¥80 trillion while its statement on monetary policy specified the continuation of about ¥80 trillion from September 2019 until April 2020 when the amount was removed at the monetary policy meeting. This flexibility could become a step toward normalization because it enables the BOJ to reduce the amount of annual purchases from ¥6 trillion if the stock market conditions remain good. Indeed, the BOJ did so by reducing the annual purchase amount to below ¥6 trillion starting in May 2019 and further to below ¥5 trillion between December 2019 and February 2020.

The reduced amount of purchases was subsequently interrupted due to the coronavirus (COVID-19) spread and associated economic slowdown and the sharp stock sell-off. In early March, the BOJ twice increased the amount of daily ETF purchases to around ¥100 billion from the ordinary level of ¥70 billion. On 16 March, furthermore, the BOJ increased the amount outstanding at an annual pace with the upper limit of about ¥12 trillion for the time being—without changing the guideline for the annual pace of ¥6 trillion. On 10 March 2020, the BOJ’s Governor Haruhiko Kuroda admitted at the national Diet committee that the BOJ’s ETF holdings (about ¥30 trillion on the book value basis) would suffer [unrealized] losses if the Nikkei Stock Average was below 19,500. The BOJ must treat the difference between
the purchased and market prices as expenditure (loss) and set aside the equivalent amount as an allowance according to the BOJ’s accounting rule. If market prices drop more than 50%, impairment treatment must be performed so that it is treated as impairment loss on the profit/loss account and as a decline in financial assets and a decline in net worth on the balance sheet. This means that the BOJ will face losses and its balance sheet will deteriorate if stock prices remain substantially low. On 18 March 2020, Governor Haruhiko Kuroda admitted at the committee of the Diet that unrealized losses amounted to ¥2 trillion–¥3 trillion. Just before his remark, the Nikkei 225 ended at around 17,000 on 16 and 17 March 2020. The Nikkei 225 ended at 18,917 at the end of March 2020 (namely, the end of BOJ’s financial year 2019). This indicates that the BOJ is taking substantial risk from ETF purchases on its balance sheet and this may impede the BOJ from continuing large-scale ETF purchases for a long time.

One concern is that there is no rule specified under the new Bank of Japan Act—which was revised in June 1997 and has been in effect since April 1998—regarding the case of net income loss and associated possible actions by the government. The BOJ’s stated capital is only ¥100 million under the old and new acts. The government contributes 55% of the stated capital, and the private sector the remaining 45%. Legal reserves amount to ¥3.2 trillion. To improve the soundness of the balance sheet, the BOJ has also accumulated the provision for possible losses on bond transactions (about ¥4.6 trillion) as well as the provision for foreign exchange transactions (about ¥1.4 trillion). The provision for possible losses on bond transactions has been accumulated from transferring part of the interest income on JGBs recorded in operating income to prepare for possible future losses on bond transactions. The provision for foreign exchange transactions has been accumulated from about 50% of foreign exchange-related profit recorded in operating income at the time of the yen’s depreciation. If these provisions are used up, the BOJ would face a net income loss. The BOJ could then use legal reserves. If those reserves are then used up, the BOJ’s balance sheet would face negative equity. The BOJ would probably then need to get support from the government and discuss ways to meet its general and administrative expenses and costs. During the period with net income losses, the payments of dividends (5% of share face value, amounting to ¥5 million), various tax payments to the central and local governments (corporate taxes, inhabitants’ taxes, and enterprise taxes) and payment to the government would be expected to be suspended. These issues are likely to be brought up and discussed extensively in the National Diet since public money may have to be spent.
3.3 Stock Market Holdings Dominated by Foreign Investors as a Group

Foreign investors as a group have been the largest shareholders of listed firms including First, Second, Mothers, and JASDAQ Sections. They maintained about 30% of the total in 2019. Foreign investors increased their presence over the period between fiscal year 2012 and fiscal year 2018, with the ratio of their stockholdings to the total market value of stocks rising from 28.5% in fiscal year 2012 to 30% in fiscal year 2018. Business corporations (nonfinancial firms) were the second largest investors as a group, holding about 22% of the total. The relatively high share of nonfinancial firms reflects traditional mutual strategic shareholding as well as stock buyback operations rising recently. The strategic shareholding practices have declined recently after the adoption of the stewardship code in 2014 and the corporate governance code in 2015 with further revisions thereafter. In addition, banks have reduced strategic shareholdings more rapidly than nonfinancial firms have done, due to the need to reduce market risk and cope with the strengthened capital requirement regulation. Relative to banks, the process of reducing strategic shares among nonfinancial firms has been slow.

The third largest investors were trust banks, accounting for 21% of the total, nearly as large a share as that of business corporations. Trust banks’ stockholdings include stocks held by entities including the BOJ, the Government Pension Investment Fund (GPIF), other pension funds, and investment trusts. An increase in the ratio of trust banks reflects mainly an increase in ETF purchases by the BOJ and investment by the GPIF. The GPIF, which manages public pension reserves of about ¥170 trillion (about 30% of nominal GDP in 2019), drastically reformed its basic portfolio guidance in 2014. The GPIF reform increased stockholdings and reduced holdings of domestic bonds including JGBs. With the reform in effect from the end of October 2014, the allocation of domestic bonds dropped from 60% to 35% (with a permissible range from ±8% to ±10%) while the allocation of both domestic and foreign stocks rose from 12% to 25% (with a permissible range from ±6% to ±9% for domestic stocks and from ±5% to ±8% for foreign stocks). The allocation of foreign bonds also grew from 11% to 15% (with a permissible range from ±5% to ±4%). Some other public pension funds changed their asset portfolio to be in line with the GPIF reform. Although foreign investors remain the largest shareholders, the presence of the BOJ has risen in the stock market since the amount of annual purchases has become the largest as a single investor.

Individuals were the fourth largest investors as a group with stock holdings of ¥113 trillion or 17% of the total. Individuals as a group
were not very enthusiastic investors over the same period as their share dropped from 19.5% to 17.0% despite an increase in the number of individual investors from about 46 million in fiscal year 2012 to 61 million in fiscal year 2017. The increase in the number of individual investors is attributable to a series of government tax exemption initiatives (the exemption to a 20% levy on income from dividends and capital gains) to encourage individuals to invest in stocks and diversify their financial assets. The initiatives include (i) Nippon Individual Savings Account (NISA), adopted in 2014, which enables individuals of at least 20 years of age to open a NISA (for maximum investment of ¥1.2 million a year, up to ¥6 million for 5 years); (ii) Junior NISA, adopted in April 2016, which enables individuals under 20 years of age to open a Junior NISA (for maximum investment of ¥800,000 a year, up to ¥4 million for 5 years); and (iii) an installment-type NISA adopted in 2018 for maximum investment of ¥400,000 a year, up to ¥8 million for 20 years. In addition, the government promoted an individual-type defined contribution pension plan or a private-pension plan with all contributions being tax deductible for virtually all individuals aged 20–59. Despite these measures together with the BOJ’s monetary easing and the GPIF reform, individuals have not become very enthusiastic about investing in Japanese stocks.

3.4 Experience of Stock Purchases Conducted in Hong Kong, China in 1998

The BOJ’s ETF purchase program is unique among central banks. A well-known case of a central bank’s purchase of stocks, which is sometimes compared with the BOJ’s ETF purchases, is the intervention by the Hong Kong Monetary Authority (HKMA) in August 1998, when it intervened simultaneously in the foreign exchange, stock and stock futures, and interbank markets. The HKMA’s purchase program was not regarded as unconventional monetary easing due to the differences in the period of intervention (about 2 weeks in Hong Kong, China vs. over 7 years in Japan) and the objective (fighting against short-term oriented speculative activities in Hong Kong, China vs. achieving the 2% price stability target in Japan). The HKMA’s policy was meant to stabilize the Hong Kong dollar against the US dollar under the Linked Exchange Rate System—the currency board system where the monetary base is fully backed up with reserves denominated in US dollars. Speculators adopted a “double-market play” strategy, by which they pre-funded themselves with Hong Kong dollars and then used the cash to build up large short positions in the cash and future stock markets.
and simultaneously sold the Hong Kong dollar in large quantities to drive up interbank interest rates. Despite a sharp drop in the Hang Seng Index, a further drop was anticipated by these speculative short selling activities—notwithstanding that the price-earnings ratio (around eight times) suggested the undervaluation of stock prices.

The Government of the Hong Kong Special Administrative Region of the People’s Republic of China became concerned that potential losses to shareholders in the case of a sharp fall in the stock market would weaken public and market confidence about the sustainability of the exchange rate policy. In response, the HKMA intervened in the stock market in the middle of August 1998 to purchase stocks listed on the Hong Kong Stock Exchange using foreign reserves as sources of funding. The stock market intervention was completed by the end of August 1998 with a total of about HK$120 billion spent. In November 1999, the HKMA was able to adopt an exit policy by launching the Tracker Fund, which is an open-ended exchange-traded fund, and reselling stocks to investors. The disposal of the stocks generated a profit. The HKMA was able to make a successful exit because its purchasing intervention in the stock market was short-lived, which meant it generated little distortion to stock prices itself. Favorable stock market conditions also helped the HKMA to conduct a smooth exit policy and enabled it to generate a profit. The HKMA’s successful exit is a welcome result. It is uncertain whether the BOJ will be able to make such a successful exit given that the BOJ struggled to sell all the shares purchased from banks during 2002–2010 and the current outstanding amount of shareholdings has become substantially greater than before.

3.5 Conclusions on Stock Purchases as an Unconventional Monetary Easing Tool

This chapter highlighted ETF purchases conducted by the BOJ. This policy is unprecedented among major central banks in scale and duration. Stock prices began to rise from late 2012 together with a sharp depreciation of the yen in anticipation of the BOJ’s aggressive monetary easing. Stock prices rose due to various domestic and foreign factors. Domestic factors include the BOJ’s monetary easing (through a decline in short- and long-term interest rates, ETF purchases, and depreciation of the yen) as well as favorable corporate profits, which are also partially supported by the BOJ’s policy. Foreign factors include higher US stock prices and the appreciation of the US dollar against major currencies.

The purpose of the BOJ’s stock purchases was to promote portfolio rebalancing among individuals and other entities as well as to raise
financial wealth, thus stimulating economic growth. For individuals, however, the outstanding amount of stockholdings rose only moderately and lagged behind foreign investors. Individuals remained largely risk-averse and did not actively rebalance their portfolio in favor of risk assets. This was despite the BOJ’s policy, the GPIF reform, and a series of government tax incentives to promote stock investment for individuals. Instead, Japan’s stock market has been dominated by foreign investors. Their presence has increased over the past 7 years. Moreover, the BOJ’s continuation of large-scale purchases has turned the BOJ into one of the top shareholders after the GPIF on a per-shareholder basis. While trust banks can exercise voting rights on behalf of the BOJ, they do so only to a limited extent because the BOJ is purchasing shares as a monetary easing tool, not as an asset owner attempting to maximize returns from investment. As such, the BOJ’s shareholder participation does not involve paying attention to environmental, social, and governance factors as other entities do when they have signed the Principles for Responsible Investment. Thus, the BOJ can be regarded as a silent investor, potentially undermining the government efforts to improve corporate governance and profitability of Japanese listed firms. In addition, ETF purchases have affected stock prices through reducing downside risk, potentially damaging the function of the stock market. Other sources of concern are possible overvaluation of some small-cap firms as well as a decline in floating shares of these stocks. Given that it is likely to take a long time to achieve 2% inflation, current monetary easing is likely to continue. Whether the BOJ can take a clearer, more decisive approach toward unwinding ETF purchases remains to be seen.
Growing Interest in Alternative Monetary Policy Frameworks

After the global financial crisis of 2008–2009, many central banks in developed economies faced the effective lower bound and thus found it necessary to implement unconventional monetary policy to achieve the inflation target. Over the past years, the effectiveness of such policy has been increasingly questioned given that some of these central banks have struggled to raise inflation and inflation expectations in a stable manner. In response, the search for a better monetary policy framework has become one of the main topics in the central banking circle. Before the global financial crisis, central banks formed a consensus that flexible inflation targeting is a main pillar of the monetary policy framework. Flexible inflation targeting is a monetary policy that attempts to achieve the inflation target in the longer run by considering resource maximization or reducing the unemployment gap and output gaps. This chapter summarizes recent discussions of alternative monetary policy frameworks, such as (i) average inflation targeting, (ii) price-level targeting, (iii) nominal gross domestic product (GDP) targeting, and (iv) nominal wage targeting, especially by paying attention to the case of Japan.

4.1 Search for a New Monetary Policy Framework

Many central banks share the view that flexible inflation targeting was proven successful in terms of achieving lower and stable inflation while raising economic growth in many developed economies and emerging economies. This consensus, however, has grown shaky since the global financial crisis especially in developed economies for three reasons.

First, real interest rates have declined since the early 1990s for structural reasons (i.e., aging, reduced productivity growth, and rising global savings) as well as cyclical reasons (i.e., the legacy of the global financial crisis). The real interest rates are highly unlikely to recover to the higher pre-crisis level. This suggests that the nominal policy rate remains lower than in the pre-crisis period. For example, the nominal
federal funds rate in the United States is likely to be around 3% or lower currently, as compared with around 5% before the global financial crisis. The decline in real interest rates reflects a decline in r-star ($r^*$), which refers to the long run real rate of interest that brings output into line with its potential level (namely, the neutral rate). At this interest rate, the economy is neither accommodative nor contractionary. Williams (2019) estimate that global $r^*$ dropped significantly from around 2% to near 0% since the global financial crisis. Global $r^*$ was calculated as the weighted average of estimates for the major economies such as Canada, the euro area, Japan, the United Kingdom, and the United States. In the case of the euro area, most of the estimates of $r^*$ conducted by the European Central Bank (ECB) have been negative regardless of the type of model used (ECB 2018). The protracted downward trend in $r^*$ indicates central banks in developed economies face the heightened probability of monetary policy becoming constrained by the effective lower bound on nominal interest rates in the future. Andrade et al. (2019) show that the probability of hitting the effective lower bound would be about 11%. Lubik and Matthes (2019) estimate that the probability of the United States falling into the effective lower bound would be negligible over the next 2 years, rise to just above 5% during 2022, and increase at most to 15% by the end of the 2020s. These estimates turned out to be incorrect since the unexpected coronavirus (COVID-19) spread and sudden sharp economic downturn prompted the Federal Reserve to cut the federal funds target range by 150 basis points to 0–0.25% in March 2020—virtually the effective lower bound for the Federal Reserve, as discussed in Chapter 2.

Second, many developed economies face disinflationary pressures rather than inflationary pressures after the global financial crisis. This come along with slower economic growth than in the past despite the lengthened expansionary phase. For example, it took the Federal Reserve more than 6 years (since its adoption of the 2% goal) to achieve about 2% based on personal consumption expenditures (PCEs) and core inflation in some months of 2018, but then inflation declined and remained somewhat below 2% throughout 2019. For the ECB, inflation based on the Harmonized Index of Consumer Prices (HICP) reached around 2% or above from April 2018 to November 2018, but core inflation has remained around 1%—well below their price stability target of “below, but close to, 2%.” The Bank of Japan (BOJ) failed to achieve the 2% price stability target despite massive monetary easing since 2013—excluding the period when the consumption tax hike took place in fiscal year 2014. These outcomes in the three economies suggest that raising inflation from a low level is much harder than lowering inflation from a high level—indicating asymmetry with regard to the ease of converging to the inflation target.
Third, reflecting these backgrounds, some central banks have been examining the current monetary policy framework. For example, the Federal Reserve has been conducting a review since 2019 over monetary policy strategy, monetary policy tools available, and communication strategies to ensure that the statutory goals of maximum employment and price stability are achieved sustainably. Meanwhile, Christine Lagarde, who took over the presidency of the ECB from Mario Draghi in November 2019, followed suit and initiated a strategic review of monetary policy in January 2020—the first review in 16 years. Lagarde also acknowledged the presence of the side effects of monetary policy (Lagarde 2019a). The review, expected to be concluded by the end of 2020, will involve all stakeholders and will encompass quantitative formulation of price stability, a monetary policy tool kit, economic and monetary analyses, and communication practices. In addition, the review will consider issues such as financial stability, employment, and environmental sustainability. These reviews of monetary policy are based on the practice conducted by the Bank of Canada since 1995. In 1991, the first agreement on an inflation-control target framework to guide Canadian monetary policy was signed by the Bank of Canada and the Minister of Finance. The inflation target of 2% has been in place since 1995, and the framework is reviewed and renewed every 5 years.

### 4.2 Average Inflation Targeting as a New Monetary Policy Framework

Average inflation targeting attempts to make up for a period during which a central bank failed to achieve the inflation target by compensating for past inflation deviations from the inflation target. While flexible inflation targeting aims to achieve the inflation target over the medium term without paying attention to the past deviation, average inflation targeting aims for the average of inflation, over some period, to match the inflation target rate. If inflation has been below the target rate, a central bank must aim for above-target inflation in the future, in order to bring average inflation up toward the target. To do so, a central bank needs to inform the general public of its commitment to achieve an inflation outcome that averages 2% over time. An announcement through forward guidance needs to be made in a convincing manner in advance that the central bank will not tighten monetary policy immediately even if actual inflation begins to exceed the inflation target and exert moderate upward pressures for some time.

To launch average inflation targeting, a central bank should specify the length of the inflation averaging period. The length could be fixed
(e.g., the latest 5 years) or flexible over the business cycle—for example, starting the averaging window at the last business cycle peak and continuing it through the present (Reifschneider and Wilcox 2019). As there is no appropriate method to define the length, the format could be country specific. Additionally, the central bank must determine how quickly and how precisely it would aim to move average inflation back to the inflation target. Using a standard New Keynesian model in the presence of a low neutral rate of interest and a lower bound on interest rates, Mertens and Williams (2019) demonstrate that average targeting is superior to flexible inflation targeting to mitigate a downward bias in inflation expectations because it pursues above-target inflation during periods when policy is unconstrained. John Williams, the president of the Federal Reserve Bank of New York, is an advocate of average inflation targeting in addition to price-level targeting, which is described below (Williams 2017). Lael Brainard, the governor of the Federal Reserve, detailed her idea about a somewhat looser form of average inflation targeting (Brainard 2019, 2020). For example, following 5 years during which inflation outcomes were in the range of 1.5–2%, Brainard explained the Federal Reserve could target inflation outcomes in a range of, say, 2–2.5% for the subsequent 5 years to avoid a decline in expectations and achieve inflation outcomes of 2% on average overall.

One shortcoming of average inflation targeting is that the general public may begin to view above-target inflation as normal and hence adjust long-term inflation expectations upward. This could undermine the credibility of the inflation target. Loretta J. Mester, the president of the Federal Reserve Bank of Cleveland, stressed implementation challenges, pointing out that academic works often assume unrealistic perfect credibility and commitment, as well as assuming that the general public fully understands the new monetary policy framework and believes that a central bank would conduct monetary policy along the average inflation targeting rule (Mester 2019). While this means that a central bank can control inflation expectations, Mester stressed that it is not clear whether these assumptions would hold in practice. When demand grows strongly and inflation pressures rise, for example, Mester questions whether it is credible for a central bank to maintain low interest rates just because average inflation has not reached the inflation target yet. It is uncertain what actually would happen to inflation expectations.

Moreover, Reifschneider and Wilcox (2019) demonstrate through simulation that average inflation targeting would be a weak addition to the Federal Reserve’s monetary policy tool kit for dealing with recessions and persistently low inflation. The researchers show that the adoption of average inflation targeting would not matter much unless
the Federal Reserve were determined to respond more aggressively to deviations of inflation from the inflation target than having been the case in the United States historically. For example, if the Federal Reserve had adopted the negative interest rate policy (“below zero on average”) since late 2013, monetary easing could have been much greater than the actual policy adopted by the Federal Reserve. Unless such drastic monetary easing is pursued, the mere adoption of average targeting would not generate significantly different inflation performance. In addition, Reifschneider and Wilcox (2019) stress that average inflation targeting might produce highly undesirable policy responses. As an example, they provided a simulation of the time of 2006–2008 when oil prices rose markedly prior to the global financial crisis. As inflation averaged well above 2%, the simulation shows that average inflation would have prescribed holding the federal funds rate near 8% even if the housing market collapsed, financial stress intensified, and the economy slipped into recession during this period. Only at the end of 2008 when the financial crisis peaked and the economy was in a severe recession, the average targeting rule would have called for a cut in the federal funds rate.

4.3 Price-Level Targeting as a New Monetary Policy Framework

Price-level targeting has gained traction among some central banks and academics. Price-level targeting is theoretically more powerful than inflation targeting and is similar to average inflation targeting. It is powerful because it attempts to maintain stability of the price level along the desired long-term price level path (constructed, for example, assuming that the 2% inflation rate is always achieved) by making up the past deviation of actual prices from the path (i.e., mistakes). In contrast, flexible inflation targeting ignores the past deviation of actual inflation from the 2% inflation target and attempts to achieve 2% inflation going forward. Therefore, a central bank’s monetary policy response is history-dependent for price-level targeting and is history-independent for flexible inflation targeting. If actual inflation remains low for many years, for example, a central bank should achieve higher-than-2% inflation for a while to bring actual price levels back to the desired price level path and vice versa. If the general public is rational and forward looking (so that they fully understand the desired path as well as the central bank’s attempt to make up for the past deviations), their long-term inflation expectations will likely be more firmly anchored at around 2% as compared with flexible inflation targeting. So far only one economy has
implemented price-level targeting in the past: Sweden experimented with it for less than 2 years when it went off the gold standard in 1931 (Mester 2018).

In its 2011 review of the inflation-control target framework, the Bank of Canada examined price-level targeting as a possible option, but concluded that the benefits did not outweigh the risks of de-anchoring inflation expectations and thus losing central bank credibility (Bank of Canada 2011). The price-level targeting could be superior to flexible inflation-targeting as long as agents (such as households and firms) are forward-looking, are fully conversant with the implications of the new monetary framework, and trust the central bank to live up to its commitments. Since these conditions are unlikely to hold fully in practice, the review concluded that the net benefits of the price-level targeting could be reduced or even reversed. Ben Bernanke, the former chairman of the Federal Reserve, advocated an adoption of the price-level targeting only temporarily when the effective lower bound prevails (Bernanke 2017). Some Federal Open Market Committee (FOMC) members hold the view that price-level targeting could be a potential option in the United States because it may strengthen the effectiveness of forward guidance on a policy interest rate with greater forward commitment (Evans 2012; Williams 2017; Bostic 2018).

Meanwhile, Bodenstein, Hebden, and Winkler (2019) developed a New Keynesian model with a method of agents’ learning about the central bank’s policy strategy from observed policy rates by explicitly considering the limited informational content of observed policy rates at the effective lower bound. When the central bank switches to price-level targeting at the onset of a deep recession, this switch mitigates the loss in output and the shortfall in inflation under rational expectations and full information. However, when agents are still learning, the benefits of price-level targeting remain limited because agents do not understand the new monetary policy framework immediately. This learning problem is further complicated by the fact that the policy rate quickly hits the effective lower bound, at which point agents receive little information about the true parameters of the policy rule. When agents are in the learning process, thus, switching from flexible inflation targeting to price-level targeting at the onset of a recession does not yield any desired stabilization benefits. Positive benefits materialize only after the price-level targeting rule has been in place for a sufficiently long time. Temporary price-level targeting strategies like Bernanke (2017) proposes are unlikely to be effective as compared with the existing framework.

In the case of Japan, price-level targeting has rarely been under the spotlight. This is mainly attributable to the BOJ’s failure to promote
communication with the general public about its policy objectives and the 2% inflation target. As a result, the deviation of actual price level from the 2% price level (starting from 2013 when the official 2% inflation target was adopted) has been not only widening but has also been much wider than in the United States (starting from 2012 when the 2% longer-run goal was explicitly adopted), as shown in Figure 4.1. Reaching the price level path is an extremely difficult task for the BOJ due to the limited effectiveness of the current monetary easing tools for generating inflation. The idea of trying to generate a rate of inflation exceeding 2% for many years to achieve the price level path is unlikely to be accepted by the general public.

![Figure 4.1: Desired Long-Term Price Level Path and Actual Price Level](image)

(a) Japan
(Index, year 2012 = 100)

Source: Prepared by the author using data from the Statistics Bureau of Japan, Ministry of Internal Affairs and Communications.

