

## Background to the Recent Decline in the Growth Rate of Banknotes in Circulation

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The year-on-year growth rate of banknotes in circulation surged during the period before the blanket deposit insurance was partially removed in April 2002, but became sluggish thereafter, and is recently at around 1 percent. Demand for banknotes is influenced mainly by transaction demand, the opportunity cost of holding them, the degree of financial system stability