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Growing Interest in Alternative Monetary Policy Frameworks

4.4 Nominal Gross Domestic Product Targeting as a New Monetary Policy Framework

Nominal GDP targeting aims to achieve a specific nominal GDP level (product of real GDP level and GDP deflator). Formally, nominal GDP targeting has at least three advantages over flexible inflation targeting and price-level targeting (McKibbin and Panton 2018). One advantage is that the central bank does not need to know potential GDP precisely on a real-time basis, as nominal GDP targeting allows a range of outcomes for inflation and real GDP. A second advantage is that the central bank under nominal GDP targeting would not tighten monetary policy when a negative supply shock (such as a sharp oil price hike for an oil importing economy) raises inflation but exerts downward pressures on production.
activities, thereby preventing the economy from falling deeper into recession. Under flexible inflation targeting and price-level targeting, a price hike driven by a supply shock might prompt a central bank to tighten monetary policy—partly because it is difficult to distinguish such a supply shock from a demand shock on a real-time basis. Thus, nominal GDP targeting can achieve output stabilization more firmly than flexible inflation targeting, average inflation targeting, and price-level targeting can. The third advantage is that price level targeting attempts to make up for past deviation from actual GDP level from a long-term nominal GDP target path if undershooting or overshooting for many years increases such deviation. Thus, nominal GDP targeting is history-dependent like price-level targeting. Chen (2020) shows that nominal GDP targeting helps to stabilize inflation more effectively than inflation targeting or a Taylor type monetary policy rule do. Chen demonstrates nominal GDP targeting reduces inflation volatility by 25% and output fluctuation by 27%. Summers (2018) proposes nominal GDP targeting of about 5–6% for the United States.

From the practical perspective, moreover, the general public may find it easier to understand the numerical nominal GDP target than the 2% inflation target. For example, the BOJ has been finding it difficult to convince the general public that the economy is better off if inflation has risen to the 2% target, as reported in Chapter 1. Japan's experience suggests households do not feel much benefit from the 2% inflation target, as not only has nominal wage growth risen little, but also real wage growth has remained stagnant. As nominal GDP growth is a relatively familiar concept, the general public may be more supportive of nominal GDP targeting than of the current flexible inflation targeting framework with the numerical 2% target. Nonetheless, nominal GDP targeting has a few technical problems that make it difficult for a central bank to use it operationally. These problems include frequent revisions of GDP data, lack of monthly GDP data, and lags in the release of GDP data. These issues are relevant especially in Japan because the GDP revisions are often large, and the first GDP estimate is released with a long lag (after a month and a half for the first estimate). A nominal GDP target may also wrongly give the general public and the government the impression that the central bank is able to raise potential GDP growth. The government may exert pressure on the central bank if nominal economic growth is inadequate. Nominal GDP targeting may undermine the government’s incentive to foster economic growth through structural reforms and economic growth strategies.

It is noteworthy that Japan’s government introduced nominal GDP targeting in 2015 with the numerical target level of around ¥600 trillion...
by around 2020. In late 2016, a major revision to the System of National Accounts was made, adding about ¥32 trillion to Japan’s nominal GDP in fiscal year 2015. This upward revision has made it easier for the government to achieve its target. Nonetheless, the target of ¥600 trillion remains challenging as it requires an average rate of nominal GDP growth of about 3% in 2018–2020—much higher than the average rate of 2% in 2013–2017 (Figure 4.2). Additionally, the nominal GDP target is much greater than the International Monetary Fund’s projection as of April 2018. More importantly, the adoption of nominal GDP targeting appears to have limited impact on inflation, inflation expectations, and economic growth expectations in Japan because of the lack of concrete measures to achieve the target. The media and the general public have paid little attention to the nominal GDP targeting, which suggests a lack of credibility.

Figure 4.2: Japan’s Nominal Gross Domestic Product Target and International Monetary Fund Projection (¥ trillion)

Source: Prepared by the author using data from International Monetary Fund, World Economic Outlook Database; and Economic and Social Research Institute of the Cabinet Office, National Accounts of Japan.
4.5 Nominal Wage Targeting as a New Monetary Policy Framework

Nominal wage targeting sets a numerical nominal wage target level (based on a desirable nominal wage growth path, like price-level targeting). It is somewhat similar to nominal GDP targeting since nominal GDP includes nominal wage (and corporate profits). Sumner (1995) proposes nominal wage targeting for its potential to minimize suboptimal employment fluctuations in an economy characterized by nominal wage stickiness. Mankiw and Reis (2002) show that nominal wage targeting is suitable to maximize economic stability since wages are more procyclical and suffer smaller idiosyncratic shocks than does the consumer price index, which is typically used as the reference index under flexible inflation targeting. Moreover, a central bank may find it easier to explain its policy objective to the general public since nominal wage targeting is directly associated with workers’ income and might stimulate people’s spending. Nominal wage targeting is feasible as long as labor productivity growth remains nearly constant.

However, there are several technical issues related to the practice of nominal wage targeting. First, nominal wages tend to be relatively sticky as firms and labor unions typically conduct wage negotiations once a year or for multiple years in many economies, including Japan and Europe. Wages tend to be set based on past inflation, as is the case in Japan. Productivity data are highly volatile and difficult to measure, especially when an economy shifts from manufacturing to non-manufacturing (such as health and elderly care). A large literature has documented downward nominal wage rigidity in which workers are reluctant to accept (and employers reluctant to impose) absolute nominal wage cuts (Dickens et al. 2007; Trott 2015). It is harder to reduce nominal wages by 2% when prices are stable than to keep them constant when prices rise by 2%. Second, once an explicit wage target (e.g., 4%) is adopted, this target would become the new norm for wage setting and some downward stickiness could easily transfer itself from zero to the 4% target rate (Trott 2015). Then, it might take very high unemployment to force wage growth below 4%. Third, as there is no equivalent evidence for upward nominal wage rigidity, it might not take a very tight labor market for wage growth to rise above the 4% target. While the weaker sectors would be constrained by the 4% lower bound, nothing would prevent wages in the stronger sector from rising faster. If nominal wages are turned into a policy target, they might cease to be a good indicator of the state of the economy, and hitting the target might require a permanently elevated rate of unemployment.
Considering nominal wage targeting in a practical sense in Japan, the approach may reveal some challenges. In Japan, wages are comprised of scheduled cash earnings (determined mainly by the number of working years, age, and base pay), special cash earnings such as bonuses (provided twice a year linked to corporate profits), and overtime allowances (non-scheduled cash earnings). Among these types of wages, scheduled cash earnings are considered the most important element since they contribute to permanent income growth. However, firms are generally reluctant to raise scheduled cash earnings (especially base pay) as these are a fixed cost that cannot be easily cut during an economic downturn. Thus, firms prefer adjusting bonuses as they can be more flexibly adjusted in line with ongoing profit levels. More rapid growth in total cash earnings than in scheduled cash earnings indicates that the recent wage increase has been driven mainly by volatile bonus payments. Figure 4.3 indicates that Japan’s nominal wages per employee have been growing possibly at a little less than 1% since 2016, but this

Figure 4.3: Nominal Wages per Employee
(year/year %)

Source: Bank of Japan (2020).
rate of wage growth can be nearly halved once bonuses are excluded. There are also wage differences between regular employees and part-time employees. The number of part-time or nonregular workers, which account for about 38% of total employment, has been growing, since housewives and retired elderly people tend to choose part-time positions. However, part-time employees’ wages account for about 60% of full-time employees’ wages based on hourly cash earnings, so that firms in labor-intensive businesses (such as taxis, restaurants, supermarkets, department stores, delivery of cooked food, and security work) prefer part-time workers to reduce cost and maintain profits.

In the context of the declining population, tougher competition, and firms’ low productivity growth, Japan’s firms may not feel comfortable with nominal wage targeting; firms do not want to commit to such wage hikes due to a high degree of uncertainty about corporate profits. Firms may simply ignore the nominal wage target due to the practical difficulty of implementing it at the corporate sector level given the complex wage setting structure mentioned above. In setting nominal wage targets, the wage setting structure must be considered and the types of wages to be targeted must be carefully examined. Due to the severe labor shortage, the wage differences between regular and nonregular workers are likely to shrink over time. The equal-job equal-pay rules for regular and nonregular workers since April 2020 might contribute to promoting the process of ending wage disparity. However, firms are still able to pay different wages if the content of jobs and the degree of responsibility are different provided that unreasonable disparity is not maintained. Some firms may try to equalize wages between regular and nonregular workers by containing wage growth for regular workers or cutting some benefits given to them unless productivity growth picks up. Regular workers dissatisfied with such sluggish wages may become discouraged from working hard and increasing consumption growth. It may take some years to see real changes in the wage structure as firms need some time to change their business customs and employment styles and find ways to improve productivity.

4.6 Conclusions on Alternative Monetary Policy Frameworks

The search for a better monetary policy framework has received a lot of attention especially in the United States in recent years. Alternatives—such as average inflation targeting, price-level targeting, nominal GDP targeting, and nominal wage targeting—have been put forward with the objective of achieving the inflation target more reliably in the declining
neutral interest rate environment. While these new monetary policy frameworks offer some benefits, various risks are associated with actual implementation. An additional challenge is communicating with the general public about switching monetary policy frameworks. Without being able to promote adequate understanding among the general public, a switch may destabilize long-term inflation expectations and a central bank could lose credibility over monetary policy. More importantly, the question remains as to whether central banks have enough monetary policy tools to exercise a new monetary policy framework. A mere shift of the monetary policy framework may not generate any significant differences. With regard to Japan, adoption of average inflation targeting, price-level targeting, nominal GDP targeting, or nominal wage targeting is unlikely to make a significant impact due to limited effectiveness of monetary easing and limited room available for further monetary easing to generate higher inflation. In addition, raising real economic growth or nominal wages appears to be beyond the control of a central bank.
5
Better Coordination between Monetary Policy and Fiscal Policy

Unconventional monetary policy tools are becoming nearly exhausted in developed economies as short- and long-term interest rates have been extremely low or negative. The effectiveness of monetary easing has also eroded—although the degree of erosion depends on economic and financial conditions in each economy—after having been maintained for many years, and adverse impacts have become prevalent. Besides, some unconventional monetary policy tools, such as large-scale asset purchases and yield curve control, make for ambiguous boundaries between monetary policy and fiscal policy. It is becoming increasingly clear that monetary policy alone cannot improve the current economic conditions and overcome future economic recessions or crises. In recent years, expansionary fiscal policy has been increasingly emphasized by some central banks and academics as a means of stimulating the economy and raising inflation to achieve the inflation target. A shift to closer, clearer coordination between monetary policy and fiscal policy may further blur the traditional division of labor where a central bank engages in price stability with operational independence while fiscal authorities are responsible for conducting tax reform and expenditure policy and controlling public debt. This chapter will go over the recent discussions related to policy coordination as well as describe helicopter money (monetization of fiscal deficit) and modern monetary theory (MMT).

5.1 Growing Global Call for Fiscal Stimulus and Policy Coordination

Chapter 4 pointed out that the low interest rate environment reflects partly the protracted decline in the declining neutral rate of interest rates in developed economies including the euro area, Japan, and the United
States. A series of unconventional monetary easing policies conducted by these economies’ central banks have exerted substantial downward pressures on interest rates. If the neutral rate of interest remains low, the low interest rate environment may continue. In this environment, the fiscal policy becomes more effective and fiscal multipliers become higher because of the limited crowding out effect.

5.1.1 Crowding Out Effect Limited by the Low Interest Rate Environment

The crowding out effect—which refers to the case in which expansionary fiscal policy would result in a higher interest rate—used to be considered as a factor constraining fiscal stimulus. This constraint is no longer binding in the current interest rate environment. Thus, there is a growing view that expansionary fiscal policy should be conducted to avoid further economic slowdown. Policy cooperation is an increasingly important issue, especially when an economy faces the effective lower bound and unconventional monetary policy might not be so effective.

5.1.2 Growing Call for Fiscal Stimulus in the Euro Area

The need for better policy coordination has been frequently referred to in the case of the euro area. For example, monetary easing and fiscal stimulus were collectively and intensively adopted by many economies in the world in the aftermath of the Lehman shock in 2008. However, the euro area became concerned about the rising public debt in terms of nominal gross domestic product (GDP) due to the fiscal rules imposed by the European Union (EU). Fiscal discipline has been imposed on member states through the Stability and Growth Pact, which requires a fiscal deficit to remain within the limit of 3% and public debt to remain within 60% of nominal GDP (Articles 121 and 126 of the Treaty on the Functioning of the EU). It also requires member states to avoid excessive government deficits and specifies an excessive deficit procedure (Article 126 of the Treaty on the Functioning of the EU). Moreover, the fiscal compact introduced in 2012 (as part of the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union) requires the implementation of a balanced budget rule at the national level and a further strengthening of the excessive deficit procedure within the Stability and Growth Pact. These rules make it difficult for European economies to conduct expansionary fiscal policy as flexibly as Japan, the United States, and many other economies. The euro area thus became cautious about fiscal stimulus especially after the ratio
of fiscal deficit to nominal GDP rose to around 6% in 2009–2010 from less than 1% in 2007 and the ratio of public debt to nominal GDP rose to about 85% in 2009 from 65% in 2007. The ratio of fiscal deficit to nominal GDP since dropped steadily and fell to 0.5% in 2018 while the ratio of public debt to nominal GDP ratio rose moderately to 85% in 2018. Following the European debt crisis of 2010–2012, monetary easing became the predominant instrument for stimulating the economy in the euro area.

Due to the disproportionate burden borne by the central bank, the European Central Bank (ECB) began to stress the need to conduct expansionary fiscal policy to promote better policy coordination and thus generate higher aggregate demand in the euro area (Draghi 2014). The ECB thus stressed that fiscal policy must make a more decisive contribution for member states with fiscal space (clearly, keeping Germany in mind), while member states with high public debt (presumably, Italy and Greece) should pursue prudent policies and deliver on structural balance targets (Draghi 2019b). Given that fiscal policy sustainability is ensured under the substantially low interest rate environment, it was emphasized that the expansionary fiscal policy is urgently needed in view of the weakening economic outlook and the continued prominence of downside risks. While monetary easing played an important role in coping with the global financial crisis and the European debt crisis, the ECB stressed that the euro area did not have a substantial fiscal response comparable with those of Japan and the United States. Provided fiscal space is measured by the cost of servicing debt minus output growth, there is room in many euro area member countries to implement fiscal stimulus (Pereira da Silva and Mojon 2019). Policy coordination became even more urgently needed since the coronavirus disease (COVID-19) spread and deepening recession. The European Commission is in the process of establishing a recovery fund of at least €1 trillion linked to the EU budget in 2020. By issuing bonds with an implicit guarantee from member states, the European Commission aims to help recover severely affected member countries such as Italy and Spain from the novel coronavirus pandemic.

5.1.3 Policy Coordination through a Joint Statement in Japan

The need for expansionary fiscal policy has been discussed in the environment where a central bank continues ongoing monetary easing. One way to improve policy coordination is to form a joint statement
and consensus assignment. For example, Japan’s government and the Bank of Japan (BOJ) have been implementing this since January 2013 with a joint statement to strengthen policy coordination and work together in order to overcome deflation as quickly as possible and achieve sustainable economic growth with price stability (Government and Bank of Japan 2013). Under the agreement, the BOJ would achieve the 2% price stability target at the earliest possible time while the government would revitalize the economy by flexibly managing macroeconomic policy (equivalent to active fiscal stimulus policy) and by formulating measures for strengthening competitiveness and potential economic growth. While the BOJ has implemented bold unconventional monetary easing as already explained in Chapter 2, the government has adopted various economic growth strategies and structural reforms. The reforms included adopting corporate governance and stewardship codes, labor market reforms, various free trade agreements, and tax incentives to promote portfolio rebalance. However, potential economic growth has remained low—currently around 1% as estimated by the Cabinet Office and around 0.7% as estimated by the BOJ mainly due to sluggish total factor productivity growth and adverse impacts from the labor shortage (Cabinet Office and Bank of Japan). This suggests that the reforms undertaken have not been sufficient to more than offset downward pressures driven by declining population and aging. The government has increased public investment and expenditure over the period, but overall expenditure as a percent of nominal GDP has been rather contained because of concerns about Japan’s growing public debt (about 240% of nominal GDP) in 2019.

Many academics in Japan generally support fiscal consolidation due to growing age-related expenditure that outpaces tax revenue (Braun and Joines 2015; Doi, Hoshi, and Okimoto 2011; Hoshi and Ito 2014; Imrohoroglu, Kitao, and Yamada 2018). Imrohoroglu, Kitao, and Yamada (2018) demonstrate that Japan would continue to run social security deficits (pension, public health, long-term care) and the public debt to nominal GDP ratio would continue to reach unprecedented highs. To reach a ratio in 2050 that would be below the 2020 level, various measures are proposed, including raising the retirement age to 67, cutting pensions by 10%, raising copays (a fixed out-of-pocket amount paid by an insured person for covered services) in public health and long-term care insurance, encouraging female employment and matching earnings to the levels of male workers, and increasing the consumption tax rate to 15%. The general public leans toward the view that fiscal consolidation is necessary in Japan due to concerns about huge and rising public debt;
however, the majority opposed consumption tax hikes implemented in the past and cutting pensions, suggesting that many of the proposed measures are politically difficult to pursue.

As described in Chapter 2, the BOJ has been stabilizing the 10-year yield at around 0% under yield curve control. To meet the 10-year yield target, the BOJ adjusts JGB purchases by purchasing the difference between the amount issued by the government (supply side) and the amount demanded by institutional investors (demand side). For the time being, this practice appears to be sustainable as long as inflation remains low. In 27 April 2020, the BOJ showed willingness to purchase JGBs and treasury bills unlimitedly for the time being in response to the government’s economic rescue measures in response to the COVID-19 crisis and associated increase in JGBs and treasury bills. This appears to indicate BOJ’s clear intention to finance the government’s debt indirectly through purchasing JGBs and treasury bills from markets. If the BOJ continues to do this for a long time, however, the boundary between monetary easing to raise inflation and monetary easing to finance public debt will become increasingly blurred. The BOJ does not need to worry about the market valuation of the JGB holdings since JGB holdings are not evaluated based on a mark-to-market basis, so the balance sheet is not affected by changes in interest rates. When the BOJ purchases JGBs at higher prices than face value, for example, the difference between the purchase price and the face value, divided by the remaining maturity for each year—the interest rate adjustment amount—is deducted from the operating income from interest. Thus, Japan’s government could adopt fiscal stimulus (such as tax cuts and a sharp increase in expenditures) to take advantage of the low interest rates and count on the BOJ’s yield curve control and associated JGB purchases. Nevertheless, the ratio of public debt to nominal GDP is already high and is expected to rise further with growing expenditures related to aging, as pointed out above. What is missing in the views that support fiscal consolidation is discussion of how Japanese government bond (JGB) purchases and yield curve control conducted by the BOJ are linked to lengthening of debt sustainability. Therefore, it is essential to have discussions in Japan involving the government, the BOJ, and academia as to how far the ratio of public debt to nominal GDP can rise without generating pressures on yields with the BOJ’s support and whether the rise in the BOJ’s JGB holdings (currently, around 45% of the total) can be acceptable. If the BOJ continues to hold the JGBs for a long time, the government will feel little pressure to find investors in the JGB market. The lower interest rate also reduces the government’s interest payment, lowering the sense of urgency to conduct fiscal consolidation.
5.1.4 Growing Call for Fiscal Stimulus in Academia

Globally, calls for expansionary fiscal policy have been expressed increasingly in academia. In the context of the United States, Olivier Blanchard, a former chief economist of the International Monetary Fund (IMF) and professor of economics emeritus at the Massachusetts Institute of Technology, stressed that the United States should have richer discussions about expansionary fiscal policy in the current environment with limited fiscal cost—namely, the intertemporal budget constraint facing the government being no longer binding (Blanchard 2019). Since long-term government bond yields are expected to remain below nominal GDP growth rates for a long time, it might be feasible to issue government debt without an accompanying increase in taxes later. If long-term government bond yields—the relevant risk-adjusted rate of return on capital—remain lower than the economic growth rates, Blanchard’s research also demonstrated that welfare costs would be limited. Furman and Summers (2019) support his view by stating that the costs and benefits of fiscal deficits have changed profoundly due to a decline in the neutral interest rates—under “secular stagnation” driven by demographic changes, rising inequality, and declines in the cost of and taste for capital goods—although a government still needs a limiting principle in order to conduct fiscal policy. Furman and Summers claim that a deficit cut is needed to keep interest rates down to encourage private sector borrowing and investment no longer applies to today’s economy. Rather, a cut in the fiscal deficit would even lower the underlying real interest rate, making things worse. When an interest rate is less than the economic growth rate, then the government can perpetually run primary fiscal deficits (a fiscal deficit excluding interest) with the public debt to nominal GDP ratio falling. Furman and Summers (2019), however, emphasize that a government cannot run unlimited primary fiscal deficits without the public debt to nominal GDP ratio rising substantially.

5.2 Helicopter Money and Debt Monetization

The idea of a drop of helicopter money was brought up by Professor Milton Friedman in 1969 (Friedman 1969). If a helicopter flies over a community and drops some money from the sky, and if the community knows that this is a one-time event, it is like a permanent increase in base money and increases households’ consumption.
5.2.1 Bernanke’s Proposal of Helicopter Money in Japan

This view was applied by Ben Bernanke, governor of the Federal Reserve at that time, to the case of Japan, whose inflation had been in mild deflation since 1999 (Bernanke 2002). Bernanke pointed out that the effectiveness of an anti-deflation policy could be enhanced significantly by cooperation between monetary policy and fiscal policy—for example by a central bank’s purchase of bonds issued by the government from the markets through open market operations together with the government’s implementation of broad-based tax cuts financed by debt issuance. Such monetary easing could alleviate upward pressures on interest rates (the crowding out effect) and thus could stimulate households’ consumption and hence increase prices. Even if households decided not to increase consumption but instead rebalanced their portfolios by using their extra cash to acquire real and financial assets, the resulting increase in asset values would lower the cost of capital and improve the balance sheet positions of potential borrowers. According to Bernanke, such a money-financed tax cut is essentially equivalent to Professor Friedman’s helicopter drop of money. Thus, helicopter money is equivalent to a central bank’s purchase of government bonds directly from the government or debt monetization. The government does not need to raise tax revenue or borrow money in debt markets to finance its deficit.

In the view of Bernanke, Japan’s persistent deflation could have ended successfully if Japan’s government and the BOJ had performed monetization decisively. In those days, Japan’s economy faced significant barriers to economic growth besides deflation—such as massive financial problems in the banking and corporate sectors that muted the effects of monetary easing attempted by the BOJ on a small scale. With rising public debt, moreover, the government was reluctant to use aggressive fiscal policy. In addition, comprehensive economic reforms were missing. In a precise sense, helicopter money means that the fiscal expansion conducted by the government, such as a tax cut, must coincide with a boost in the monetary base through open market operations. This ensures that any increase in interest rates is limited and there is no crowding out of private investment (Bartsch et al. 2019). In addition, the general public must understand that this boost to the monetary base would be permanent and will not be reversed in the future. If these conditions are met and helicopter money is delivered in a sufficient size, it is expected to drive up inflation since the growth of the money supply drives inflation in the long run.

As an alternative to the view of Bernanke (2002), a central bank could make monetary payments directly to individuals. This would
result in the direct and permanent monetization of a fiscal deficit. Bartsch et al. (2019) propose this view by advocating that a central bank supply money directly and permanently into the hands of the general public and other private sector spenders. Japan’s government provided small cash transfers (only ¥12,000 per person) to the general public in 2009 to cope with the global financial crisis through the budget. The government has decided to provide about ¥100,000 per person in April 2020 through the budget to cope with the COVID-19 crisis. If the BOJ provides cash directly to the general public instead of the government, the operational independence of the BOJ will be questioned. It may invite strong criticisms from the general public and the academic circle concerning debt sustainability in Japan. Thus, the implementation of helicopter money needs to be examined from the perspectives of existing institutional setting, debt sustainability, and public sentiment.

5.2.2 Temporary Debt Monetization in the United Kingdom

A government and a central bank might strengthen coordination with an explicit inflation objective that they are jointly held accountable for achieving—applied only when the effective lower bound prevails and inflation is expected to be systematically below the inflation target over the policy horizon. Moreover, the COVID-19 crisis made it necessary to strengthen policy coordination. For example, Her Majesty’s Treasury and the Bank of England (the central bank of the United Kingdom) agreed that the central bank would directly finance the government by temporarily expanding the use of the existing overdraft facility, called the Ways and Means facility, on 9 April 2020. This agreement provides a short-term source of additional liquidity to the government if needed to smooth its cash flows and support the orderly functioning of markets throughout the period of disruption from COVID-19. The government continues to use the bond markets as its primary source of financing, and its response to COVID-19 is fully funded by additional borrowing through normal debt management operations. This decision was made as some stress has grown in the bond market after the government debt issuance to cope with the COVID-19 crisis increased in March 2020. The Ways and Means facility aims at supporting market function by minimizing the immediate impact of raising additional funding in the markets. Any drawings from this facility will be repaid as soon as possible before the end of 2020. Albeit a temporary measure, this is a kind of debt monetization or financing the government deficit through money creation. No limit is set with regard to the amount of overdraft
permitted. The facility has normally maintained around £370 million. This amount was allowed to rise during the global financial crisis of 2008–2009 and is expected to rise this time to a level exceeding that of the global financial crisis.

5.3 Growing Attention to Modern Monetary Theory

Modern monetary theory (MMT) has become a much-discussed topic in public policy recently. The concept of MMT has been known for some time, but it has captured more attention since early 2019 after United States Congresswoman Alexandria Ocasio-Cortez of New York stressed its importance in boosting public spending for education and medical services (Ocasio-Cortez 2019). The growing emphasis on expansionary fiscal policy reflects the disappointing performance of unconventional monetary easing—including lower-than-expected economic growth and underperforming inflation, as well as various adverse side effects arising from monetary easing. Moreover, the global economic slowdown, rising relative poverty and inequality, and limited opportunity for additional monetary easing all support the case for fiscal expansionary policy.

5.3.1 Modern Monetary Theory’s Views of Monetary Policy

MMT is consistent with the pro-fiscal policy view, but it provides unique views about the role of government spending as well as zero-default risk on government debt denominated in domestic currency. The theory claims that governments never default on their own currency-denominated debt because the monetary sovereign government is the monopoly supplier of its currency (Tymoigne and Wray 2013; Wray 2012). Because it has the power to issue as much money as is needed, proponents of this theory say, the government faces no effective budgetary constraint and thus can increase public investment projects such as universal healthcare and a job guarantee without concern for the cost of these programs. Budget deficits and accumulated debts are no longer problematic since an increase in government spending does not need to be paid for. Greece faced a sovereign debt crisis in 2010–2012 because the central bank did not issue and control currency. A government should increase public spending in its domestic currency—namely, reserve balances of designated financial institutions with the
central bank—to achieve full employment as an employer of last resort and price stability (such as the inflation target) without worrying about rises in the fiscal deficit and public debt (Kelton 2019; Mitchell). As the government is never financially constrained, neither taxes nor bond issuance to the market are necessary to finance public spending. MMT claims that expansionary fiscal policy can be sustained until substantial inflationary risk emerges, which in turn could be controlled through a tax hike. Taxes are not only treated as an inflation adjustment tool but are also used as a tool to increase public demand for the currency. This is contrasted with the conventional view that taxes and debt issuance are needed to finance government spending and the fiscal deficit.

The most salient feature of MMT is the idea that fiscal policy is more effective than monetary policy because monetary policy is ineffective for the following reasons. First, monetary accommodation has lowered interest rates in an economic downturn phase. However, it has not necessarily generated as much private sector demand for credit, aggregate demand, or inflation as central banks hoped for. Unconventional monetary policy has only created an accumulation of bank reserves at a central bank. This reflects that firms’ outlook on profitability and households’ outlook on income have remained weak and that potential economic growth has been declining as society ages. This view seems to partially align with the fact that unconventional monetary easing conducted by major central banks after the global financial crisis generated disappointing results in terms of addressing aggregate demand, inflation, and long-term inflation expectations, as pointed out in Chapters 1 and 2. In contrast, it is stressed that the government is able to increase employment directly by conducting various public investment projects or increase disposable income by making substantial tax cuts or increasing social security benefits.

Second, MMT includes the view that a cut in interest rates could be economically contractionary rather than expansionary. This is because such a cut reduces the interest income of savers and investors, thus discouraging them from spending actively. A cut in interest rates also promotes an unfair transfer of interest income from creditors to debtors, causing distortions in income distribution. For these reasons, a negative interest rate policy is dismissed by MMT proponents. Similarly, monetary tightening or an interest rate hike in an expansionary phase does not necessarily restrain credit growth and excessive inflation if domestic demand could be boosted by increased interest income accrued to savers and investors. This view could apply to the case of Japan, where households’ bank deposits have been three times as large as their loans and firms have substantial cash and deposits.
Third, MMT posits that monetary easing tends to promote an accumulation of private sector debt if firms and households increase debt to take advantage of lower funding cost. As a result, the private sector faces a decline in net financial wealth (the difference between financial assets and liabilities). The government will not collapse even if it has a fiscal deficit and a decline in net worth. Firms and households are different from the government and may face greater risk of bankruptcy in such circumstances. This, in turn, discourages firms from increasing business investment and households from making residential investments and purchasing durable goods such as cars. MMT stresses that fiscal consolidation efforts by the government to reduce public debt often result in economic slowdown. In other words, growing government debt—rather than reducing government debt—could raise firms’ and households’ net financial wealth and thus enhance their well-being by allowing future consumption through saving today. In contrast, growing private sector debt reduces firms’ and households’ net financial wealth and amplifies default risk. On this front, monetary easing may promote an accumulation of private sector debt, thus possibly leading to future private sector debt and financial crises. Thus, private sector debt must be contained while there is no need to do so for the case of public debt. Indeed, this point appears to be consistent with the reality that private sector debt crises have occurred frequently and globally in the past while public debt crises have rarely happened in developed economies in the contemporary era, where mature physical and social infrastructure are already in place and most governments’ debt is denominated in their own domestic currency.

Fourth, a distinctive feature of MMT lies in the view that expansionary fiscal policy lowers interest rates rather than raising them—contrary to the widely shared view of the crowding out effect in the loanable funds market. This feature could prevail if government spending increases and associated reserve balances with a central bank rise since increased reserve balances place downward pressure on market interest rates.

Reflecting these views, MMT emphasizes that a central bank cannot control the monetary base (cash in circulation and reserve balances with a central bank) since the amount of cash issued is determined by demand from the general public and the amount of reserve balances is determined by the amount needed to achieve financial stability. Moreover, a central bank should support fiscal policy by maintaining short-term interest rates at around 0% persistently and passively to maximize the effectiveness of the fiscal policy. Maintaining the
low interest rate can be achieved by an open market operation with commercial banks using government bonds. This means that the objective of monetary policy should be shifted solely to making fiscal policy as effective as possible, away from the conventional active role of stimulating/containing aggregate demand and inflation with monetary easing. This might lead to a provocative conclusion that monetary policy cannot control inflation but can only control interest rates. This may pose a major challenge to modern central banking practices that emphasize the price stability mandate and central bank independence.

5.3.2 Critical Views and Conditions Applicable to Modern Monetary Theory

These views or conclusions of MMT have been controversial so far. Numerous criticisms have emerged including the risk of hyperinflation (as was the case of Germany in the past), the oversimplification of inflation dynamics, questions about the actual economy described in the model, and the lack of political economy perspectives concerning the use of taxes as an inflation adjustment tool (Palley 2013, 2019; Summers 2019). Summers (2019) stresses that it is not true that governments can simply create new money to pay all liabilities coming due and avoid default since this approach might lead to hyperinflation, as experienced by some emerging economies in the past. As there is a limit to the amount of revenue that can be raised via such an inflation tax, hyperinflation prevails if this limit is exceeded. Furman and Summers (2019) also point out that there is still some constraint on fiscal policy even if one accepts the MMT view that inflation is the only constraint on government spending. Provided that a government will eventually face a budget constraint, it needs to prioritize among the many worthy, and some not so worthy, claims on scarce resources. Sumner and Horan (2019) make the criticism that MMT proponents overestimate the potency of fiscal policy as they mistakenly assume that fiscal policy can control inflation. In addition, the researchers stress that central banks in most countries are independent and are charged with the task of stabilizing price levels; they are not required to support fiscal policy by lowering interest rates in order to allow governments to borrow more cheaply. MMT’s explanation for inflation might only work in economies like Zimbabwe and Venezuela, where the central banks are subservient to governments, and thus central bank independence is eliminated. From a practical perspective, it would also be difficult to imagine why elected politicians who adjust tax and spending measures would be more effective than central banks
in controlling inflation—knowing that tax increases may dampen economic activities.

In my view, at least two conditions are necessary to justify MMT’s conclusions, although they are not necessarily sufficient conditions—in addition to the condition that the proper institutional setting and inflation dynamics must be carefully examined in response to taxes.

- First, public spending should intensively prioritize productivity-enhancing infrastructure, human capital, and innovation, which would raise potential economic growth and productivity and thereby prevent substantial inflation.
- Second, a government should issue its own currency rather than issue bonds through capital markets that are sensitive to investor sentiment and subject to volatility. To do so, dollarization or the prevalence of a foreign currency in domestic economic and financial transactions should be avoided. The general public needs to build up trust in a central bank and its issuing currency. This means that only developed economies with stable, low inflation and credible governments can currently do this.

5.3.3 Implications of Modern Monetary Theory for the Case of Japan

Professor Stephanie Kelton of Stony Brook University, one of the MMT proponents, focuses on Japan as an economy that has proven that the views of MMT are correct. In particular, Kelton claims that Japan’s experience supports the view that a government issuing its own currency can issue debt unlimitedly without becoming insolvent. Japan—even with its public debt being substantially high among developed economies—has so far avoided a debt crisis and there is little sign of such a crisis coming soon. Kelton and some other MMT proponents also believe that Japan has been conducting MMT for some time, for example, as reported in the Nikkei newspaper’s interview with Kelton in April 2019 (Nikkei 2019). This statement invited heated discussions in Japan and was viewed widely in Japan as a misunderstanding of the BOJ’s policy by the MMT proponents. The misunderstanding appears to have stemmed from seemingly familiar circumstances such as the BOJ’s large-scale holdings of government bonds and associated reserve balances, as well as the long-term interest rate stabilization policy at around 0% under yield curve control (Table 5.1, Figure 5.1). It should be noted that the BOJ purchases government bonds from the market at negative yields—losing money by purchasing bonds at
higher prices than face value. Kelton’s view was also rejected by Prime Minister Shinzo Abe and Governor Haruhiko Kuroda by stressing the government’s commitment to getting its fiscal house in order (Kihara and Kaneko 2019; Kihara 2019)—even though the government goal of achieving a primary fiscal surplus has been kept postponed and thus long unfulfilled. Indeed, Kelton denied the claim made in April 2019 that Japan has been engaged in MMT in a press conference following a presentation at Kyoto University in July 2019 (SakuraSo TV 2019). Kelton emphasized that she meant to say Japan is an example of having no debt crisis and no high inflation despite huge public debt.

What will be the implications of MMT for the Japanese economy if MMT is adopted? Japan’s level of household consumption has remained weak over the past 2 decades, reflecting stagnant growth of real wages—mainly arising from low productivity growth and an increased use of non-regular workers, as described in Chapter 1. Households’ nominal disposable income has increased moderately in recent years but has remained sluggish in real terms. Weak consumption is also attributable to concerns related to the rapidly aging society, with average life expectancy reaching 84 years in 2018. The general public has been worried about limited pension benefits and many have questioned the

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Source: Prepared by the author.
Figure 5.1: Bank of Japan’s Balance Sheet

(a) Assets
(¥ trillion)

(b) Liabilities
(¥ trillion)

ETF = exchange traded fund.
Note: Government bonds include treasury bills.
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sustainability of the national pension system. These concerns might be attributable to the relatively high ratio of young people who do not pay compulsory pension premiums (about 30%). The young generation is concerned with the imbalance of costs and benefits among the generations, where current pensioners receive more benefits than they paid while the younger generation is expected to pay more but receive lower benefits than current pensioners since the national pension is a social insurance pay-as-you-go pension scheme (partially funded by government taxes and reserves).

To deal with weak consumption and low inflation in Japan, MMT proponents might recommend to the government that pension and other social security benefits (for example, support for single mothers, aged widows, and other low-income households) should be increased more generously, and the consumption tax hike—in October 2019 from 8% to 10% and the previous tax hike in April 2014 from 5% to 8%—should be removed. Also, an urgent task for the government should be to increase productivity by spending more on information networks, occupational training, and education in the fields of engineering and computer science, as well as by spending more on research and development (R&D) related to health care, new drugs, and labor-saving medical treatment methods. MMT proponents might think this would work despite the huge size of Japan’s public debt. The persistent current account surplus of over 3%, signaling excess production over domestic spending, could be another rationale for the government to spend more to increase domestic absorption and thus improve domestic living standards according to MMT. Meanwhile, the BOJ would be instructed to maintain the short-term (and long-term) interest rates at around 0% while removing the negative interest rate policy.

What are the blind spots in applying MMT in Japan? First, Japan has little economic slack due to the serious labor shortage coming from unfavorable demographics. Increased government spending in this circumstance may only exacerbate the labor constraint and squeeze private sector economic activities since the general public, which prioritizes job security in Japan, tends to view jobs as more secure in the government than in the private sector. The recent liberalization policy to accept more temporary foreign workers is welcome but will not be enough to offset the growing labor shortage as the government is unlikely to accept enough foreign workers to completely offset the labor shortage. Thus, MMT may not be a suitable solution to Japan’s complex labor problems.

Second, the adoption of MMT by the government would require good communication skills to convince households that the social security system will always be sustainable despite mounting
aging-related costs and the generous provision of pension benefits, health care, and long-term care services. However, should inflationary risk emerge, the government might be compelled to cut social security benefits as the sustainability of such a generous social security system diminishes. If households anticipate this event, concerns about aging problems and the sustainability of the social security system will always persist.

Third, low interest rates, long a fixture in Japan, may be sustaining zombie firms and discouraging vital corporate restructuring through preventing a shift of workers from zombie firms to viable firms. This has dampened productivity growth and earning capacity. According to the BOJ estimate, Japan’s potential economic growth has already declined from 1% in 2014 to less than 0.7% today mainly due to a decline in total factor productivity growth (Bank of Japan). The decline in potential economic growth is likely to move toward around 0.5% in the medium term due to tighter labor constraints. This lower growth might reduce consumption.

5.4 Conclusions on Helicopter Money and Modern Monetary Theory

In developed economies, low inflation and moderate economic growth appear to be related to aging and low productivity growth in the services sector. These problems may be associated with concerns about post-retirement life (longevity risk) and the sustainability of the social security system, the labor shortage, and sluggish income growth. To cope with the problems, proponents of helicopter money may call for more expansionary fiscal policy such as tax cuts, cash transfers, and increased public investment supported directly by the BOJ’s purchases of government bonds. However, this view is opposed by Japan’s mainstream academics, who continue to stress the importance of fiscal consolidation through tax hikes and expenditure control in the atmosphere of growing public debt and the prospect of a rising ratio of public debt to nominal GDP in the future. Monetary financing of expansionary fiscal policy used to be present in some developed economies (such as Italy, France, and the United Kingdom) at least until the early 1980s, but it was terminated after substantial inflation took place in the 1970s partly due to oil price hikes. This high-inflation event eventually led to the adoption of inflation targeting and operational independence of central banks.

Since the global financial crisis, however, persistently low inflationary pressures suggest that controlling high inflation is no
longer an essential issue, as discussed in Chapter 1. Moreover, many developed economies are likely to continue to face low real interest rates for a long time. This enables governments to have a higher ratio of public debt to nominal GDP than in the past. The debate over whether helicopter money or monetization of fiscal debt should be adopted may require a careful review of the level of the ratio of public debt to nominal GDP below which debt sustainability prevails. Meanwhile, MMT provides the pro-fiscal policy view with unique views about the role of government spending as well as zero-default risk on government debt denominated in domestic currency. MMT’s challenges center on the implementation of its views. Insufficient discussions about inflation dynamics, questions about the institutional setting, and the lack of political economy perspectives have been pointed out by critics. Nonetheless, the COVID-19 crisis has made it necessary to enhance monetary and fiscal policy coordination. Quantitative easing is now undertaken by a greater number of central banks. The government and the Federal Reserve collectively support firms, individuals, and states and municipalities through various measures, as pointed out in Chapter 2. The Bank of England directly financed the government by temporarily expanding the use of the existing overdraft facility. Further massive fiscal measures may be needed if the economic damages caused by the COVID-19 pandemic remain large and the recovery process takes a long time. In such a case, the world may need to pursue a new type of policy coordination.
PART II

Cash, Crypto Assets,
and Central Bank
Digital Currency
Cashless Payment and Cash Hoarding

Cash is the oldest and most useful instrument for small purchases and payment of goods and services and other transactions. It enables people to settle peer-to-peer payment obligations instantaneously. Cash remains popular among elderly people, marginalized people, and low-income people. Cash becomes especially useful when natural disasters (such as earthquakes, typhoons, and hurricanes) or military conflicts cause serious damage to communities and people’s daily lives by generating power shortages and destruction of buildings and computer systems. On the other hand, cash is difficult to use for large transactions and is costly to store. Cash is easily used for money laundering and illegal activities. In recent years, cashless payment methods have become more prevalent and diversified in the world. These methods range from conventional tools (such as bank account transfers, credit cards, debit cards, and prepaid cards) to more recent payment services using smart phones and mobile phones. Nevertheless, cash in circulation has been rising faster than nominal gross domestic product (GDP) has in a number of developed economies, while an opposite trend has been observed in the Nordic economies, where cash in circulation is declining both in terms of the amount and as a share of nominal GDP. The rising trend observed in many developed economies also differs from the trend seen in many emerging economies. This chapter focuses on movements of cash in circulation in developed and emerging economies.

6.1 Factors Contributing to the Growing Demand for Cash

Cash is money issued by a central bank (“central bank money”). It is the safest and most liquid settlement instrument for payment obligations by the general public. Cash is also called “money” since it fulfills the three basic functions of money: unit of account, means of exchange, and store of value. Cash is legal tender and an official medium of payment determined by the government through the passage of law.
that requires creditors to accept debt service payment or payees such as shops to accept payment in the legal tender. Cash is also used for paying public charges and taxes. For the general public, cash remains an important means of payment, but it is increasingly being taken over by money issued by the private sector (“private money” or “private sector-issued money”). Most important private money is bank deposit accounts (“bank money”), which can be used not only as a store of value and is thus treated as a financial asset, but also as a settlement tool for payment obligations through the use of wire transfers, ATM cards, debit cards, and checks. Bank deposit accounts represent claims on funds that customers may exercise at any time. Bank money can be used to pay loans from credit cards and to get access to various forms of electronic money (e-money) payment tools (such as Apple Pay, PayPal, Alipay, and WeChat Pay). Bank money is denominated in legal tender and is thus relatively stable as long as central banks successfully control inflation. Bank money is also widely regarded as safe due to tight banking regulations and deposit insurance systems. Bank money is part of digital currency as defined in Chapter 7.

Cash demand is influenced mainly by two motives: (i) a transaction motive used for payment and (ii) an asset holding motive. The transaction motive reflects demand for cash used for payments of goods and services as well as other transactions. This motive is likely to strengthen with an expansion in economic activities (normally proxied with nominal GDP). On the other hand, the asset holding motive could be influenced by factors including opportunity cost, the precautionary motive, and other motives such as aging. The asset holding motive tends to grow with a decline in opportunity cost, an intensification of precautionary motives, and other motives. “Cash hoarding” could be defined as cash lying idle and not being utilized for payments, so cash hoarding could be driven by the asset holding motive. The opportunity cost for holding cash is related to the financial return arising from close substitutes of cash, such as retail deposit interest rates paid by commercial banks to the general public or the cost of holding credit cards and bank cards (such as various fees including annual fees charged for the card membership). Generally, the higher the opportunity cost, the lower the demand for cash becomes. As a related indicator, inflation also influences cash demand. Low inflation, which often coincides with low interest rates, means that the opportunity cost of holding cash is low since the value of cash remains stable. Precautionary motives reflect demand for cash among households and firms, which tends to grow during financial and economic crises and/or when there is a sharp decline in risk appetite among investors.
Firms may also try to keep some liquidity assets in the form of cash just to ensure smooth business operations.

Other motives that could be categorized in the asset holding motive include not only aging, but also tax-saving purposes, illegal activities, and cash demanded from abroad. Cash can be prevalent in economies that have a large proportion of elderly people due to their habits and preference for using cash as compared with economies that have a small proportion of elderly people. Some elderly people stop using credit cards after retirement and thus depend on cash as one of their main payment instruments. Tax-saving incentives can be motivated by various government tax-raising measures as explained in Section 6.3 in the case of Japan. In addition, cash demand from abroad is large for the case of the United States (US) given that the US dollar is the most important reserve currency, the invoice currency used for international trade and debt issuance, and the vehicle currency used for various foreign exchange transactions, as well as a safe haven currency. Also, an increase in frequent foreign tourists, businesspersons, and students may raise cash demand for foreign currencies such as the US dollar, especially when exchange rates are perceived to be favorable (Flannigan and Parsons 2018).

A central bank normally determines the amount of cash to be issued passively—that is, it does so on demand by responding to changes in the public’s demand for cash. Therefore, the amount of cash in circulation mainly reflects the demand-driven factors mentioned above, rather than supply-driven or issuer-side factors determined by a central bank. Thus, the amount of cash in circulation is beyond the control of a central bank. A central bank issues and circulates cash through the banking system by providing commercial banks with cash in exchange for the equivalent amount withdrawn from their reserve balances with a central bank. These commercial banks then distribute the acquired cash to the general public on demand through tellers at bank branches and/or ATMs. Through monitoring movements of cash withdrawn from bank branches and/or ATMs, banks know the patterns of cash demand. For example, during long holidays, cash demand tends to be higher than in normal periods. Thus, banks tend to obtain in advance a greater amount of cash from the central bank to prepare for seasonal increases in cash demand. Most members of the general public do not differentiate between cash and retail deposits, viewing them as close substitutes partly because both are denominated in the same unit of account and partly because providers of retail deposits are regulated by tight banking regulations and deposits are guaranteed up to a certain amount per account holder set by the deposit guarantee system in many economies.
6.2 Cash Demand Mainly from Households

Demand for cash from households and firms is determined largely by various motives as pointed out above. Generally, households are the largest holders of cash among economic entities (such as households, firms, financial institutions, and governments) because of their frequent purchases of daily goods and services using low-value banknotes. Households are often sensitive to interest rates since ordinary bank accounts are a close substitute for cash, as both such bank deposits and cash are used to pay in daily small-value transactions and both serve to store value. Following households, nonfinancial firms are generally the second largest holder of cash. They demand cash (and cash equivalents such as checking accounts) mainly due to precautionary motives because they need to maintain flexibility in their daily transactions. Firms may demand more cash when business decisions related to mergers and acquisitions and research and development (R&D) must be made in the context of growing uncertainty surrounding business conditions and capital constraints. Especially when there is information asymmetry between borrowing firms and creditors, firms with a large growth opportunity or a large external funding risk tend to maintain more liquid assets rather than use uncertain external funding (Myers and Majluf 1984).

Nonetheless, cash holdings are dominated by households, not by firms, because households often keep cash in safety boxes at home or at commercial banks due to their smaller amounts of cash holdings while firms often keep money in the form of cash equivalents (i.e., bank deposits) rather than in the form of cash itself for security reasons (unless for illegal or informal activities). For example, in the case of Japan, where the data on cash holdings by types of holders are available from the flow of funds data, households’ cash holdings as of the end of 2018 accounted for 80% of total outstanding cash issued, representing steady growth from 53% in 2000. In contrast, the ratio of nonfinancial firms’ holdings dropped from 37.5% to 8.6% over the period.

6.3 Divergent Movements of Cash in Circulation in the World

6.3.1 Case of Selected Developed Economies

The average amounts of cash in circulation as a percentage of nominal GDP are shown for the period 2000–2018 by classifying 11 developed economies into three types: (i) economies with a rising trend,
(ii) economies with a roughly stable trend, and (iii) economies with a declining trend (Figure 6.1). The economies with a rising trend are the euro area, Japan, the Republic of Korea, Singapore, the United Kingdom, and the United States. The rising trend strengthened especially after economic uncertainty rose as a result of the global financial crisis of 2008–2009. By contrast, the economies with a declining trend are the Nordic economies such as Denmark, Norway, and Sweden, which have had a well-developed cashless and contactless payment system for some time. The economies with a generally stable trend are Australia and Canada.

Among the economies with a rising trend, Japan is unique because its cash-nominal GDP ratio has always exceeded other economies by a wide margin and has shown a rising trend, reaching around 20% recently, further widening the gap. Japan’s high cash demand may reflect such factors as a decline in the relatively younger population (which tends to use cashless payment methods), a preference for using cash among the elderly, a limited number of crimes associated with cash handling and counterfeiting, and long-standing low inflation. The unwillingness
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of some small retail stores and taxi drivers to accept credit cards, debit cards, or other cashless payment instruments—because of the high installation cost and/or card processing fees—has also discouraged the general public from shifting to a fully cashless economy. On this front, when the consumption tax was raised in October 2019, the government temporarily provided subsidies to encourage small retail shops to adopt cashless payment tools by lowering the installation cost. The government also incentivized consumers to use cashless payment tools by temporarily providing “points” (which can be used to purchase goods at franchise shops). Japan has a bank-dominated financial system and ATM cards and credit cards are widely used. However, various types of cashless payments using mobile phones have emerged and are intensely competing. One type is based on QR codes (such as PayPay, Rakuten Pay, and LINE Pay) and the other type uses near-field communication technology (such as Suica, Apple Pay, and Waon). Many payment instruments using QR codes are relatively new; those providers offer several incentives to attract users. While the younger generation increasingly uses such instruments, achieving such rapid penetration across ages appears to be challenging. Some competition has emerged recently among cash, bank money, and e-money. Japanese banks attempt to cope with intensified competition by offering similar services. Elderly people appear to continue to prefer traditional payment methods, including cash.

Moreover, a series of monetary easing measures conducted by the Bank of Japan (BOJ) since the collapse of the stock and real estate bubbles in the early 1990s reduced interest rates over time and thus lowered the opportunity cost of holding cash. As pointed out in Chapter 2, there was a rapid increase in notes in circulation after the announcement of the negative interest rate policy in January 2016. This increase lasted until around September 2016 due to conversion from individual deposits into cash holdings in safety boxes at home or banks. The growth rate on notes in circulation exceeded 5% until September 2016 while the growth rate on individual deposits dropped to around 1.2% in 2016 from 2.5% in 2014–2015. The ratio of notes in circulation to nominal GDP rose to about 20% in 2018. Given that households’ deposits and cash are about three times as large as their loans, households experienced an adverse effect in terms of the net impact of the negative interest rate. To mitigate households’ concerns, the BOJ’s Governor Haruhiko Kuroda repeated several times at the national Diet committee that retail deposits would not turn negative with the negative interest rate. The rush from retail deposits to cash faded as the public came to understand Governor Kuroda’s explanation—although the ratio of cash in circulation to nominal GDP continued to grow.
In addition, the intensified demand in Japan for cash that began around 2016 might be driven by tax-saving incentives motivated as a result of various government tax-raising measures. For example, the government introduced the My Number system in 2015, providing all residents with an individual identification number that can be used for social security, tax payments, remuneration, financial investment, and other government records. The government also adopted several tax-revenue raising measures—including (i) an inheritance tax hike in January 2015 (by reducing the amount of the exemption threshold), (ii) a compulsory reporting system in 2014 requiring residents to submit information on detailed foreign assets if exceeding ¥50 million, and (iii) a compulsory reporting system in 2016 requiring individuals to submit detailed information about domestic financial and nonfinancial assets and debts. The growth rate of cash in circulation has declined recently partly due to the reduced impact of the negative interest rate. The public has grown accustomed to low interest rates, and the substitution from deposits to cash becomes limited once interest rates stay at the same low levels for a long time. An increase in cashless payment instruments may be another contributing factor. Nevertheless, the cash growth rates have remained above the rates of nominal GDP growth.

In the case of the euro area, the circulation of euro banknotes (and coins) began at the end of 2001 and those euro banknotes (and coins) became legal tender in 2002. Demand for euro banknotes appears to have increased gradually as the public gained confidence in the euro as well as the monetary policy conducted by the European Central Bank (ECB), as evidenced by the steady increase in the amount of euros in circulation. The ECB conducted a series of innovative unconventional monetary easing measures, and the resultant declining interest rates made cash holding more attractive than before. After having terminated the asset purchase program at the end of 2018 and having presented a plan to conduct the first hike on policy rates within 2019, the ECB shifted its monetary policy stance to a move toward accommodation in 2019 by cutting the deposit facility rate further and resuming an asset purchase program, as described in Chapter 2. This series of enhanced monetary easing measures may promote further demand for cash while the coronavirus disease (COVID-19) pandemic may promote cashless payment tools to prevent infection from the virus.

The United Kingdom has also faced a moderate increase in the ratio of cash to nominal GDP even though the economy is more advanced than other developed economies in terms of new cashless and contactless retail payment systems. The economy had already adopted a retail fast payments scheme in 2008 as a banking sector initiative to
accelerate payment times between different banks’ customer accounts from 3 working days to a few seconds. The scheme now offers a real-time payment service for the general public 24 hours a day. Contactless cards and instantaneous payments became available from around this time. Nevertheless, cash in circulation continues to grow in the United Kingdom. The low interest rate environment generated by the Bank of England and indirectly affected by the monetary easing of other major central banks appears to have contributed to greater cash demand. The Bank of England, after having lowered the interest rate from 0.5% to 0.25% in 2016 to cope with the expected economic slowdown following the referendum on Brexit (exit from the European Union), increased the rate back to 0.5% in 2017 and further to 0.75% in 2018. Since early 2019, the growing concerns related to Brexit and uncertainty related to internal politics have undermined the British economy and the sentiments of households and firms. The COVID-19 pandemic and associated economic slowdown, moreover, led the Bank of England to cut the policy rate from 0.75% to 0.25% on 11 March 2020 and further to the record low of 0.1% on 19 March 2020 with a resumption of asset purchases of £200 billion including government and corporate bonds. While the low interest rate reduces the opportunity cost of holding cash, the novel coronavirus may promote a shift away from cash.

In the case of the United States, meanwhile, it is interesting to find that the cash to nominal GDP ratio continued to rise even after the Federal Reserve increased the federal funds rate nine times between December 2015 and December 2018 in the process of monetary policy normalization. This happened even though households are using cash less frequently than the past. According to the 2018 Diary of Consumer Payment Choice by the Federal Reserve, Kumar and O’Brien (2019) find that individuals used cash in 26% of transactions (down from around 30% in 2017 and 2016), while credit cards accounted for 23% (up from 21% in 2017 and 18% in 2016) and debit cards made up 28% (up from 26% in 2017 and 27% in 2016). Prepaid and electronic instruments remained unpopular, accounting for only 2–3% and 10–11%, respectively, over the same period. Surprisingly, the share of cash use among individuals under 25 years old was the highest (34%) of any age group, slightly higher than those aged 55 years old and above. Since 2019, the Federal Reserve has shifted the monetary policy stance to an accommodative one. The federal funds rate has been brought down to 0–0.25% again. Despite a sharp decline in interest rates, the sharp increase in the number of people infected by the novel coronavirus may reduce demand for cash.

Sweden exhibits a completely different pattern in sharp contrast to Japan, the euro area, the United Kingdom, and the United States. Sweden progressed to become the most advanced cashless society in the world
because of the declining trend concerning the ratio of cash to nominal GDP and the amount of cash in circulation. Credit cards and a mobile-phone-based fast retail payment system called Swish have been widely available for some time. Sweden’s ratio of cash to nominal GDP has been declining more quickly since 2008, which is contrary to the movements observed among the other developed economies. It should be noted that this ratio in Sweden continued to drop even after a negative interest rate policy was adopted on the repo rate in February 2015, was deepened gradually toward −0.5% by February 2016, and was maintained at that rate until it was raised to 0% in 2019 as part of monetary policy normalization. The negative rate policy did not promote substitution from bank deposits to cash.

6.3.2 Case of Selected Emerging Economies

Eleven emerging economies were classified into the three types defined in the previous section (Figure 6.2). The economies with a rising ratio are Mexico, the Philippines, Poland, Thailand, and Turkey, with their rising trend prevailing from the early 2000s. This may reflect an

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**Figure 6.2: Cash in Circulation in Selected Emerging Economies**

(% of nominal gross domestic product)

- Rising trend
- Stable trend
- Declining trend

Note: The economies with a rising ratio are Mexico, the Philippines, Poland, Thailand, and Turkey; the economies with a roughly stable ratio are Brazil, India, Indonesia, Malaysia, and the Russian Federation; and the economy with a declining ratio is the People’s Republic of China.

Source: CEIC. CEICdata.com.
increase in cash demand due to lower interest rates driven by monetary policy. Meanwhile, the economies with a roughly stable ratio are Brazil, Indonesia, Malaysia, and the Russian Federation, as well as India with the exception of a recent sharp drop due to the impact of the 2016 demonetization currency reform, as pointed out below. The People’s Republic of China (PRC) is the sole economy that faced a steady declining trend from the early 2000s. The PRC’s secular declining trend in the ratio of cash to nominal GDP is likely to reflect a shift in the form of money held by the general public from cash to bank deposits or other cashless payment tools. This is in line with the deepening of the banking system and an increase in the number of depositors with commercial banks partly because Alipay and WeChat Pay, for example, require bank cards and bank account information for users to obtain payment services.

While India’s cash growth is generally in line with transaction demand growth, a sharp drop in the ratio happened temporarily in 2016 after the government abruptly implemented a currency reform that triggered a temporary shortage of banknotes in circulation. India’s government banned the ₹100 and ₹500 banknotes and instead introduced new ₹500 banknotes and issued new ₹2,000 banknotes. This currency reform was meant to fight corruption, and money laundering, and illegal activities, but it severely disrupted economic activities as a result of creating serious cash shortages. While the cash ratio recovered somewhat in the following year, it appears that the ratio has been lower than the past trend would predict, suggesting a moderate shift from cash to bank deposits or cashless payment tools.

Many emerging economies have increasingly shifted from cash to cashless payment tools to purchase goods and services and to conduct other transactions in recent years. This is because payment systems are innovating and transforming rapidly with the increasing number of technology companies and financial institutions being involved as payment providers. Many governments also encourage the use of electronic payment instruments to improve efficiency in the payment systems. While cash demand has remained strong in many emerging economies, it is possible that these economies’ ratio of cash in circulation to nominal GDP may decline in the future like in the PRC.

### 6.4 Outstanding Banknotes Issued
#### Differentiated by Denomination

The movements of cash demand can be examined further by focusing on the number of outstanding banknotes issued by size of denomination. The demand for large-denomination banknotes is likely to be associated
Cashless Payment and Cash Hoarding

more with cash hoarding, as described in Section 6.1. Such demand may have become more important during the global financial crisis, since concerns about the solvency of financial institutions might have prompted depositors to withdraw their funds from commercial banks or other equivalent money market funds to increase their precautionary holdings of banknotes (Cusbert and Rohling 2013). The demand for large-denomination banknotes of international reserve currency (such as the US dollar) might be increased by the increased number of foreign tourists, businesspersons, and students who frequently visit the economy (such as the United States). Large-denomination banknotes of the US dollar are also preferred by people outside the United States during crises—reflecting the demand for a safe-haven currency. The demand for larger-denomination banknotes could be associated more negatively with changes in interest rates (Arango-Arango and Suárez-Ariza 2019). Regarding payment tools, non-cash payment tools such as credit cards are more frequently used for high-value purchases such as home electronics, furniture, and expensive clothes. On the other hand, small-denomination banknotes are more often used for lower-value purchases such as food and beverages. The expansion of ATM networks may increase the demand for smaller-denomination banknotes because of the increased frequency of trips to withdraw small amounts of money.

Consistent time-series data on the number of outstanding banknotes issued classified by denomination are available for seven economies—Canada, the euro area, Japan, Poland, the Republic of Korea, the United Kingdom, and the United States. These economies can be classified into two groups: the first group has dominant large-denomination banknotes (Japan, the Republic of Korea, and the United States) and the other group has dominant middle-denomination banknotes (Canada, the euro area, Poland, and the United Kingdom).

Regarding the first group, the outstanding issuance amount of the largest note (¥10,000) in Japan has always been largest over the observation period. The pace of issuance increased further since 2013 when the BOJ adopted quantitative and qualitative easing (QQE), as explained in Chapter 2 (Figure 6.3). Meanwhile, the United States experienced a rapid rise in the outstanding issuance amount of the $100 note since the global financial crisis. The amount recently exceeded those of smaller-denomination banknotes (Figure 6.4). The rising trend of $100 issuance is attributable to not only domestic demand but also foreign demand for a safe haven currency, especially from emerging economies (Haasl, Schulhofer-Wohl, and Paulson 2018; Judson 2017). For these economies, high and rising demand for cash holdings is present since large-denomination banknotes are best suited for this purpose (Otani and Suzuki 2008; Fujiki and Nakashima 2019). The high
Figure 6.3: Banknotes Issued by Denomination in Japan
(¥ billion)

Source: CEIC. CEICdata.com

Figure 6.4: Banknotes Issued by Denomination in the United States
($ billion)

Source: CEIC. CEICdata.com
Demand for banknotes from abroad is unique to the case of the US dollar, given the dominant status of the US dollar in various cross-border trade, financial, and other transactions. Foreign holdings of US dollar banknotes take place through the cash flows of immigrants, tourists, or other parties especially from the United States to Mexico, as well as through other commercial banking and nonbanking cross-border cash transfer channels. Judson (2017) estimates that foreign demand has accounted for more than 60% of all US dollar banknotes and nearly 80% of $100 banknotes.

As for the second group, the outstanding amount issued of medium-denomination banknotes dominated those of other larger- and small-denomination banknotes. This is because the public use cash only for lower-value transactions and use credit cards or other cashless payment tools for higher-value transactions. Canada has used the Can$20 banknotes dominantly over the period. The gap between that banknote and the largest-denomination (Can$100) banknotes has remained large. The euro area is dominated by the €50 banknote, followed by the €20 banknote, so that the outstanding amounts issued of the €500, €200, and €100 banknotes remained small (Figure 6.5). This could be related to the fact that residents in the euro area maintained smaller-
denomination banknotes for daily transactions and did not increase precautionary demand for cash. The ECB conducted a survey in 2016 to analyze the use of cash, cards, and other payment instruments used at points of sale by euro area households (Esselink and Hernández 2017). The results indicated that nearly two-thirds of the transactions were below €15. Moreover, two-thirds of all transactions took place in shops for purchases of day-to-day items, as well as in restaurants, bars, and cafés. On the other hand, only 8% of all transactions were above €50, and only 14% were made in shops for durable goods or in petrol stations. The limited use of the €500 note indicates that a limited impact on the economy came from the ECB’s decision in 2016 to stop printing the €500 note at the end of April 2019 (although that note continues to circulate in the economy as legal tender).

### 6.5 Preliminary Analysis of Factors Contributing to Demand for Cash

Several empirical analyses were separately conducted on the euro area, Japan, and the United States using the ratio of cash in circulation to nominal GDP as a dependent variable (Shirai and Sugandi 2019a, 2019b). Independent variables included the opportunity cost (proxied by the central bank policy rate), the precautionary motive (proxied by a dummy variable set as equal to one during the bursting of the dot-com bubble in the early 2000s and the post-global financial crisis era and set to zero otherwise, or by the stock market volatility index), aging-related variables (proxied by life expectancy or the ratio of population aged 65 years old or older), and demand from abroad (proxied by the nominal effective exchange rate). It was found that the central bank policy rate was the most robust variable in the three economies. The other statistically significant variable was the aging-related factors. Similar analyses were conducted for pooled-data regressions covering the twenty-two economies. The central policy rate and age-related factor remained the most important determinants for demand for cash in these economies.

### 6.6 Conclusion on Cash Hoarding, Monetary Policy, and Financial Inclusion

The rising trends of cash in circulation might have several impacts on monetary policy as well as the economy. On the one hand, greater cash hoarding might erode the effectiveness of monetary policy through
weakening the money creation process as well as the effectiveness of a negative interest rate policy. Moreover, greater cash utilization deteriorates the economy’s efficiency owing to high cash handling costs arising from the direct costs (i.e., cost of paper and design fees to prevent counterfeiting) and indirect costs (i.e., the security and personnel cost associated with the maintenance of cash provision and payment services by commercial banks, shops, firms, and individuals), as often seen in emerging economies. Cash prevalence may also discourage new technology firms from pursuing innovative payment and financial activities. On the other hand, greater cash issuance increases a central bank’s income through greater seigniorage. These issues remain relevant to some developed economies such as the euro area, Japan, the Republic of Korea, the United Kingdom, and the United States since their interest rates have become lower. By contrast, cash is disappearing in Norway and Sweden despite a decline in interest rates. While many emerging economies face an increase in cash circulation, the increase is roughly in line with transaction demand. In the future, emerging economies may see a gradual decline in the unbanked population, which may promote financial inclusion. The penetration of mobile phones has been encouraging the general public to shift transaction or settlement instruments from cash-based to cashless ones such as debit cards, credit cards, e-money, and other tools. This might help lower the ratio of cash to nominal GDP. For emerging economies, thus, a decline in the cash ratio may suggest higher levels of financial inclusion, a strengthened function of the banking system for financial intermediation, and improved monetary policy transmission mechanisms. A decline could be also associated with greater transparency, efficiency, and a growing tax base as a result of reduced activities in the informal economy and in illegal activities. The demand for cash will be stimulated further with an increase in the ATM networks and reduced charges for ATM use and cash and/or debit cards.

One interesting question is whether electronic money (e-money) payment tools merely provide a service on existing money (e.g., bank deposits) or, alternatively, hold true monetary value that can serve as money proper, ultimately replacing cash and deposits (Bossone 2017). E-money is a convenient technology for customers to access these funds. In the case that e-money plays a role in providing a service on bank deposits, the funds received by e-money service providers are deposited with banks, and customers become the owners of the related deposit claims and their interest income. In this case, banks are entirely responsible for providing both the liquidity necessary to support e-money redeemability and the insurance coverage needed to protect customer deposit claims (and securities) from insolvency.
As e-money service providers only offer transaction services and do not own the funds received, they may not be held responsible for the inability of banks to support e-money redeemability through liquidity and insurance provision. Provided that customer deposit claims are not commingled with their assets, their insolvency does not put those claims at risk. Therefore, no extra regulatory requirements need to be imposed on e-money providers beyond those relating to service quality and market conduct. As the e-money sector develops further, e-money may play a role in providing true monetary value. The funds received against e-money issuances should be recorded on the e-money providers’ balance sheet as assets against e-money liabilities, and any interest income earned on them should belong to the providers, who would retain the right to decide on its use. Tighter regulations should be applied to e-money providers to require them to guarantee redeemability and to ensure legal protection of their e-money liabilities against their own insolvency. The regulations adopted in the People’s Republic of China as explained in Section 7.4 could be viewed as action adopted in this environment.
The contemporary monetary system is equipped with central bank money like cash as well as private money (or private sector-issued money) like bank deposits, as described in Chapter 6. Cash and bank deposits are denominated in the same unit of account. Central bank money, especially banknotes issued by a central bank, is often called “fiat currency” since the value of banknotes is backed solely by the credibility of a government. As the value is not backed by any corresponding precious metals used to maintain full convertibility, this contemporary monetary system differs from the gold standard where the value of banknotes was linked to a fixed amount of gold. Under the contemporary monetary system, the responsibility related to money issuance is delegated to a central bank. Since the primary goal of a central bank is to maintain price stability (usually interpreted as low and stable inflation of around 2% a year), the value of fiat currency remains stable as long as a central bank conducts monetary policy credibly along the price stability mandate stipulated in the central bank act. This chapter takes an overview of the concepts and features of private money in comparison with central bank money. The actual performance of central bank and private money is also examined by focusing on selected developed and emerging economies. Meanwhile, “crypto assets” (or cryptocurrencies) have emerged and been issued by private financial technology (fintech) firms over the past 10 years with the use of cryptography and distributed ledger technology (DLT), innovation in payment fields, and development of online trading platforms. Crypto assets can be considered as part of “private money” (“private sector-issued money”) as they can be used for payment of some goods and services. More recently, “stablecoins” have caught attention since Facebook announced a plan to issue a global stablecoin called Libra in June 2019. This chapter will focus on the features of central bank money and private money including Bitcoin and various stablecoins, the Libra plan, and recent regulatory developments in Switzerland and the People’s Republic of China (PRC) as well as views expressed by global regulatory authorities on crypto assets and the Libra plan.
7.1 Bank Deposits Constituting a Major Form of Money

Private money mainly takes the form of bank deposits or deposits held by the general public at commercial banks (“bank money”), as shown in Table 7.1. Bank deposits are liabilities for commercial banks and are assets for the general public. While bank deposits are not legal tender, their values are denominated in legal tender and they can be exchanged at a one-to-one value with cash and are, thus, stable. Bank deposits are redeemable upon demand by depositors at face value. Deposits are managed and monitored by commercial banks and are thus “non-anonymous.” Transactions and transfers of funds using deposit accounts are verified by commercial banks in a centralized manner. The banking sector is regulated heavily, and deposits are protected under the deposit insurance system up to a certain amount. Nonetheless, deposits are riskier than cash because the issuers are private sector commercial banks and financial institutions that could go bankrupt and depositors might not be fully reimbursed. Even though the tighter banking sector regulations (such as capital and liquidity requirements) under the Basel III reforms have significantly reduced the likelihood of systemic banking crises, there is no guarantee that a bank will never go bankrupt and stop providing the payment and settlement services. Transactions using bank deposits are “traceable” because the commercial banks that issue bank deposits can monitor all the transactions of depositors and trace their transactions by the time sequence in which they were made. Bank deposits belong to “digital currency,” which refers to currency that exists only in digital or electronic form. A positive or negative interest rate can be applied to digital currency. A negative interest rate

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<th>General Public</th>
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O = applicable, x = not applicable, ∆ = partially applicable.
is technically applicable, but commercial banks generally refrain from charging a negative retail deposit rate in practice for fear of losing clients, as pointed out in Chapter 2. Some commercial banks have attempted to apply small charges on their services (such as fees for using ATMs, making transfers, and holding accounts) instead of directly charging a negative interest rate since such charges are less noticeable.

Real-time fast settlement systems are increasingly becoming available 24/7 for retail bank depositors in many countries, including India, Japan, the PRC, the Republic of Korea, Singapore, Sweden, Switzerland, Turkey, and the United Kingdom. Chapter 6 has shown that cash in circulation has been growing in many advanced economies despite an increasing use of cashless payment tools—the exception being the Nordic economies with their developed cashless systems. However, the size of bank deposits has been much larger than the size of cash in circulation and has grown at a much faster pace than that of cash in circulation. This difference is mainly due to the presence of numerous financial institutions providing various financial services to firms, individuals, and government. The sheer size reflects that bank deposits can also be expanded through the money creation (deposit creation) activities of commercial banks, which generate money through creating deposits and loans powered by the multiplier effect. In other words, new bank deposits are created when commercial banks extend new loans to firms and individuals, which in turn deposit those proceeds and, thus, increase the size of bank deposits. Commercial banks are the major entities engaging in money creation as depository institutions.

Central bank money is composed not only of cash but also reserve balances or reserve deposits with a central bank. Reserve deposits are comprised of required reserves (the amount the banks are required to maintain under the reserve requirement system) and excess reserves. Normally, a central bank charges a positive rate on excess reserves. Reserve balances belong to digital currency. A negative interest rate policy, mentioned in Chapter 2, is applied to all or part of excess reserves. The deposit accounts can be used to make settlements among financial institutions where a central bank acts as a settlement agent. Bank money (bank deposits) is associated closely with reserve deposits through the conduct of monetary policy. In a recessionary (or expansionary) phase, a central bank attempts to cut (or increase) the short-term market interest rate. The central bank lowers (or raises) the market interest rate by increasing short-term liquidity-providing operations at a lower (higher) interest rate against collateral and thus increases (decreases) the reserve deposit balance. In addition, a central bank may provide longer-term loans to financial institutions at a lower (higher) interest rate against collateral—such as targeted longer-term refinancing operations.
Growing Central Bank Challenges in the World and Japan

(TLTROs) provided by the European Central Bank (ECB) or the loan support program provided by the Bank of Japan (BOJ), as explained in Chapter 2. These operations also expand the reserve deposit balance with a central bank. Quantitative easing—namely, large-scale asset purchases—substantially increases the size of reserve deposits and the monetary base. Money creation takes place only when commercial banks use the increased funds (arising from increased reserve deposits) by extending loans and investment to the private sector, thus expanding aggregate demand and inflation. Alternatively, quantitative easing could increase aggregate demand by raising various asset prices (such as stocks and real estate) and promoting portfolio rebalancing effects—even if a substantial increase in reserve deposits or the monetary base may not take place (McLeay, M., A. Radia, and R. Thomas 2014).

7.2 Crypto Assets that Emerge as a New Form of Private Money

In addition to bank deposits, which constitute a major form of private money, there is newly emerging private money in the form of crypto assets. A crypto asset is digital currency that users can store and exchange electronically in a peer-to-peer manner without any involvement of intermediaries. Encryption techniques are used to regulate the issuance of crypto assets and verify the transfer of funds in a decentralized manner. According to the classification by the Bank for International Settlements, digital currencies are either digital token-based or account-based depending on their verification approaches (Bech and Garratt 2017). With digital tokens, it is essential to verify whether tokens are genuine and whether owners really own tokens, as well as to prevent double spending problems. By contrast, the account-based system verifies the identity of the payers’ and payees’ accounts and ascertains their account histories.

7.2.1 Features of Crypto Assets in Comparison with Bank Money

A crypto asset refers to a cryptographically secured asset with a new payment system that exists only in digital form. It provides its own unit of account—such as BTC in the case of Bitcoin—that can be applied equally across the globe. It is based on DLT, which records transactions between two parties, shares the information among any participants in the network, and synchronizes the transaction data in an electronically distributed ledger in a traceable and unfalsifiable way. Crypto assets
are issued by independent “miners” (or nodes). The innovative nature of DLT lies in the mechanisms in the decentralized process to verify transactions, where verification is conducted by unknown, independent third parties (namely, nodes) without relying on a central manager or register (such as a central bank or a commercial bank that manages the payment system). Using cryptography secures payment networks and transactions in a decentralized manner by ensuring that a sender is the author of the message of payment information with the ownership of a crypto asset and thus transfer of ownership is made to a recipient securely. Thus, a crypto asset is a digital currency based on DLT using cryptography. All the transactions and information are open to all the participants, whose true identities do not need to be known.

Blockchain technology is a specific record-keeping type of DLT where each payment transaction between two parties is proven to be true using encryption keys and digital wallets. Information about new transactions is recorded on a new electronic distributed ledger, which is then connected through a chain (using hash functions) to previous, proven distributed ledgers using a consensus protocol based on a proof-of-work system, where miners compete to update a block chain and connect to the previous blocks in such a way that makes the falsification of payment transaction data or double spending problems difficult. The most famous crypto asset is Bitcoin, the first crypto asset issued based on blockchain technology in 2008 by Satoshi Nakamoto. A blockchain is accessible to all anonymous participants and a new crypto asset is issued by miners as rewards. The miner winning new crypto assets can earn profits by selling them through crypto asset exchanges. A sufficient mining process is needed to ensure the security of the blockchain, which requires substantial electricity. Blockchain technology is used for transactions with Bitcoin, Ethereum, and other crypto assets that operate on their own independent ledgers. For example, Bitcoin is a cryptocurrency operating on the Bitcoin blockchain platform while Ether is a cryptocurrency operating on the Ethereum blockchain platform. If the crypto asset is traded at a high value, it incentivizes miners to participate in mining activities. Supply of a crypto asset like Bitcoin is regulated by an upper limit set in advance. While this helps to support the value of a crypto asset, the limited supply implies that such a crypto asset might not be a major payment tool that takes over the existing payment system.

While a pillar of crypto assets is decentralization, crypto assets could be issued in a more centralized manner. Most crypto assets are based on blockchain technology. Altcoins such as Litecoin refer to alternative crypto assets to Bitcoin that are “forked” from the Bitcoin open-source protocol. Meanwhile, “cryptographic tokens” are crypto
assets issued using the existing blockchain platform—mostly based on the Ethereum blockchain platform used to generate smart contracts related to creating Ethereum tokens. Ethereum tokens are thus different from Ether generated on the Ethereum blockchain platform. Issuers of these tokens do not need to build an entirely new blockchain platform. Those tokens are often issued through an initial coin offering (ICO).

### 7.2.2 Permissionless or Permissioned Network

A blockchain operating without access controls, like Bitcoin, is called an “open,” “public,” “permissionless” network, where anybody with appropriate computer equipment and knowledge can engage in transactions and operate computers (nodes) as a miner since ledgers are replicated across computers connected to a common network over the internet. In the general public network, participants or users often transact with each other anonymously without disclosing their true identity. In contrast, a blockchain operating with access controls is called a restricted, permissioned network. The permissioned network is restricted to a limited number of individuals or entities who have been given permission and the necessary credentials to access the ledger. The financial industry prefers a permissioned network since clients’ information needs to be kept private while anti-money laundering (AML) and combating the financing of terrorism (CFT) regulations must be satisfied. Among permissioned networks, a “private” type refers to the case of a single centralized entity that controls the content included in the ledger, while the “consortium” type refers to the case of a consortium of entities that control the rules and verify transactions.

There are currently more than 5,000 crypto assets and they have diverse features. These crypto assets have their own units of account that are universal across countries, with systems that enable instantaneous cross-border transfers of ownership. The assets can be exchanged for certain goods and services in some economies or with other crypto assets. One of the attractive features of crypto assets is their similarity to cash, since peer-to-peer transactions can be made instantaneously and are available 24/7 (see Table 7.1). All the transactions are “anonymous,” like cash, but are technically “traceable,” in contrast with cash. Unlike cash, meanwhile, a crypto asset is a digital currency, so a positive or negative interest rate can be applied. Although this interest rate-bearing feature makes a crypto asset superior to cash, one distinct feature of cash over a crypto asset is the relative ease of verifying peer-to-peer transactions. This is partly because cash is designed by a central bank (or a government in the case of coins) in a way that is not easily falsified (although this condition depends on the quality and design developed
by a central bank as well as related crime and arrest rates), and partly because cash recipients (such as commercial banks, shops, and individuals) might check carefully whether cash received is authentic, while a crypto asset requires more complicated verification approaches.

### 7.2.3 Regulatory Authorities’ Views of Crypto Assets as Money

Central banks and regulatory authorities around the world so far do not regard a crypto asset as money and insist on calling it a “crypto asset” rather than “cryptocurrency.” By using this word choice, they are calling for the general public to take caution in using it or investing in it. Crypto assets are not yet used widely as money mainly because of the extreme volatility in the value that hampers the widespread use as a medium of exchange and store of value. For example, the value of a Bitcoin varied from as low as around $3,700 in early January 2019 to as high as $13,400 on 20 June 2019, but the value then dropped to $7,117 by the end of December 2019. The value of a Bitcoin went up to more than $10,000 in early February 2020, but thereafter dropped to around $6,474 at the end of March (Figure 7.1). Many crypto assets set a cap on the amount of issuance (for example, 21 million units in the case of Bitcoin) in advance to prevent their value from dropping sharply. Nevertheless, the value of crypto assets remains highly volatile largely due to the lack of intrinsic value and lack of a mechanism to stabilize their value such as a circuit

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**Figure 7.1: Bitcoin Price and Market Capitalization**

BTC = Bitcoin.  
Source: CoinMarketCap.
breaker in the case of stock transactions. In addition, consumers and investors are not well protected since a regulatory framework for crypto assets is still in the preliminary stage. Crypto assets are also subject to technical and legal problems such as scalability, 51% attacks and double spending challenges, vulnerability to cyberattacks, and susceptibility to money laundering and illegal activities. Given that the values of several well-known crypto assets, such as Bitcoin, Ether, and altcoins, tend to move together, investors find it difficult to reduce volatility by diversifying holdings of crypto assets.

Nonetheless, DLT has the potential to apply to many different fields, not only for payment and settlement systems but also for promoting trade finance, insurance, and other fintech services; tracking producers of industrial and agricultural products and commodities; and tracing the ownership of real estate and precious metals. As the technology evolves day to day, and as various new crypto assets have been issued with diverse features, DLT might conquer some of technical and legal problems in the future—including 51% attack and double spending problems, scalability, substantial energy consumption, substantial volatility in the values, vulnerability to cyberattacks, and potential money laundering and illegal activities. According to CoinMarketCap, the size of the market capitalization of existing digital coins is estimated to have reached about $189 billion at the end of December 2019, of which Bitcoin accounted for about 68% of the total market capitalization. The size contracted to $130 billion in April 2020, of which Bitcoin accounted for 64%. The size of crypto assets remains much smaller than central bank money (such as cash) and bank money since the use of crypto assets as a payment tool remains limited. Moreover, money creation is not permitted by crypto asset exchanges and developers in many economies. Thus, these assets have generated little threat to central banks and commercial banks issuing traditional money.

7.3 Emergence of Stablecoins to Overcome Extreme Volatility

7.3.1 Various Types of Stablecoins

In recent years, new types of crypto assets called “stablecoins” have emerged and been issued to the general public as a way to overcome volatility problems. They provide their own units of account but the values are more stable than other crypto assets such as Bitcoin. This is because they are pegged to international currencies like the United
States (US) dollar, the euro, other legal tender, or gold. A stable value can be achieved since an issuer supplies users with stablecoins in exchange for legal tender or gold that can then be accumulated and managed to support the value and meet users’ requests for redemptions of legal tender or gold. Thus, stablecoins could be legal tender-backed or commodity-backed crypto assets. This might enhance the use of crypto assets to make payments and settlements for goods and services and to transfer funds across borders, as well as to store value or hedge against legal tenders that are unstable or not reputable and are subject to high inflation and depreciation risks.

There are various approaches to maintain reserve assets: (i) holding assets only in the form of reference legal tender or commodity to which the stablecoin is pegged; (ii) holding assets including other legal tenders, commodities, and/or crypto assets as a basket of reference assets; and (iii) maintaining par value through algorithmic trading. Under the first approach, a stablecoin forms a direct claim on a single fiat currency or commodity and the value of a stablecoin is guaranteed by the issuer, who is committed to redeem at par value on demand in the same legal tender or commodity in which a stablecoin was purchased with some fees charged. As for the second approach, the value is linked to a basket of reference assets; thus, the value can be less stable than that of the first approach if other reference currencies such as the euro, the yen, or the pound sterling, or commodities fluctuate widely against the US dollar. Like the discussions on the choice between a US dollar peg or a currency peg, a stablecoin using a basket-peg system is relatively harder to administer. Compared to crypto assets such as Bitcoin, moreover, a stablecoin uses a more centralized system since there is a single issuer that holds a bank account containing the collateralized assets denominated in reference currency or commodity. The third approach uses an algorithm based on a smart contract that adjusts the supply of a stablecoin in circulation automatically online in response to change in demand, in order to stabilize the value. No collateral is required to issue an algorithmic stablecoin due to the automatic, decentralized system.

The first stablecoin is Tether, issued by Tether Limited, which is registered in Hong Kong, China. Tether Limited began to issue Tether in 2014 with its own unit of account called USDT, which guarantees a one-to-one Tether–US dollar conversion ratio. Tether is pegged to the US dollar with the commitment to maintain all underlying reserves denominated in US dollars. Tether Limited is a central entity that functions solely as an issuer of Tether, a custodian of reserve assets, and a manager to initiate and integrate with existing blockchain wallets and
exchanges, as well as an operator of a wallet that enables users to send, receive, store, and convert Tether conveniently. Tether is also issued against the Euro with its own unit of EURT, which works in a similar manner but is limited in scale. The Tether platform is built on existing open blockchain technologies based on the Bitcoin and Ethereum blockchain platform using a proof-of-reserves process. A proof-of-reserve process generally refers to the case whereby an issuer of any asset-backed crypto asset proves cryptographically and mathematically that all cryptocurrencies issued are fully reserved and backed by the underlying asset. Some fees are charged upon deposit and withdrawal of legal tender while no fees are charged upon deposit and withdrawal of Tether.

Tether is transacted on various exchanges including Bitfinex, ShapeShift, and GoCoin so that the arbitrage is expected to lead the value of Tether closer to legal tender. For example, if the market value of Tether is less than $1, users can ask Tether Limited to exchange Tether for US dollars. The resulting decline in the supply of Tether in circulation would raise the value of Tether toward $1. If the market value of Tether is greater than $1, on the other hand, users can ask Tether Limited to issue more Tether in exchange for US dollars and sell that Tether at exchanges for profit. The resulting increase in the supply of Tether in circulation would lower the price of Tether toward $1. Figure 7.2 shows that the value of Tether in terms of the US dollar has been generally stable at around $1 albeit with occasional fluctuations. About 60% of transactions of Tether are reportedly conducted exchanges in the People’s Republic of China (see for example, Boddy [2019]). While Tether is popular and has the largest market capitalization among stablecoins, its market capitalization amount remains limited, accounting for only about 3% of the market size of Bitcoin.

Since 2017, some allegations have been reported against Tether concerning the lack of proper auditing and disclosure. For example, it has been pointed out that Tether Limited may not fully back up the value of tether by maintaining the US dollar and equivalent—to invest in Bitcoin or for other purposes such as financing losses of the affiliated Bitfinex exchange and other entities. Moreover, it has been reported that Tether may be issued without acquiring corresponding US dollars to invest in Bitcoin, raise its value, and sell it at high market prices—possible price manipulation (See for example, Kharpal [2018]). The daily transaction values of Tether and Bitcoin have often shown similar growth trends when the value of Bitcoin has risen sharply. In addition to possible inadequate reserves, the New York Supreme Court has also
criticized Tether Limited for inappropriate corporate governance given that it and the Bitfinex exchange are owned by the same parent company and operated by the same small group of executives (Supreme Court of the State of New York 2019).

There are many other stablecoins pegged to the US dollar or other major international currencies. For example, USD Coin has been issued by Coinbase since 2018 based on blockchain technology. USD Coin has been transacted to transfer funds to over ninety economies including unstable economies like Argentina. Meanwhile, the TrustToken platform offers stablecoins that can be redeemed one for one for US dollars in the case of TrueUSD, for Australian dollars in the case of TrueAUD, for pounds sterling in the case of TrueGBP, for Canadian dollars in the case of TrueCAD, and for Hong Kong dollars in the case of TrueHKD. TrustToken was developed to issue stablecoins like Tether while preventing allegations and controversies by presenting transparent information about the bank accounts maintaining the collateral reserves for all crypto assets. Moreover, Paxos Standard is a stablecoin pegged one to one to the US dollar developed jointly by Paxos Trust Company, located in New York, and crypto asset exchange Binance. This stablecoin is fully backed by appropriate dollar reserves held at banks insured by the United States Federal Deposit Insurance Corporation. Paxos also obtained approval from the New York Department of Financial Services, so Paxos is a

Figure 7.2: Tether Price and Market Capitalization

USTD = Tether.
Source: CoinMarketCap.
stablecoin regulated by the agency. The approval was also obtained from the United States Securities and Exchange Commission to hold and maintain client funds.\(^3\)

### 7.3.2 Stablecoins Issued by Financial Institutions

There are also stablecoins issued by financial institutions to leverage the financial strength and stability of the issuing financial institution (G7 Working Group on Stablecoins 2019). Commercial and investment banks are increasingly interested in issuing stablecoins to their clients as an alternative to a deposit by operating a permissionless DLT platform that enables faster transfer of funds to other users on the same platform. Clients may be allowed to get stablecoins at par in exchange for deposits or cash for their corporate clients. These are “wholesale stablecoins” as opposed to “retail stablecoins” issued to the general public. In this case, stablecoins are backed by the credibility and reputation of the issuing financial institution and its total financial assets.

One such example is the case of Signature Bank, based in New York, which issues a stablecoin called Signet to its wholesale clients, which has enabled them to send and receive funds promptly and at any time without incurring any transaction fees. This bank was given regulatory approval on the issuance of the stablecoin from the New York Department of Financial Services in December 2018. A recent famous example is the JPM Coin, issued by J.P. Morgan Chase & Co. on an experimental basis by involving a few institutional clients in June 2019. JPM Coin is also pegged to the US dollar through a one-to-one relationship to the clients based on blockchain technology. Clients moving a certain amount of the US dollar from their accounts to the designated accounts could obtain equivalent amounts of JPM Coin, which can then be transferred to other account holders for payments instantaneously. The experiment turned out to be successful as this enabled instantaneous transfer of payments between clients that hold bank accounts with J.P. Morgan. While J.P. Morgan is exploring the possibility of expanding to other currencies, the services are mainly for institutional clients, not for their retail clients.

\(^3\) Also, Gemini, Stably, and OnRamp are categorized as stablecoins pegged to the US dollar, STASIS as a stablecoin pegged to the euro, HKD as a stablecoin pegged to the Hong Kong dollar, and KRWb as a stablecoin pegged to the Korean won (Abraham and Guégan 2019).
The utility settlement coin (USC) is another stablecoin pegged one-to-one to the US dollar issued by USC SG, a company based in Singapore. While this stablecoin is not issued by a financial institution, it claims that the USC can be transparent, stable, readily convertible, and secured by the US dollar. It aims to be used worldwide for cross-border wholesale payments. The USC is intended for use only among financial institutions that are part of the USC consortium.

### 7.4 Regulation Related to Digital Currency and Crypto Assets

#### 7.4.1 Proactive Regulatory Movement in Switzerland

The government of Switzerland defines crypto assets (called “virtual currencies”) as digital representation of a value that can be traded on the internet and takes on the role of money, but it classifies them as assets (properties) due to their limited role as means of payment. Switzerland’s regulatory regime appears to be more proactive on crypto assets since it is one of few economies in the world that accepts crypto assets such as Bitcoin as a means of tax payment in the canton of Zug and the municipality of Chiasso in the canton of Ticino. Other economies such as the Isle of Man and Mexico also permit the use of cryptocurrencies as a means of payment along with their legal tender (Law Library of Congress 2018).

Switzerland has been making proactive moves toward enhancing the related regulatory framework in order to promote innovation in the fintech industry and enhance competitiveness in the Swiss financial center, while protecting customers and the financial system as a whole. However, all fintech firms must be subject to tight regulations such as the Anti-Money Laundering Act and authorization requirements for financial services. A series of new steps have been undertaken by the Swiss Financial Market Supervisory Authority (FINMA) to cope with challenges related to authorization, supervision, and regulation presented by the fintech industry—in collaboration with relevant associations. FINMA is a regulatory authority with the mandate to supervise banks, insurance companies, exchanges, securities dealers, collective investment schemes, and their asset managers and fund management companies. It is charged with protecting creditors and investors. FINMA is also responsible for ensuring that Switzerland’s financial markets function effectively.
First, FINMA published guidelines regarding the regulatory framework for initial coin offerings (ICOs) in February 2018. An ICO refers to a mechanism in which investors transfer funds in the form of crypto assets to the ICO organizer and in return receive a quantity of blockchain-based crypto assets that are created and stored in a decentralized form (either on a blockchain specifically created for the ICO or through a smart contract on a pre-existing blockchain).

Second, the Swiss parliament introduced a new fintech license with relaxed requirements to promote innovative companies in December 2018. This enables fintech companies to accept public deposits of up to SwFr100 million, provided that these are not invested and no interest is paid on them. Such a fintech company is also required to be a company limited by shares, a corporation with unlimited partners, or a limited liability company and must have its office registered and its business activities conducted in Switzerland. In line with this action, FINMA began to accept license applications from January 2019. This means that fintech companies are not allowed to engage in money creation using crypto assets but are given opportunities to expand their businesses. Upon receiving license applications, FINMA assesses whether the intended business activities require a license and whether the planned business activities are possible under the terms of the fintech license. To simplify the application process, FINMA has published guidelines and allows interested companies to present their projects to FINMA during a meeting prior to submission of the application.

Third, FINMA has been working on the regulatory framework focusing on blockchain firms and their relationships with commercial banks. As part of these efforts, the Swiss Bankers Association in collaboration with the Crypto Valley Association came up with guidelines in September 2018 for opening corporate accounts by blockchain firms with banks. This reflects that financial institutions such as banks increasingly regard blockchain technology as an opportunity to enhance their business activities and models while blockchain companies find it necessary to have corporate accounts with banks to ensure further growth in their businesses. As opening an account by blockchain firms poses various new challenges for banks due to risks especially in relation to money laundering and illegal activities in the use of crypto assets or fraud, the guidelines were prepared in order to support the Swiss Bankers Association's member banks to engage in discussions with blockchain companies, and at the same time to assist with risk management in their business dealings. This action was welcomed by FINMA.

In August 2019, furthermore, FINMA issued guidance on regulatory requirements for blockchain-based payments. The guidance targets
blockchain service providers including exchanges, wallet providers, and trading platforms, and requires those providers to meet anti-money laundering and know your customer requirements. In the same month, subsequently, FINMA granted a banking and securities dealer license to SEBA Bank AG (formerly SEBA Crypto AG), a blockchain firm focusing on digital assets that was just founded in 2018 with the current capital of SwF100 million. The license enabled the firm to provide integrated banking and investment products and services in a secure environment to professional individuals and institutional investors in October 2019. Their clients are now able to invest, store, trade, and borrow against traditional and digital assets, as well as issue tokens. This is a major regulatory step in the world because SEBA Bank AG is able to close an important gap between traditional banks and digital asset companies since the firm is able to provide accounts for both fiat currency and digital assets for a wide range of services covering custody storage, trading, and liquidity management, as well as asset and wealth management. In the same month, the same license was provided by FINMA to Sygnum, a blockchain firm founded on Swiss and Singapore heritage operating globally. Sygnum also obtained a capital markets services license from the Monetary Authority of Singapore (the central bank of Singapore), which also regulates financial institutions in the banking, capital markets, insurance, and payments sectors. With the CMS license, Sygnum is able to conduct asset management activities focusing primarily on digital asset investment strategies for institutional and private qualified investors in Singapore. It is interesting to see whether such a move may eventually lead to money creation in crypto assets if the number of firms obtaining such licenses grows.

7.4.2 Regulatory Movements in the People’s Republic of China

The government of the PRC thinks highly of blockchain technology and has promoted research and development (R&D) and practical application of it in fields such as finance, manufacturing, and medical care. Meanwhile, the government has been cautious about crypto assets issued by the private sector despite the underlying technology being based on the blockchain. The following regulatory measures were adopted against digital currency including crypto assets and electronic money (e-money) to protect investors and lower financial risks. First, the government defined Bitcoin, the only major crypto asset prevailing at the time, as a virtual commodity in 2013. In the same year, the government introduced regulation of banks and payment providers to prohibit them from doing business associated with Bitcoin, such as opening bank
accounts, trading crypto assets, and using Bitcoin pricing for services. The regulation was adopted jointly by five regulatory authorities or ministries—the People’s Bank of China (the central bank in the PRC), the Ministry of Industry and Information Technology, the China Banking Regulatory Commission, the China Securities Regulatory Commission, and the China Insurance Regulatory Commission. This regulation was updated in 2017 to cover other crypto assets.

Second, the government adopted a regulation to prohibit ICOs in the face of growing crypto asset trading and the practice of raising funds through ICOs or obtaining crypto assets such as Bitcoin by issuing new cryptographic tokens. This reflected the view that the ICOs were the source of financing raised from the general public without obtaining official approval, as well as being the source of various frauds and losses to investors. The regulation was announced jointly by seven regulatory authorities or ministries—the People’s Bank of China, the Cyberspace Administration of China, the Ministry of Industry and Information Technology, the State Administration for Industry and Commerce, the China Banking Regulatory Commission, the China Securities Regulatory Commission, and the China Insurance Regulatory Commission. The regulation also prohibited crypto asset trading platforms from exchanging between the yuan (legal tender) and crypto assets, trading crypto assets, setting prices for crypto assets, and providing other related agent services. Platforms failing to comply with the regulation could have their business licenses suspended (Law Library of Congress 2018). This regulation effectively closed the crypto asset trading business. Consequently, Bitcoin traded with the yuan has dropped from over 90% of global Bitcoin trading volume to under 1% after the regulation. Despite the prohibition of crypto asset currency exchanges, residents in the PRC have found ways to access platforms using crypto assets. In July 2018, the People’s Bank of China indicated that 88 virtual currency trading platforms as well as 85 ICO platforms were identified and all of them were withdrawn from the market. (Law Library of Congress 2018). Meanwhile, the general public is allowed to hold crypto assets and exchange them among individuals.

Third, a regulation was adopted on crypto asset mining businesses in 2018. The PRC’s Leading Group of Internet Financial Risks Remediation requested that local governments remove existing preferential policies for Bitcoin mining companies in terms of electricity prices, taxes, and land use, and guide the orderly exit of such companies from the Bitcoin mining business. The localities must submit regular reports on Bitcoin mining operations in their jurisdictions. Since then, regulations on Bitcoin mining have been strengthened, at least in some provinces.
As a result, many Bitcoin miners in the PRC have stopped operating (Law Library of Congress 2018). This reflects the government’s decision that the crypto mining industry should be phased out.

Fourth, a regulation on e-money was adopted as the e-commerce market has grown rapidly. With the rapid penetration of online third-party payment systems, some measures become necessary to ensure safe payments and delivery of ordered products. The third-party payment providers operate as intermediaries between consumers and shops and as intermediaries between lenders and borrowers, and also offer related services such as provision of individual credit rating services using payment and transaction data. The amount of annual transaction volume using mobile payments was about CNY277 trillion (about $40 trillion) in 2018. Of that total amount, payment transactions using nonbank third-party payment networks, such as Alipay (managed by Alibaba Group) and WeChat Pay (operated by Tencent), accounted for about 75%. In response, the People’s Bank of China strengthened the regulation of online payment providers to protect consumers. The new regulations were especially focused on the clients’ funds stored in trust accounts. The central bank required online payment providers to place all clients’ funds in a special trust account designated by the central bank. The central bank does not pay any interest rate on these special accounts. In other words, the central bank applied a 100% reserve requirement ratio beginning in January 2019. Prior to that restriction, these e-money providers enjoyed profits from investing those clients’ funds temporarily into bank deposits or other liquid assets such as government bonds. After the adoption of the 100% reserve requirement, the providers lost those profits entirely, which put some smaller payment providers in financially difficult positions.

Fifth, a clearing house, the NetsUnion Clearing Corporation, was established in August 2017 to settle online payments in a centralized manner by the Payment & Clearing Association of China under the leadership of the central bank. This regulation is part of a related regulatory initiative to reduce risks related to paying using e-money. Prior to the initiative, online payment providers had played a role in performing clearing and payment activities. The NetsUnion Clearing Corporation helps regulatory authorities including the central bank to monitor the online payment industry more directly by separating online payment services from clearing services and making those providers focus on providing innovative payment services while improving customer protection and the safety of the online payment industry.
7.5 Facebook’s Project to Issue Libra as Global Stablecoin

Facebook, a US online social media and social networking service provider, announced in June 2019 that it would issue a global crypto asset called Libra to provide a fast global payment tool. This announcement has captured significant attention in the world.

7.5.1 Features of the Libra Project

Facebook established a subsidiary called Calibra to provide financial services that would enable smartphone holders to access and participate in the Libra network, with a digital wallet launch for Libra scheduled in 2020. Once people open an account, they will be able to convert funds (such as US dollars) to Libra and place the currency in their digital wallet. They will be able to do this using credit cards, bank cards, or existing currency exchanges. Account holders will enjoy convenient, fast, and low-cost payment and settlement, and they will also have access to funds-transfer services as well as a new tool to store value using Libra. These services are expected to create new business opportunities for individuals and small firms and promote financial inclusion. Like Tether, Libra will be a stablecoin but one stabilized against a basket of reputable fiat currencies—similar to Singapore’s currency basket or the special drawing right (SDR) adopted by the International Monetary Fund (IMF)—and reserve assets will be maintained in bank deposits and short-term treasury securities denominated in those currencies (Table 7.2).

In September 2019, Facebook stated that the currency basket would be comprised of the US dollar accounting for half, the euro for 18%, the Japanese yen for 14%, the pound sterling for 11%, and the Singapore dollar up to 7%. The yuan, issued by the PRC, will be excluded from the basket. Libra will be more volatile than Tether, since other international currencies are volatile against the US dollar, but is likely to be more stable than other crypto assets such as Bitcoin. Unlike Tether, which is based on the existing Bitcoin or Ethereum blockchain platforms, Libra will be issued using its own Libra blockchain platform, using its own programming language called Move so that transactions can be programmable (like Ethereum’s smart contracts). General account holders or users will not receive any interest collected from profits arising from the management of reserve assets—comprising liquid assets such as bank deposits or treasury bills denominated in the international currencies. This means that Libra is to be used mainly to facilitate the payment process.
### Table 7.2: Features of Bitcoin, Tether, and Libra

<table>
<thead>
<tr>
<th></th>
<th>Bitcoin</th>
<th>Tether</th>
<th>Libra</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit</strong></td>
<td>BTC</td>
<td>USDT</td>
<td>Libra</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td>Extreme volatility</td>
<td>Stable against the US dollar</td>
<td>Stable against the basket currencies</td>
</tr>
<tr>
<td><strong>Market capitalization</strong></td>
<td>About $133</td>
<td>About $6.4</td>
<td>Potentially large</td>
</tr>
<tr>
<td><strong>Central manager</strong></td>
<td>None</td>
<td>Yes (private type) (Tether Limited)</td>
<td>Yes (consortium type) (Libra Association)</td>
</tr>
<tr>
<td><strong>Cap on issuance</strong></td>
<td>Yes (21 million)</td>
<td>Potentially no limit</td>
<td>Potentially no limit</td>
</tr>
<tr>
<td><strong>Issuing technology</strong></td>
<td>Bitcoin blockchain</td>
<td>Existing open blockchain (such as Bitcoin and Ethereum)</td>
<td>Own blockchain</td>
</tr>
</tbody>
</table>

Source: Prepared by the author using information from CoinMarketCap.

Meanwhile, the Libra Association, headquartered in Geneva, Switzerland, was established as an independent nonprofit entity to manage the whole system. The Libra Association is responsible for the issuance or destruction of Libra, management of reserve assets, development of the Libra network, and promotion of financial inclusion. Libra will be issued when authorized resellers obtain it from the Libra Association in exchange for designated international currencies. Libra will be destroyed when authorized resellers sell it to the Libra Association in exchange for the underlying international currencies from reserve assets at a price equal to the value of the basket. The Libra Association is comprised of a consortium of founding members whose number was initially expected to be 28 including Facebook’s Calibra; Visa; Mastercard; PayPal; Vodafone; Uber Technologies, Inc.; Coinbase; and eBay. The Libra Association is governed by the Libra Association Council, which is comprised of these founding members, each of which becomes one representative per validator node—thus, forming a permissioned blockchain. Only these validators, as members of the Libra Association, are authorized to modify the database, operate the network, and manage the reserve assets. To become a validator node, each must invest at least $10 million to jumpstart the ecosystem in exchange for “Libra investment tokens.” The validators thus become token holders (namely investors) and will receive dividends in the future. Major policy or technical decisions will be made based on the consent of two-thirds of the Libra Association Council to avoid any
self-profit maximizing malpractices conducted by a few founding members. According to the plan, the number of founding members is expected to grow to about 100 by the first half of 2020. Facebook envisions the permissioned blockchain eventually transforming into a permissionless blockchain, wherein the eligibility to become a validator is open to anybody. The governance structure of the Libra Association appears to show that it is carefully designed to avoid allegations—associated with existing stablecoins, as pointed out above, such as safety, protection of private information, and disclosure—and promotes confidence among the general public, which has been damaged by Facebook’s Cambridge Analytica data scandal revealed in 2018. The scandal happened because Cambridge Analytica, the data and consulting firm, improperly acquired from Facebook the personal data of Facebook users’ profiles without obtaining their consent and then used the data to benefit Donald Trump’s political advertisements during the 2016 United States, presidential election campaign.

As for founding members, seven members such as Visa, Mastercard, and PayPal decided to withdraw from participation in the Libra Association in the face of strengthened criticisms by regulators and central banks as well as growing calls for tight regulations, as pointed out below. Thus, only 21 members signed the Libra Association charter in October 2019 at the general assembly held in Geneva. The members also formalized the Libra Association Council, elected the Board of Directors, and appointed members of the Libra Association executive team. Given that Facebook has 2.4 billion users in more than 70 economies, the market size could easily become much bigger than that of any other stablecoin. This is why Libra has attracted greater attention globally than other stablecoins.

In April 2020, the Libra Association issued a new white paper. The paper announced four key changes: offering single-currency stablecoins in addition to the multi-currency coin; enhancing the safety of the Libra payment system with a robust compliance framework; forgoing the future transition to a permissionless system while maintaining its key economic properties; and building strong protections into the design of the Libra Reserve (Libra Association 2020). As for the stablecoin, the Libra network will be augmented with single-currency stablecoins in addition to the multi-currency Libra Coin (or ≙LBR). The multi-currency Libra Coin will initially start with some of the currencies such as LibraUSD (or ≙USD), LibraEUR (or ≙EUR), LibraGBP (or ≙GBP), and LibraSGD (≙SGD). This enables individuals and firms in the respective economies whose local currencies have single-currency stablecoins on the Libra network to directly access a stablecoin in their currency. Thus, the multi-currency Libra Coin
will simply be a digital composite of some of the single-currency stablecoins available on the Libra network. It will be defined in terms of fixed nominal weights, such as the SDR maintained by the IMF. The multi-currency stablecoin is expected to be used as an efficient cross-border settlement coin as well as a neutral, low-volatility option for individuals and firms in economies that do not have a single-currency stablecoin on the network yet. Each single-currency stablecoin will be fully backed by reserve assets comprising of cash or cash equivalents and very short-term government securities denominated in that currency (about 80% in the form of short-dated government paper of up to 3 months’ remaining maturity with at least an A+ rating and 20% in the form of money market mutual funds). Reserve assets are likely to be managed by custodians and traditional asset managers and banks, but no fractionalization of banking and lending will be conducted. To enhance safety of the payment system, the Libra Association developed a comprehensive framework for financial compliance and network-wide risk management by establishing a Financial Intelligence financial intelligence unit function to help support and uphold operating standards for network participants. The Libra Association also announced the initiation of a payments licensing process with FINMA in April 2020.

7.5.2 Growing Criticisms Against Global Stablecoin Libra Plan

To obtain approval from the regulatory authorities to conduct the Libra payment platform, Facebook chose Switzerland and established the Libra Association in Geneva perhaps to benefit from Switzerland’s proactive moves to promote innovation in the fintech industry. In September 2019, the Libra Association filed a request with FINMA in Switzerland to assess the Libra project under Swiss supervisory law. In response, FINMA issued stablecoin guidelines in the same month to explain how stablecoins would be assessed under Swiss supervisory law. Stablecoins would be treated in the same manner as the existing approach toward blockchain-based crypto assets. Under the financial market infrastructure regulation, the Libra project would require a payment system license from FINMA. Payment systems are regulated based on the prevailing international standards, particularly the Principles for Financial Market Infrastructures and the Anti-Money Laundering Act. Additional services that increase a payment system’s risks, including bank-like risks, must be subject to additional requirements—such as capital allocation (for credit, market, and operational risks), risk concentration, and liquidity, as well as the management of the Libra
reserves—in line with the “same risks, same rules” principle covering the banking and infrastructure regulation. As the Libra project involves the issuance of Libra payment tokens, FINMA stressed that the Libra project would provide services beyond a pure payment system and would thus require such additional requirements. To obtain a license, therefore, the guidelines state that the Libra Association must be prepared to meet all these regulations. FINMA also stressed that an internationally coordinated approach would be necessary in terms of formulating the requirements related to managing the reserve and AML and CFT regulation (FINMA 2019). This suggests that the Libra project may not be easily approved given the growing criticisms, which are summarized next.

The Group of Seven (G7) economies expressed strong concerns about the Libra project. In October 2019, the G7 published the final report of its Working Group on Stablecoins as well as a statement by Benoît Coeuré, Chair of the Committee on Payments and Market Infrastructures (G7 Working Group on Stable Coins 2019; Coeuré 2019b). The statement rejected global stablecoin projects like Libra by stating that no global stablecoin project should begin operation until the legal, regulatory, and oversight challenges and risks are adequately addressed. In addition to regulation, the G7 also expressed concerns over the possibility of undermining the core elements of monetary sovereignty. The group urged other central banks and regulatory authorities in emerging economies to follow suit. United States President Donald Trump also heavily criticized the project in July 2019, stating on Twitter, “If Facebook and other companies want to become a bank, they must seek a new Banking Charter and become subject to all Banking Regulations, just like other Banks, both National and International.” The PRC also expressed concerns that the Libra project may profoundly alter monetary balances, financial stability, and even the international economic system if adopted widely.

Facebook’s Libra project has generated a big shock wave among global regulatory authorities and central banks on an unprecedented level. Regulators and central banks appear to treat Libra more stringently than they treat other crypto assets such as Bitcoin and stablecoins for several reasons. First, the difference between crypto assets on the one hand and central bank money and private money on the other is becoming increasingly unclear. Stablecoins combine the advantage of stable values obtained by using established, reputational fiat currencies (such as the US dollar, the euro, the yen, and the pound sterling) as collateral with the technical superiority of low cost, convenient, and faster transactions driven by crypto assets using DLT. Central banks and regulatory authorities may find it difficult not to regard such stablecoins
as “money” if it is widely used as a unit of account, medium of exchange, and store of value.

Second, it is not clear whether an issuer is able to continue to supply a global stablecoin in a system for large-value payments without disruptions to payments and substantial volatility in the value of the stablecoin after the global stablecoin becomes widely used by the general public as means of payment. This concern would be essential if low-income people without access to bank accounts in emerging economies were to use stablecoins like Libra not only as a payment tool but also to store value. The related concern is that financial stability risk may be amplified since the general public may shift funds from retail deposits managed by local banks to the stablecoin given that the opportunity cost is small in the substantially low interest rate environment in developed economies and some emerging economies. Capital flight could more easily happen with the stablecoin as compared with fiat currencies in an economy with an unstable, unreliable government. As a result, a shift from a domestic fiat currency to a stablecoin may not only erode the effectiveness of monetary policy but may also promote substantial depreciation of the currency, thus leading to a foreign debt crisis in some emerging economies. “Dollarization,” or a shift from a domestic currency to a more reliable foreign currency (such as the US dollar) in daily economic and financial transactions, may occur at a faster pace in the case of Libra. For these reasons, tighter regulations might be necessary, particularly for Libra. Examples could include requiring issuers to obtain a license like those for money transfer operators or commercial banks. Effective regulations must also require international coordination or standardization of associated regulations.

Third, the Libra project may increase illegal and terrorist activities more than other crypto assets due to the potentially large number of users. Regulatory authorities are expected to apply strict international standards to prevent such activities. An issuer of a stablecoin will be required to mitigate operational and cyber risks. In addition, consumers and investors need to be well-protected from various risks. Concerns over market concentration by an issuer having access to diverse information about users need to be addressed.

In response to growing international criticisms, Mark Zuckerberg, the founder, chairperson, and chief executive officer of Facebook, acknowledged that Facebook would not move forward with the Libra payments plan anywhere in the world without explicit approval from all US financial regulators at his testimony before the House of Representatives Committee on Financial Services in October 2019 (House of Representatives Committee on Financial Services 2019.) He also made it clear that Facebook is committed to strong consumer protections for
Growing Central Bank Challenges in the World and Japan

the financial information it obtains by ensuring that decisions about lending or creating credit reports using personal transaction data will not be made and that such data will not be shared with third parties for lending or credit decisions. Such data will be used only to improve services. At the same time, Zuckerberg emphasized that the Libra project could enhance the US financial leadership and democratic values and oversight around the world. He also warned about the risks of not innovating in the US by preventing the Libra project, pointing out other economies that have been moving quickly to launch similar ideas and possibly taking over Facebook’s initiative. He presumably referred to the case of the PRC’s digital currency electronic payment (DCEP), often referred to as the “digital yuan project,” led by the People’s Bank of China, as discussed in Chapter 8. It was also stressed that the Libra Association is independent so that Facebook will not control it. Based on the interaction between Facebook and global regulators, the Libra plan is likely to take longer than initially envisaged. In April 2020, the Libra Association released a white paper by responding to the criticisms, as pointed out above.

7.6 Synthetic Central Bank Digital Currency and Financial Risks Related to Electronic Money

E-money is increasingly used in the world. It is an electronically stored monetary value denominated in a common unit of account such as legal tender and a prepaid digital payment instrument using prepaid cards or online electronic payment schemes using near field communication technology. One popular type of e-money is the e-wallet (digital wallet), in which users store amounts of money to use for making payments easily and quickly using their mobile phones. E-wallets also can be used to store various card information. Given the growing use of e-money in the world, there is a growing recognition that various financial risks associated with e-money might emerge and thus need to be tackled. The idea of involving central banks to mitigate such risks is one potential solution.

7.6.1 Financial Risks Associated with Electronic Money

In emerging economies, e-money is becoming popular and is rapidly penetrating in society. Examples include Alibaba’s Alipay and Tencent’s WeChat Pay in the PRC, Paytm in India, and M-Pesa in Kenya. According to Adrian and Mancini-Griﬃoli (2019), stablecoins (such as Tether, USD Coin, and Facebook’s Libra, discussed above) are included in the
definition of e-money. As explained in Section 7.3, stablecoins work as a means of payment and a store of value fully backed or collateralized by international currencies. E-money can be issued through an app on smart phones and settled in a centralized or decentralized fashion. E-money transfers differ from bank transfers or credit cards since transaction cost can be lower and settlement is immediate. Some people in emerging economies may trust e-money more than bank deposits (bank money) as a result of Big Tech and fintech firms making great efforts to promote financial inclusion at low cost by exploiting network effects through social media or e-commerce.

As the use of e-money has rapidly expanded, attention needs to be paid to several risks. One such risk is losing the value of users’ funds held in the trust account managed by online electronic payment providers. Another risk is related to the interoperability of different e-money payment systems among different payment providers. As for the risk of losing the value of users’ funds, the value of e-money could potentially become volatile. For example, when a run on e-money occurs, the value may drop significantly and thus users face a substantial loss of wealth (Adrian and Mancini-Griﬃoli 2019). Moreover, the trust account held by users may not be securely managed if a payment provider invests its clients’ funds in risky or illiquid assets or uses its clients’ funds as collateral for other fund-raising purposes. This may happen when a payment provider ﬁnds it difﬁcult to meet redemption of e-money smoothly in response to users’ requests. The second risk is related to the interoperability of e-money arising from the presence of multiple e-money payment operators that provide different payment systems. Due to the strong network effects in payments, only the largest providers might end up surviving in the online payment industry and become dominant, thereby undermining the original goal of providing low-cost, fast, innovative services to all users.

7.6.2 Synthetic Central Bank Digital Currency Proposal

To cope with these risks, Adrian (2019) and Adrian and Mancini-Griﬃoli (2019), IMF economists, propose that a central bank should be involved in making online e-money providers’ payment operations safer by allowing those providers access to reserve accounts (reserve deposits) with a central bank under strict conditions. With effective supervision, a central bank could make sure that e-money issuance is fully backed by safe and liquid assets (i.e., reserve deposits) so that loss could be avoided with regard to their users’ funds in case of bankruptcy. Moreover, the economists stress that a central bank should mitigate the interoperability risk by ensuring interoperability between e-money
issued by different providers by offering a common settlement platform between trust accounts.

This idea is called synthetic central bank digital currency (synthetic CBDC) since the currency is not purely central bank digital currency; it is issued by the private sector but a central bank can help to improve the credibility of private issuers’ e-money with better protection provided on consumers’ funds and thus to ensure financial stability. According to Adrian and Mancini-Griﬃoli (2019), a synthetic CBDC has notable advantages relative to the full-fledged version of a CBDC where a central bank issues its own crypto asset to the general public using DLT, as explained in Chapter 8. The idea of a synthetic CBDC is to outsource several steps taken in the process of issuing a CBDC to the private sector—including technology choices, customer management, customer screening, and monitoring including for “know your customer” and AML and CFT regulation and compliance, and data management. In this way, a central bank might avoid all sources of substantial costs and various risks, as it needs to do when planning to issue its own digital currency. Under a synthetic CBDC, a central bank becomes responsible only for settlement between trust accounts and for regulation and close supervision including e-money issuance. Thus, synthetic a CBDC is essentially a public–private partnership that encourages competition between e-money providers and preserves comparative advantages among them by promoting innovation, interface design, and better client management. As a result of the provider’s interaction with a central bank, the general public may increase its trust of e-money payment systems provided by the private sector.

Indeed, the PRC has already implemented some reforms to cope with the risk of losing the value of users’ funds held in the trust account managed by online electronic payment providers, as pointed out in Section 7.4. The People’s Bank of China now requires online payment providers to place all clients’ funds in the trust account with the central bank.

7.7 Applying the Distributed Ledger Technology to the Wholesale Cross-Border Payment System

An initiative to apply DLT to the cross-border settlement system was launched in May 2019 by Fnality International, located in London in the United Kingdom, by issuing a USC in the foreign-exchange market. The original idea of the USC project was proposed by UBS together with the technology start-up ﬁrm Clearmatics in 2015. The goal was to reduce fees, time, and risk associated with foreign exchange transactions.
Fnality International was founded as a 4-year R&D project focusing on understanding how market infrastructure needs to evolve to meet the challenge. The project’s aim is to create a network of decentralized financial market infrastructures by adopting tokenization to deliver the means of payment-on-chain in future wholesale banking markets. It is backed by a consortium of large, established financial institutions including Banco Santander, Bank of New York Mellon, Barclays, Commerzbank, Credit Suisse, ING, Lloyds Banking Group, Mizuho Bank, MUFG Group, Nasdaq, Sumitomo Mitsui Banking Corporation, State Street Bank and Trust, and UBS.

### 7.8 Conclusions on Digital Currency, Crypto Assets, and Regulations

This chapter gave an overview of the concepts and features of private money (private sector-issued money) and pointed out that bank money is a major form of money while cash demand continues to be strong, as reported in Chapter 6. Bank money provides various payment methods including ATM cards, account transfers, and debit cards. However, bank money faces competition from new payment instruments such as prepaid instruments (e-money) in addition to traditional credit cards. Moreover, crypto assets such as Bitcoin have emerged as private money over the past decade with their own unit of account and they can be used for purchasing some goods and services in many economies. There are more than 5,000 crypto assets that can be invested in many countries anonymously, instantaneously, and at any time. Crypto assets are based mainly on DLT such as blockchain, which makes the falsification of transaction data difficult. Crypto assets are like cash in terms of anonymity, peer-to-peer transactions, and 24/7 availability for the general public. Unlike cash, however, transactions using crypto assets are technically traceable and a positive or negative interest rate can be charged, potentially improving the effectiveness of monetary policy such as the negative interest rate touched on in Chapter 2.

So far, regulatory authorities and central banks around the world do not regard crypto assets as money, mainly because of the extreme volatility in their values, which hampers their widespread use as a medium of exchange and store of value. Some crypto assets like Bitcoin set a cap on the amount of issuance in advance to prevent their value from dropping sharply, but the value of crypto assets remains highly volatile largely due to their lack of intrinsic value. In addition, consumers and investors using crypto assets are not well-protected by regulations, so crypto assets are regarded as risk assets. Crypto assets are subject to
technical and legal problems such as scalability, 51% attacks and double-spending challenges, vulnerability to cyberattacks, and susceptibility to money laundering and illegal activities.

In recent years, new types of crypto assets called stablecoins have emerged as a way of overcoming volatility problems. Global regulators and central banks have not felt threatened by these crypto assets and stablecoins so far as their sizes of market capitalization remain limited. However, Facebook’s announcement in June 2019 that it would issue a global crypto asset called Libra has changed such views. Much attention has been paid by global regulators and central banks in the world to the Libra project due to the potential for Libra being used globally on a greater scale than any other existing crypto assets due to the sheer number of Facebook users. In response, the G7 economies expressed that such global stablecoin projects like Libra should not begin operation until the legal, regulatory, and oversight challenges and risks are adequately addressed. Concerns over the possibility of undermining the core elements of monetary sovereignty were also raised. While it is likely to take some time before a big project like Libra can be implemented, serious attention should be paid to rapid developments and innovation with regard to the application of DLT on payments and other areas globally. As new crypto assets have frequently been developed with diverse features, it is possible that someday the general public may find some crypto assets attractive and promote a rapid shift from cash and bank money to crypto assets. Thus, the development of crypto assets should be closely monitored on a global scale through greater collaboration among regulators and central banks.
While the emergence of crypto assets issued by the private sector has prompted intensive debates over whether such assets could become money in the future, another heated debate has emerged recently as to whether central banks should issue their own digital currency. The idea of a central bank digital currency (CBDC) is comprised of two types of proposals: targeting the general public (“retail CBDC”) and targeting financial institutions (“wholesale CBDC”). Technology has been progressing fast in the payment and settlement areas and a potential threat has emerged from Facebook’s global stablecoin initiative, pointed out in Chapter 7. Given this background, central banks have increasingly shown interest in the CBDC proposals and have begun to consider implementation. This chapter will take an overview of the CBDC proposals and recent initiatives.

8.1 Motivations for Promoting a Retail Central Bank Digital Currency

It is interesting to find that the International Monetary Fund (IMF) has stressed the potential innovative nature of crypto assets and has supported CBDC proposals using distributed ledger technology (DLT). Christine Lagarde, the then managing director of the International Monetary Fund, for example, urged central banks to consider the CBDC in November 2018 since it could satisfy public policy goals including financial inclusion, security and consumer protection, and privacy in payments (Lagarde 2018). Various factors have been motivating some central banks to examine the CBDC proposals (Amstad, et al. 2019). There are at least five reasons, described in this section.

8.1.1 Circulating Safe, Liquid Money

First, central banks find it necessary to provide safe, liquid payment instruments to the general public—just like central banks have been
doing for financial institutions using reserve balances (or reserve deposits) with central banks for a long time, as pointed out in Section 7.1. This is relevant to Sweden and Norway, where a large majority of the general public no longer uses cash, as explained in Chapter 6. In particular, the Swedish central bank, the Riksbank, feels that for the sake of fairness in a democratic society, a central bank is obligated to provide a safe, liquid payment instrument to the general public as it does to financial institutions using reserve deposit accounts at the central bank. This reflects that private money is riskier than central bank money. There are concerns that private issuers of money may take advantage of their privileged positions, possibly by increasing fees and lending interest rates as well as misusing the information obtained from tracking transactions of money if the general public depends solely on private money. Also, if enough private issuers or cashless payment providers go bankrupt to cause systemic financial crises, the general public may suffer substantially without proper payments and settlement systems and may encounter large losses. This means that the payments and settlement systems, as well as the financial systems, may become less stable and less safe under a system dominated by the private sector. Central bank notes in circulation in terms of nominal gross domestic product (GDP) have dropped to around 1% in Sweden and Norway. According to the Riksbank’s survey, only 13% used cash for paying their most recent purchase in 2018, down from 39% in 2010. Sweden appears to be enthusiastic about the idea of a retail CBDC and has already published its first e-krona report in September 2017 and the second one in October 2018 and has announced its intention to experiment with the e-krona project in 2020. Further details are described in Section 8.3.

8.1.2 Reducing Cash-Handling Cost and Crimes

Second, some economies wish to lower the cost of printing and managing cash and reduce the associated crimes by promoting cashless payment tools. Reflecting this motivation, some emerging economies are interested in the CBDC to be issued to the general public. Substantial cost is paid in each economy, not only on direct paper and design fees (spent to reduce counterfeits) but also on the personnel and transportation costs needed to handle cash (at central banks, commercial banks, and shops, and at the individual level) as well as on the security fees paid to reduce crimes including robbery, tax evasion, and other illegal activities. DLT including blockchain has the potential to reduce cash handling costs since all the transactions can be made using a digital representation of money and are traceable. The informal economy is large in many emerging economies,
so governments find it difficult to increase the tax base on all economic activities and to cope with illegal and unreported activities. Thus, a shift in central bank money from cash (i.e., physical money) to digital currency is one way to transform the economy from being informal-based to formal-based so that the economy becomes more tax-based, transparent, and efficient. DLT enables anonymity, but a CBDC might reduce the possibility of executing unreported transactions and crimes.

### 8.1.3 Promoting Financial Inclusion and Financial Development

Third, financial inclusion is another important motivation for emerging economies considering a CBDC targeting the general public. There are still many low-income people or people living in rural areas who are unbanked and without access to bank deposits and the broadband infrastructure. Thus, these people use cash as their main payment method daily. According to the World Bank, the global unbanked population amounted to 1.7 billion adults in 2017. While the number of wired broadband subscriptions amounts to only about 1 billion connections globally, the mobile population has reached more than 4 billion users and enables access to the internet. With the use of mobile devices, a retail CBDC might promote further digitization of the economy and thus promote economic and social development.

In particular, some emerging economies show growing interest in an application of DLT in the payment system to promote a technological environment that might reduce the social cost of the existing payment system and foster the digitization of the economy by the fintech sector. Many emerging economies are keen on developing global financial centers in their cities and regard fostering the fintech sector as one of the most promising routes for fulfilling this objective. While those economies may find it difficult to develop banking systems and capital markets that are comparable to those in developed economies, fintech services are new and innovative, and the general public may be more willing to use them given that the banking system and capital markets are still in the early processes of financial development. With the vision to achieve a greater chance of success in DLT and associated fintech development as a global leader, increasing activities have been seen in the Shenzhen area in the People’s Republic of China (PRC) and other emerging economies.

Meanwhile, a CBDC could be used to improve the existing wholesale financial systems—including interbank payments and settlement systems, delivery versus payment systems, and cross-border payments and settlement systems—by speeding up and rationalizing the
clearing and settlement processes and reducing the associated costs of transactions and of developing and upgrading computer systems. The wholesale financial system could be more stable as a result of limiting the chances of data manipulation and removing single point of failure problems and their resultant disruption from the systems. Moreover, a wholesale CBDC may be able to technically broaden the eligible financial institutions that have access to reserve deposits held at a central bank and, thus, improve the efficiency of the wholesale financial systems—such as insurance firms, pension funds, and other nonbank financial institutions that are normally not eligible to have reserve accounts with a central bank.

8.1.4 Enhancing the Effectiveness of Monetary Policy

Fourth, shifting from cash to digital currency through issuing a retail CBDC may enhance the effectiveness of monetary policy by improving the pass-through mechanism of monetary policy from policy rates to short-term interbank market rates and thus to lending rates applied to firms and individuals. This is true especially if cash is abolished and the general public shifts cash to an interest-bearing CBDC. For example, a negative interest rate policy, explained in Chapter 2, can be more effective if cash can be abolished as a result of the general public shifting from cash to accounts with a central bank or other digital currency issued by a central bank (Rogoff 2017). The negative interest rate can be deepened further since the general public does not shift to cash charging the zero interest rate by withdrawing bank deposits subject to a negative interest rate. The effective lower bound can be eliminated because of limiting the scope of cash substitution that could emerge to avoid a negative interest rate. Another benefit of a retail CBDC (especially an account-based CBDC, as explained below) is that helicopter money or monetization of government debt, as pointed out in Chapter 5, could be implemented more effectively and easily if the general public has access to deposit accounts with a central bank. Using the account, a central bank can distribute money to the general public promptly.

8.1.5Reducing United States Dollar Dominance

Fifth, a CBDC could be issued to reduce the dominance of the United States (US) dollar, thus limiting the ability of US monetary policy to undermine the autonomous (or independent) monetary policy of other economies. Many emerging economies have liberalized cross-border capital controls and have promoted financial liberalization over time. The flexibility of the exchange rates was also increased with a consensus
that a flexible exchange rate regime could manage capital flows well and maintain a sufficient degree of monetary policy autonomy. Specifically, an economy can adjust the domestic interest rate to achieve internal balance (i.e., price stability and full employment) while the exchange rate can be adjusted to achieve external balance (i.e., moderate current account deficit or surplus).

In practice, however, emerging economies often find it difficult to materialize the consensus described above. Thus, achieving autonomous monetary policy is not as easy as initially envisaged. Early empirical studies such as Hausmann et al. (1999) and Frankel, Schmukler, and Serven (2004) already found that exchange rate flexibility did not necessarily provide monetary autonomy to many economies since their domestic interest rates were heavily influenced by foreign interest rates such as the US interest rate. Hausmann et al. (1999) tested empirically whether flexible exchange rate regimes enabled better cyclical management, greater monetary policy autonomy, and improved control of the real exchange rate. They found that flexible exchange regimes did not permit a more stabilizing monetary policy and resulted in higher real interest rates and greater sensitivity of domestic interest rates to movements in international rates (such as the US interest rate). Frankel, Schmukler, and Serven (2004) also found that full transmission of international interest rates such as the US interest rates in the long run could not be rejected for emerging and developed economies with flexible exchange rate regimes. The impact of foreign interest rates appears strong since the extremely low interest rate environment generated by unconventional monetary easing conducted by major central banks promoted the search for yield behavior among global investors. This, in turn, affected emerging economies through more volatile capital flows and exchange rate movements. Monetary policy conducted by the Federal Reserve is clearly the most important driver for these movements.

Financial Channel of Exchange Rate Reducing Monetary Autonomy

Two main factors limit autonomous monetary policy in emerging economies. One factor is the presence of the “financial channel of exchange rate” stressed by Kearns and Patel (2016). A standard textbook often claims that the “trade channel or demand substitution channel” is the major determinant of how economies respond to exchange rate movements. An appreciation of the exchange rate, for example, reduces export demand from abroad through an increase in the international price of exports while increasing import demand through a decreased domestic price of imports, thus leading to a substitution away from
domestic production to imports. On the other hand, such an appreciation of the exchange rate reduces the amount of foreign debt once converted into domestic currency and thus improves debt repayment conditions of domestic debtors. By contrast, a depreciation of the exchange rate improves the international price competitiveness of exports and helps to improve the trade balance while reducing imports due to higher import prices. Meanwhile, such a depreciation of the exchange rate increases the amount of foreign debt once converted into domestic currency, thereby raising the debt repayment burden for domestic debtors and tightening domestic monetary conditions. Monetary easing (or tightening) in the United States may lead to a depreciation (or appreciation) of the US dollar and hence an appreciation (or depreciation) of domestic currency through a decline (or increase) in interest rate differentials. A flexible exchange rate regime might amplify this spillover effect from US monetary policy to an emerging economy, undermining the emerging economy’s monetary policy autonomy.

The US dollar is the currency most actively used for cross-border bank lending and the issuance of debt securities in international markets. Mark Carney, governor of the Bank of England at that time, pointed out that about two-thirds of both external debts issued by emerging economies and global debt securities issued are denominated in the US dollar (Carney 2019a). Kearns and Patel (2016) find empirically that the financial channel of the exchange rates could generate a significant offset to the trade channel particularly for emerging economies. Georgiadis and Zhu (2019) find that the sensitivity of a domestic economy to monetary policy conducted by the Federal Reserve could be reduced when the foreign currency exposure is mitigated by reducing net short positions rather than by increasing net long positions. Moreover, the sensitivity of a domestic economy to US monetary policy was found to be stronger if the foreign currency exposure stems from portfolio debt securities or bank loans rather than from more resilient foreign direct investment (FDI) and portfolio equity instrument. Especially, FDI is considered resilient due to state-contingent payoffs and longer investment horizons. In addition, Georgiadis and Zhu (2019) find that the sensitivity of a domestic economy to US monetary policy was stronger during tighter US monetary policy than during looser US monetary policy. This finding is consistent with the fact that emerging economies are particularly concerned about local currency depreciation, under which borrowing constraints may become binding in the presence of foreign currency exposures. Cerutti and Osorio-Buitron (2019) focus on cross-border bank lending from the United States and the euro area to emerging economies. They find that monetary tightening conducted by the Federal Reserve and the European Central Bank (ECB) had a significant
negative impact on cross-border lending by reducing the amount of those lending inflows to emerging economies. In particular, the negative impact is found stronger for the case of US monetary tightening while that impact of monetary tightening by the ECB was important only for the case of European emerging economies.

**Dominant United States Dollar Pricing Reducing Monetary Autonomy**

Another factor limiting autonomous monetary policy for emerging economies is the presence of dominant US dollar pricing. This refers to the widespread use of the US dollar in trade invoicing, in place of the currency of either the exporter or the importer. While the standard textbook tends to assume that invoicing in international trade transactions is either in the home currency or in the trade counterpart’s currency, in reality, most invoicing is in US dollars. Dominant currency pricing led by the US dollar is widespread in the world partly due to the prevalence of global supply chains. Carney (2019a) indicates that the US dollar represents the currency of choice for at least half of international trade invoices—around five times greater than the share of the United States in global merchandise imports and around three times greater than the share of the United States in global merchandise exports.

Under the dominant US dollar pricing in trade invoicing, the exchange rate pass-through of changes in the US dollar in import prices in terms of a local currency is high for many economies regardless of whether their exports and imports are directly associated with the United States. A sharp appreciation (or sharp depreciation) of the US dollar in terms of domestic currency, thus, may generate substantially low (or substantially high) inflation in emerging economies even through imports from the United States remain small. In contrast, the pass-through of changes in non-dominant currencies in import prices in terms of domestic currency is small. As a result, import prices once converted into domestic currency do not adjust efficiently to reflect changes in relative demand between direct trading partners. Gopinath (2016) looks at the case of Turkey that invoiced only 3% of imports in the Turkish lira and 60% of imports in the US dollar—even though their actual imports from the United States accounted for only 13%. By contrast, over 90% of US imports were invoiced in its domestic currency, the US dollar in the case of the United States. Using input-output tables to measure the import content of consumer goods expenditure, Gopinath (2016) estimates that the direct impact of a 10% depreciation of the US dollar on cumulative domestic inflation over 2 years was only 0.4–0.7 percentage points in the United States while it was much greater at 1.65–2.03 percentage points in Turkey. Boz, Gopinath, and
Plagborg-Møller (2017) also claim the relevant predictor for bilateral trade prices and volumes is the US dollar exchange rate in the world, not the bilateral exchange rate, even when the United States is on neither side of the trade transaction. A 1% appreciation of the US dollar against all other currencies in the world could produce a 0.6% decline within a year in the volume of total trade between countries in the rest of the world, after controlling for the global business cycle. Boz, Gopinath, and Plagborg-Møller (2017) also demonstrate that the impact of the US dollar exchange rate increased as the share of an economy’s trade invoiced in the US dollar rises.

The Hegemonic Digital Currency Proposed by the Bank of England

Given that the US nominal GDP accounts for only about one fourth of global nominal GDP, the dominance of the US dollar in global trade and financial transactions is disproportionate and may be inappropriate because of its potential to destabilize emerging economies. Section 2.4 pointed out the importance of the US dollar liquidity swap arrangement provided by the Federal Reserve—which also signified the importance of the US dollar in global financial and capital markets. Therefore, Carney (2019a, 2019b), governor of the Bank of England at that time, stressed the need to move away from the dominance of the US dollar to reduce the excessive impact of the US economy and its monetary policy on cross-border capital flows as well as recipient domestic economies. As a long-run solution, Carney suggested central banks could issue a CBDC. Private sector-issued stablecoins like Facebook’s Libra, as mentioned in Chapter 7, may face several problems in such areas as privacy, anti-money laundering (AML) and combating the financing of terrorism (CFT) regulation, and operational resilience—even though those stablecoins provide a new payments infrastructure fully backed by reserve assets denominated in the international currencies included in the basket, such as the US dollar, the euro, the pound sterling, and the yen. Meanwhile, central banks might be able to provide safer digital currencies in the form of CBDCs, which may lead to a creation of “hegemonic digital currencies” or the basket comprising of several CBDCs. Given that central bank liabilities have long been provided as a widely accepted means of payment, providing low-cost hegemonic digital currency may help to diversify international invoice currencies as well as currencies used in financial transactions since global trade might become more sensitive to changes in conditions in the countries of other currencies in the basket backing the hegemonic digital currencies.
Nonetheless, it is not clear whether the construction of the basket of CBDCs issued by several economies would reduce dependence on the US dollar if the Federal Reserve also issues the US dollar CBDC. The preference for the US dollar and a CBDC denominated in that currency is likely to continue. Moreover, a single CBDC may be preferred over a basket of them due to simplicity and habits. Perhaps the CBDC issued by the PRC alone may, in the future, generate significant impact globally—and especially in emerging economies—if supported by the enhanced “Belt and Road Initiative,” greater efforts to expand currency swap arrangements involving the yuan, and gradual liberalization of financial markets and capital controls. The Belt and Road Initiative is an ambitious infrastructure development project initiated in 2013 by the PRC’s President Xi Jinping that covers regions from Asia to Europe and Africa through building up land and maritime networks.

### 8.2 Three Types of Central Bank Digital Currency Proposals

The ideas about a CBDC discussed around the world can be categorized as either a retail CBDC or a wholesale CBDC. The CBDC proposals can also be divided into “account-based” and “token-based” (which also can be referred to as “value-based”) following the classification developed by the Bank for International Settlements (BIS) based on the verification approaches (Bech and Garratt 2017). The CBDC proposals can thus be classified into the following three types (Figure 8.1):

- Account-based CBDC targeting the general public
- Value-based or digital token-based CBDC targeting the general public
- CBDC based on distributed ledger technology (DLT) targeting financial institutions

The account-based retail CBDC allows the general public to have accounts at a central bank—just like financial institutions that have already had access to reserve balances with a central bank for some time under the contemporary central banking system. This would widen the access of the general public to direct claims on the central bank in digital form. It can be used as a store of value and a medium of exchange. Rather than providing direct access to a central bank account, the account-based CBDC can be issued through a two-tier (or delegated) system where the general public gain access to CBDC accounts indirectly through special accounts with a commercial bank under the two-tier system. Under the
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token-based or value-based CBDC, meanwhile, the general public has
direct access from the central bank to the digital currency. The general
public obtains digital tokens in exchange for withdrawing the equivalent
amount from their bank deposits using cash, apps, or bank accounts.
The two-tier system could also be used. The token-based or value-based
CBDC can be implemented with or without DLT. Both account-based
and value-based retail CBDC proposals enable 24/7 availability, and an
interest rate can be applied in both cases. The retail CBDCs issued to the
general public might be viewed as legal tender just like cash. Regarding
a wholesale CBDC, a digital currency is issued using DLT to improve the

Figure 8.1: Types of Central Bank Digital Currency Proposals

Source: Prepared by the author based on information from the websites of various central banks.
existing interbank settlements system and other wholesale services by increasing efficiency and lowering maintenance and transaction costs. A wholesale CBDC could offer real-time 24/7 operation with a lower cost to develop and maintain the payment system.

The BIS conducted a survey of central banks in 2018—to which 63 central banks responded, including those in Canada, India, Japan, the People’s Republic of China, the United States, and a few European economies—about their current work on a CBDC, their motivations for a CBDC, and the likelihood that they would issue a CBDC (Barontini and Holden 2019). The results of the survey indicate that about 56% of the respondents focus on both retail and wholesale CBDC, while about 30% focus solely on a retail CBDC and the remaining 13% focus solely on a wholesale CBDC. Almost all respondents had conducted research on CBDC. About half of those respondents that had conducted research worked on experiments by attempting to replicate wholesale payment systems using DLT. Only five central banks progressed to running pilot projects. As for the timing to issue a CBDC, the majority considered that issuance would be unlikely in the short term (about 1–3 years according to the survey). For the medium-term outlook (about 1–6 years according to the survey), similarly, the majority of central banks would be unlikely to issue CBDCs although the number choosing “possible” issuance increased moderately between 2017 and 2018.

### 8.3 Retail Central Bank Digital Currency Proposals

#### 8.3.1 Account-Based Retail Central Bank Digital Currency Targeting the General Public

The account-based retail CBDC is the issuance of a digital currency to the general public in the form of directly providing an account at a central bank. All the transactions will be “traceable” as an underlying register enables the recording of all transactions and identification of the rightful owner of the digital currency. This technical feature is important to help prevent money laundering and criminal activities. Transactions are “non-anonymous” because all transactions are identified. As for monetary policy, it is possible for a central bank to technically impose a positive/negative interest rate on the account-based proposal.

Since around 2016, the Riksbank (the central bank in Sweden) has been examining the feasibility of the account-based CBDC proposal under the e-krona project together with the value-based CBDC, as explained below (Skingsley 2016; Riksbank 2018). The Riksbank has reported that the feasibility of the account-based retail CBDC has been
examined without the use of DLT. The Riksbank began a pilot project in 2020 based on the value-based CBDC proposal first. This is because the Riksbank needs to discuss with the Parliament as to whether the existing central bank act (Sveriges Riksbank Act) should be revised in order to provide the Riksbank with the clear mandate to issue an account-based retail CBDC. Thus, the Riksbank needs some time to prepare for drawing up the account-based CBDC for the amendments before conducting any experimentation. It is not clear when and whether a pilot project based on the account-based CBDC proposal will be conducted in the near future.

Other central banks in developed economies generally appear to be unenthusiastic about issuing account-based CBDCs. There are several reasons for this lack of enthusiasm. First, issuing CBDCs to a large population may be technically challenging. This difficulty can be technically mitigated if a central bank issues CBDCs through commercial banks under the two-tier system like cash. Second, there is no strong demand from the general public for the adoption of new central bank digital currency in many economies. This reflects that many developed economies face growing demand for cash as shown in Chapter 6, except in Sweden and Norway, where cash in terms of the amount and nominal GDP have been dropping. Thus, there is no urgent reason for other central banks to consider account-based CBDC proposals at this stage.

Third, one concern often raised by central banks is the potential adverse impact on the banking system. This concern—which is also applicable to the case of value-based retail CBDC using DLT—reflects that commercial banks may suffer a loss in low-cost retail deposits since the general public may shift deposits from bank accounts to those of a central bank. Consequently, banks might lose the financing sources needed to extend credit to firms and households. If those commercial banks try to compensate for the rising funding cost by increasing lending rates, this will lead to a reduction in lending and would undermine intermediation roles. This concern, however, might be mitigated if a central bank pays a lower interest rate to the general public on central bank deposits than commercial banks pay to their retail customers. A related concern is that bank runs may be exacerbated in the event of a financial and economic crisis by an increased shift in deposits from commercial banks to a central bank, thereby deepening banking crises. However, central banks may help to mitigate the problems by lending to commercial banks in a shortage of deposits. As a related issue, Chiu et al. (2019), economists of the Bank of Canada, presented a counter-argument by demonstrating theoretically that the retail CBDC may help to limit banks’ market power and force them to offer their retail
depositors better, higher deposit rates. This in turn could attract more deposits and reduce bank profits per unit of deposit if the deposit market is not perfectly competitive. Commercial banks would then become more willing to accommodate the increased deposit demand because they would still make a profit per unit of deposits, leading to more funding available to commercial banks and thus increased loans with lower lending rates. In addition, a central bank can provide liquidity (loans) to commercial banks if the general public makes a large shift from retail deposits to central bank deposits. Commercial banks can use these funds and increase lending to firms and individuals.

8.3.2 Value-Based or Token-Based Retail Central Bank Digital Currency: Case of Sweden

The value-based or digital token-based CBDC proposal is relatively popular among central banks in emerging economies. This is because of the motivation to take the lead in the rapidly emerging fintech industry, to promote financial inclusion by accelerating the shift to a cashless society, and to reduce cash printing and handling costs as well as cash-associated illegal activities and crimes, as pointed out in Section 8.1. Value-based retail CBDC is also being examined actively by the Riksbank.

In the case of Sweden, the Riksbank initially examined the feasibility of value-based retail CBDC without recourse to DLT (along with the account-based CBDC as pointed out above). The value-based CBDC can be stored on a card or in a mobile phone app in the form of e-wallets. Like the account-based CBDC, value-based CBDC will be “traceable.” Under the value-based system, a register examines whether a payer has the sufficient amount of the e-krona to transfer, and all cards and digital wallets must be registered so that both payers and payees can be identified just as users of private bank cards and Swish (a fast mobile retail payment system) can be identified. Payment transactions are “non-anonymous” because all transactions are identified. One exception of non-anonymity envisaged by the Riksbank is the case of a prepaid e-krona card, where the e-krona currency is already stored and, thus, can be used as cash and passed from one user to another. This is allowed as long as the payment amounts to less than €250 (to be lowered to €150 by 2020) under the E-money Directive set by the European Union (EU), on the condition that there is no suspicion of money laundering or terrorist financing according to the legislation on money laundering.

The Riksbank decided to experiment with the value-based CBDC proposal first in 2020. This is because the value-based CBDC is classified as electronic money (e-money) in Sweden’s existing financial
regulation and, thus, is consistent with the Riksbank’s mandate of promoting a safe and efficient payments system. Thus, value-based CBDC experimentation by the central bank is legally feasible in the current legal framework. The effectiveness of monetary policy could be improved under the value-based CBDC as well if a positive/negative interest rate can be charged. In Sweden, however, a positive/negative interest rate would not be applied to the value-based e-krona since it is regarded in legal terms as e-money and, thus, should be a non-interest-bearing instrument according to the E-money Directive set by the EU.

In February 2020, the Riksbank announced that a pilot project is being conducted using DLT such as blockchain technology with Accenture until the end of February 2021. The goal of the project is to develop a technical solution for an e-krona that can work as a complement to cash (Riksbank 2020). It is noteworthy that the Riksbank decided to adopt DLT, deviating from the initial position. Like cash, the Riksbank (namely Riksbank’s node) is the only entity that issues and redeems e-krona. Participants in the network (namely participants’ nodes) such as designated financial institutions can obtain/redeem the e-krona against the debiting or crediting of reserves held directly by the participants or via a representative in the Riksbank’s settlement system called RIX. RIX is the central payment system at the Riksbank in which transfers between accounts in different banks are handled. The e-krona network is supplied with liquidity by the participants, either as direct participants or as representatives for indirect participants, paying in reserves in RIX in exchange for the Riksbank providing the participant’s node with the same amount of e-krona currency. Participants in the e-krona network subsequently distribute the e-krona currency to end-users, who can then use various payment methods for the e-krona. The consumer or merchant controls their supply of e-krona with a digital wallet installed as an app in a mobile phone or in the merchant’s cash register (terminal). This is a two-tier system delegating the role of circulating e-krona among the general public to financial institutions. In addition to a mobile app, the pilot is to develop a digital wallet for use in smart watches and cards. To be able to use the e-krona for payments, the digital wallet must first be activated by a participant connected to the e-krona network. After activation, the user can, for example, receive e-krona as payment from another user, pay a retailer with the e-krona, make transfers from their bank account to the digital wallet (and vice versa), and check their e-krona balance. Thus, the e-krona network is “private” and only accessible to participants approved by the Riksbank (the “permissioned” networks mentioned in Section 7.2). All transactions in the e-krona network occur separately from existing payment networks. Payments in the e-krona network take place without the involvement of RIX, but the supply and redemption of e-krona currency is conducted via RIX.
8.3.3 Value-Based or Token-Based Retail Central Bank Digital Currency: Case of Venezuela

In Venezuela, the government led by President Nicolás Maduro announced in December 2017 that it would issue its own crypto asset (called the “petro”) in order to obtain revenue and take advantage of the booming crypto asset market. The petro is issued based on DLT and backed by a purchase-sale contract for one barrel of Venezuelan oil as quoted in the Organization of the Petroleum Exporting Countries Reference Basket as well as for other commodities including gold, diamonds, coltan, and gas (Law Library of Congress 2018). Holders of the crypto assets using digital wallets can exchange with other crypto assets or legal tender of Venezuela (namely, bolívares) at the market exchange rate published by a national crypto asset exchange house. In response, however, the National Assembly (i.e., the Venezuelan Congress), dominated by opposition parties, declared that the issuance of the petro would be illegal in March 2018, because such a government action requires congressional approval with a compilation of a special law under the National Constitution. It was also emphasized that only the Central Bank of Venezuela should issue national currency and that oil reserves should not be used to guarantee any government debt since those belong to the republic as national assets. Donald Trump, president of the United States, also reacted to Venezuela’s National Assembly initiative by signing an executive order to prohibit US citizens and residents from investing or making transactions using the petro. Despite these actions, the government began issuing the controversial petro in October 2018 as legal tender. The petro has been transacted in several exchanges. However, information is limited as to the extent that the petro has been issued and used for transactions.

8.3.4 Value-Based or Token-Based Retail Central Bank Digital Currency: Case of Cambodia

Cambodia launched a new retail payment system called Bakong in July 2019. The system uses mobile phones and was developed and managed by the National Bank of Cambodia (the central bank of Cambodia). It is a pilot project that would enable a fast real-time retail payment system without charging fees to users, retail shops, and commercial banks. This is part of a government initiative to promote digitization of the economy and financial inclusion. Under the two-tier system, central bank digital currency is distributed to the general public in the form of digital tokens through the banking system. The general public can make payments by purchasing the CBDC in advance
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in exchange of the equivalent amount withdrawn from their bank accounts. Thus, the central bank provides prepaid money (e-money) using DLT, which could be viewed as a digital token (a crypto asset) issued by the central bank to the general public. Goods and services are then paid for by scanning a harmonized QR code of a retail shop—like the one already introduced in Singapore—and inputting the payment amount. Subsequently, the payment transaction is finalized between the payee’s commercial bank and the payer’s commercial bank. The maximum amount per purchase made at each retail shop would be set at about $2,500. Remittance between users can be made in two stages: one is to input the payee’s bank name and account number and the amount to be remitted and the other is to record the payee’s bank information in advance in the QR code and just scan the code and check the amount to be remitted. This payment system was enabled by connecting financial institutions to the application developed by the central bank and applications developed by the participating banks to the general public. The payment system uses blockchain technology called Hyperledger Iroha-powered Bakong, where all the nodes in the Bakong blockchain are located at the central bank so that verification of payment transactions is conducted by the central bank (Mori and Miyazawa 2019). The Hyperledger Iroha permissioned blockchain was primarily developed by Soramitsu, a Japanese technology company delivering blockchain-based solutions for firms, universities, and governments.

The aim of this pilot project appears to be to promote the wide use of the country’s own currency (the Cambodian riel) and reduce the US dollar prevalence. While it is not clear whether the retail CBDC could promote a shift from the US dollar to the Cambodian riel, it is expected to reduce domestic remittance costs substantially; allow interoperability among financial institutions and online payment providers, issues pointed out in Chapter 7; and support payment transactions in Cambodian riels or US dollars, both of which are used in daily payments in the economy. Financial institutions and payment providers wishing to participate in the project must register to get the central bank’s permission to connect with the payment network. The general public must register to have a Bakong settlement account to use the new payment method and remit to other individuals using the new system. Like the central bank in the PRC, as described below, the National Bank of Cambodia aims to control the payment system.

In addition to upgrading the domestic repayment system, the National Bank of Cambodia has begun to examine how the Bakong system could apply to retail cross-border payments. The central bank signed a memorandum of understanding with the Bank of Thailand, the central
bank of Thailand, in February 2019 to initiate a pilot project to develop a QR-code-based payment system denominated in Cambodian riel and Thai baht (Bank of Thailand 2019). The project aims at developing the interoperability of standard QR payment by connecting Cambodia’s Bakong and Thailand’s PromptPay (the prepaid retail payment system developed under the initiative of its central bank). The National Bank of Cambodia also signed a memorandum of understanding with Maybank, the largest bank in Malaysia, in October 2019 to promote a similar collaboration in the area of cross-border payment and remittance between Cambodia and Malaysia (Maybank 2019). The National Bank of Cambodia, Maybank Cambodia, and Maybank Malaysia plan to work together to explore the possibility of enabling real-time transfers, payments, and cross-border remittance of funds between Cambodia and Malaysia through the Bakong payment system and Maybank’s digital platform.

8.3.5 Value-Based or Token-Based Retail Central Bank Digital Currency: Case of the People’s Republic of China

The retail CBDC proposal entered the global spotlight in 2019, especially after the PRC accelerated its move toward issuing the retail CBDC using DLT. The People’s Bank of China accelerated the move toward implementation of the CBDC for use by the general public along with existing cash in a two-tiered system in the middle of 2019. Research on the retail CBDC project was launched in 2014 under Zhou Xiaochuan, the then governor of the People’s Bank of China. Subsequently, the Institute of Digital Money was established within the central bank in 2017. Using the two-tier system, the central bank plans to issue a digital token or digital yuan called the digital currency electronic payment (DCEP). Commercial banks will operate digital wallets for the retail CBDC for the public on behalf of the central bank and the general public will be able to conduct peer-to-peer transactions and transfer of funds like with cash. Blockchain technology will not be used due to scalability problems although digital payment technology inspired by blockchain technology will be used. The central bank hopes that the DCEP will eventually replace cash. The DCEP may not require any bank card or linked bank account as long as users have smartphones and thus have digital wallets. This approach differs from existing popular cashless payment services provided by Alibaba’s Alipay and Tencent’s WeChat Pay, which require bank cards or linked bank account information to obtain payment services. Due to the use of blockchain-like technology,
all the transactions are “traceable” by the central bank. Given that a huge volume of transactions will take place, the central bank is likely to monitor only the transactions of suspicious activities such as money laundering and illegal activities by tracing them through transaction patterns.

The PRC is prioritizing the two-tiered system for several reasons. First, it is relatively easy to replace cash since the People’s Bank of China supplies cash to the public on demand through commercial banks just like any other central bank does. Second, the existing banking system is unlikely to be overturned, so commercial banks have an incentive to provide the CBDC to the public (Qian 2018). This is likely if a deposit rate paid by a central bank is lower than the interest rate paid by commercial banks. Third, while the central bank wishes to promote the retail CBDC without disrupting the existing banking system, it may promote competition among banks and nonbanks in developing solutions in this area. After receiving approval from the state council for implementation in October 2019, the central bank has begun to work closely with major commercial banks. The People’s Bank of China announced on 17 April 2020 that a pilot project will be conducted in four cities—Shenzhen, Suzhou, Xiong’an New District, and Chengdu by involving several retail firms and shops. The digital yuan may be used at the 2022 Beijing Winter Olympic Games.

8.3.6 Recent Views on Value-Based or Token-Based Retail Central Bank Digital Currency

Facebook’s announcement about Libra in June 2019 appears to have stimulated some emerging economies to issue a retail CBDC to make existing legal tender more attractive and convenient. The PRC’s move toward the implementation of a retail CBDC might be viewed as a safeguard against Libra. While Facebook has 2.4 billion users and Libra may attract these users, PRC’s DCEP, for example, might attract a similar or even greater number of users within the PRC alone given that Alibaba’s Alipay and Tencent’s WeChat Pay have about 1 billion active users each (although many users may have access to both online payment services) and about 2.2 billion people in the PRC lack access to bank accounts.

Contrary to the eagerness expressed by some central banks in emerging economies, central banks in developed economies—including the Federal Reserve, Bank of Japan, Bundesbank, European Central Bank, and Swiss National Bank—are relatively less enthusiastic about
retail CBDC at this stage (Cœuré 2018). This is also true in the United States. For example, US Congress members French Hill and Bill Foster proposed in 2019 that the Federal Reserve issue a government-backed crypto asset (a CBDC). In an open letter in response, Jerome Powell, the chairman of the Federal Reserve, replied that the Federal Reserve is not currently developing but is continuing to monitor developments closely and analyze the potential benefits and costs. The Federal Reserve sees no immediate compelling reasons like those seen in other economies, such as a rapid migration by consumers away from cash or the absence of fast, reliable digital payment services widely available (Hill 2019). Powell stressed that the existing US payments landscape is already highly innovative and competitive, offering many such options to consumers, and that the issuing of such a CBDC would raise important legal, monetary policy, payments policy, financial stability, supervision, and operational questions that need to be considered carefully.

These views are shared by other developed economies for several reasons. First, many economies (such as Australia, Japan, the Republic of Korea, the United States, and the United Kingdom) have adopted a fast payment system so that existing retail payments and settlement systems have become more efficient, faster, and available 24/7. Second, almost all citizens are banked in developed economies, so financial inclusion is not an urgent issue that should be tackled by a central bank. Third, many central banks do not wish to amplify the financial instability risk that might emerge as a result of adopting a retail CBDC, although various views on these points were pointed out above. Fourth, central banks in developed economies are more cautious because they fear they would lose their reputation if their implementation of the retail CBDC initiative were to fail. These banks’ fear of reputation damage appears greater as compared with central banks in emerging economies. Fifth, public interest and support for the proposal are limited. This reduces the incentive for these central banks to consider the idea. Partly due to limited initiatives in developed economies, the central bank in Israel issued a report in November 2018 regarding retail DLT-based CBDC (called “e-shekel”). The report concluded that implementation should be postponed until other major central banks take the lead, notwithstanding several potential advantages identified (Bank of Israel 2018). Somewhat positive action was made by the Bank of England in March 2020. A discussion paper was published to initiate a dialogue on the appropriate design of a CBDC and benefits and risks, although it stressed that a decision was not yet made on the adoption (Bank of England 2020).
8.4 Central Bank Digital Currency
Targeting Financial Institutions

The third proposal, issuing a wholesale CBDC using digital tokens, is relatively popular among central banks in developed economies because of the potential to make existing wholesale financial systems faster, cheaper, and safer. The BIS also shares the view that a wholesale CBDC could benefit the payments and settlements system (Bank of Canada, Bank of England, and Monetary Authority of Singapore 2018).

8.4.1 Various Experiments Conducted for Wholesale Central Bank Digital Currency

Since 2016, several central banks have conducted research and experiments using DLT to test the concept of wholesale central bank currency over large interbank payment systems, cross-border payment systems, and securities settlement arrangements. These initiatives have been undertaken by central banks in Canada (CAD-coin under Project Jasper), Singapore (Project Ubin), Japan–euro area (Project Stella), South Africa (Project Khokha), and Thailand (Project Inthanon). Among these central banks, those in Canada, Singapore, South Africa, and Thailand have experimented with the proposal by involving various financial institutions, fintech firms, consultants, and/or technology firms. All these proposals are “permissioned” because of the need to maintain restricted access to financial institutions and privacy needed in the financial industry. This means that validation of payment transactions would be conducted by selected members or a trusted notary (such as the central bank or selected institutions). The main purpose of these experiments was to promote the central bank’s understanding of the DLT systems and their applicability in the existing wholesale financial markets, such as real-time gross settlement systems, delivery versus payment (DVP) systems, and cross-border interbank payments and settlement systems.

Among central banks, two front-runners have been the Bank of Canada and the Monetary Authority of Singapore (MAS), both of which launched a series of wholesale CBDC initiatives in 2016 by experimenting with financial markets such as interbank payments and settlement systems (real-time gross settlement systems) and delivery versus securities systems using the DLT platform (Bank of Canada 2017a, 2017b, 2018; Monetary Authority of Singapore 2017a, 2017b, 2018). The Bank of Canada and Payments Canada collaborated
with R3—an enterprise software firm focusing on DLT and leading a consortium of financial institutions, banks, trade associations, and fintech companies—and Canadian commercial banks to initiate Project Jasper. MAS worked on Project Ubin in collaboration with R3 and several institutions, such as Credit Suisse, and J.P. Morgan Chase & Co. Both Canada and MAS have concluded that their experiments successfully transferred digital tokens on a distributed ledger in real time and in reasonable volumes. They issued digital currency (digital tokens) on DLT against claims on central bank reserves held in a segregated account (called a digital depository receipt approach). In Canada, the central bank digital currency (called CAD-coins) are issued at the beginning of the day and redeemed at the end. In Singapore, meanwhile, banks acquire or redeem central bank digital currency (the tokenized Singapore dollar) at any point during the day and can keep them on the distributed ledger overnight. Hence, transfers on the DLT platform of the Singaporean proof of concept are not restricted to the opening hours of MAS. Project Jasper also implements a liquidity-saving mechanism on the DLT platform.

With regard to the DVP system, MAS and Singapore Exchange launched a project in August 2018 to develop DVP capabilities for settlement of digital tokens across different blockchain platforms. This would allow financial institutions and corporate investors to carry out simultaneous exchange and final settlement of digital tokens and securities assets, thus improving operational efficiency and reducing settlement risks. The project was successfully concluded in less than 3 months. Meanwhile, the Bank of Canada together with Payments Canada and TMX Group, Accenture, and R3 published a report in October 2018 demonstrating the feasibility of clearing and settlement of securities using distributed ledger technology (Bank of Canada 2018).

8.4.2 Growing Interest in Cross-Border Payments and Settlements

Subsequently, the Bank of Canada, the Bank of England, and MAS began to work together in 2018 with some financial institutions. Their objective was to assess whether wholesale CBDC could enhance cross-border payments and settlements by improving the access, speed, and transparency of payments. Given the experience from the Bank of Canada and MAS research projects (Project Jasper and Project Ubin, respectively) in exploring tokenized forms of central bank liabilities for domestic use cases, they examined a few variations based on issuing a wholesale central bank digital currency. The three central banks
published a report in November 2018 in which they provide an initial framework for the global financial community to assess cross-border payments and settlements in greater depth by discussing how a variety of payment models could be implemented, from both a technical and non-technical perspective (Bank of Canada, Bank of England, and Monetary Authority of Singapore 2018). Subsequently, the Bank of Canada and MAS experimented with cross-border and cross-currency payments using the two central bank digital currencies by linking their payment systems and announced in May 2019 that the experiment was successful (Bank of Canada and Monetary Authority of Singapore 2019). MAS further announced the successful development of a blockchain-based prototype that enable payments in different currencies on the same network in collaboration with J.P. Morgan and Temasek in November 2019.

A new move was launched by the two central banks in Hong Kong, China and Thailand—the Hong Kong Monetary Authority and the Bank of Thailand—which initiated a joint research project with 10 participating banks from the two economies to study the application of a CBDC to cross-border interbank payments. The project, named Project Inthanon–LionRock, started in May 2019. The two central banks developed a cross-border corridor network prototype between the Thai baht and the Hong Kong dollar as a bridge between the Inthanon and the LionRock networks—blockchain-based local payment networks in Thailand and Hong Kong—using blockchain technology. Such a network would enable participating banks in both economies to conduct funds transfers and foreign exchange transactions instantaneously on a peer-to-peer basis. This would help reduce settlement layers and transaction cost and would improve efficiency. The project was completed in December 2019 and the joint report was published in January 2020 (Bank of Thailand and Hong Kong Monetary Authority 2020). Leveraging smart contracts, the cross-border funds transfer process could be enhanced on a real-time payment-versus-payment system. The two central banks agreed to proceed with further joint research in relevant areas, including exploring business cases and connections to other platforms, involving participation of banks and other relevant parties in cross-border funds transfer trials.

### 8.4.3 Establishment of a Joint Research Group Among Six Central Banks

While many central banks acknowledge the great potential of applying DLT to the existing wholesale systems, most of them believe that the
technology has not yet become sufficiently advanced to cope with technological issues and issues related to privacy protection and illegal activities. These central banks believe that the process of verifying transactions could be faster and most cost-efficient if the verifier were more centralized (through a group of selected commercial banks or a central bank), but then this approach would end up being similar to the existing centralized system (not necessarily becoming superior to the existing system). While the Federal Reserve has not actively investigated the feasibility of wholesale a CBDC, six central banks—the Bank of Canada, the Bank of England, the Bank of Japan, the European Central Bank, Sweden’s Riksbank, and the Swiss National Bank—and the BIS created a research group in January 2020 to share experiences and assess the potential cases for a CBDC in their jurisdictions. The group is co-chaired by Benoît Coeuré, head of the BIS Innovation Hub, and Jon Cunliffe, deputy governor of the Bank of England and chair of the Committee on Payments and Market Infrastructures. While the focus is likely to be on a wholesale CBDC, the group included the Riksbank, which focuses on a retail CBDC, perhaps to share its experience on e-krona projects. The group assesses economic, functional, and technical design choices related to a CBDC, including cross-border interoperability, and shares knowledge on emerging technologies. The issues examined will include whether an interest rate should be applied to a CBDC and if so, what rates would be appropriate as compared with the existing interest rate on excess reserves held by financial institutions. They may also focus on the application of DLT to the cross-border payments and settlement systems. It is somewhat puzzling that Singapore, which has been active in wholesale CBDC since 2016, did not become a member. By contrast, it is not so surprising that the Federal Reserve did not become a member, since the central bank has not developed a proof of concept for a CBDC. If these six central banks take a further step and plan to issue a wholesale CBDC in the future, it might lead to further collaboration. This may possibly include discussions related to the issuance of hegemonic digital currencies—a basket of CBDCs proposed by Mark Carney, as pointed out in Section 8.1—to reduce the dominance of the US dollar and associated problems in the future.

This recent initiative by central banks in developed economies may indicate that their view on DLT has become more positive partly because they felt threatened by Facebook’s announcement of the Libra project in June 2019, as pointed out in Chapter 7. The Libra project appears to have pressured these central banks so that they have begun to pay greater attention to the feasibility of DLT and a CBDC. In particular, a positive view on developing a wholesale CBDC
was expressed in December 2019 by the Bank of France’s President François Villeroy de Galhau (Villeroy de Galhau 2019). He stressed that there would be some advantage in moving rapidly to issue a wholesale CBDC as the first issuer in the world to reap the benefits of having a benchmark CBDC. Moreover, he expressed the intention for the Bank of France to experiment with a wholesale CBDC in 2020. Villeroy de Galhau stressed that such an action would contribute to the work of the Eurosystem (which comprises the ECB and the national central banks of the member states in the euro area). This view is in line with the positive view the ECB’s President Christine Lagarde expressed in December 2019 of investigating a CBDC for European citizens and economies at the European Parliament (Lagarde 2019b).

**8.5 Conclusions on Central Bank Digital Currency Initiatives**

This chapter provided an overview of motivations for CBDCs and CBDC proposals. While a CBDC does not necessarily need to use DLT, many central banks increasingly focus on the application of DLT in CBDC issuance. The chapter focused on the potential application of DLT to central bank money issued to the general public or financial institutions. A growing number of central banks are actively studying CBDC feasibility and technological potential as well as potential risks and strategic responses. Central banks in Cambodia, the PRC, and Sweden are taking the lead in exploring retail CBDC projects aiming at actual implementation. Retail CBDCs are a digital version of cash and might promote attractiveness of central bank money. Retail CBDCs could provide depositors with a new, safer, and more liquid asset; enhance the effectiveness of monetary policy; and give central banks even greater capacity to monitor payment and settlement transactions. On the other hand, it should be debated further as to whether this would put central banks in direct competition with private banks for retail deposits (bank money), which could undermine the private banks’ retail base and incur new types of risks to central banks.

Meanwhile, central banks in Canada, the euro area, Japan, Singapore, Thailand, and other economies have focused on wholesale CBDC projects. With regard to a CBDC targeting financial institutions, central banks found that DLT could provide promising potential in enhancing efficiency of the existing financial infrastructure by enabling direct transfers of crypto assets among financial institutions and a central bank, irreversible record keeping tools, and programmable automation using smart contracts. Nevertheless, implementation may
take time since various technological and regulatory issues remain. Questions remain as to whether central banks should develop their own digital currencies or encourage the private sector to issue digital currencies with better regulation and supervision suitable to the rapidly expanding fintech environment. Although it will take time to form a consensus about the pros and cons of the CBDC proposals, various discussions and experiments have provided an opportunity to review the existing financial structure and the conduct of monetary policy.
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Growing Central Bank Challenges in the World and Japan
Low Inflation, Monetary Policy, and Digital Currency

Central banks are facing a range of growing challenges that have arisen from recent trends in aging populations, low productivity, and new technology and innovation. Growing Central Bank Challenges in the World and Japan offers insights for central banks looking to tackle the most pressing challenges under the global spotlight, starting with low inflation and its related impacts on unconventional monetary policy and policy coordination, including fiscal stimulus. It also provides important insights into issues related to central bank money, private money, the emergence of crypto assets, and the prospect of central bank digital currency.

Part I focuses on examining the persistently low inflation in advanced economies and reviews various unconventional monetary easing tools. It summarizes recent discussions on new monetary policy frameworks that could become alternatives to existing flexible inflation targeting, such as average inflation targeting and price-level targeting, as well as policy coordination, including helicopter money and modern monetary theory.

Part II sheds light on issues related to money, crypto assets, and central bank digital currency in advanced and emerging economies. It highlights the global rise in cash in circulation and gives an overview of the recent movements in private money, including bank deposits and e-money payment tools. It also examines the latest developments in crypto assets, including various types of “stablecoins” and Facebook’s Libra, reviews central bank digital currency proposals, and discusses the recent views expressed by regulatory authorities while incorporating new perspectives based on the coronavirus disease (COVID-19) outbreak.

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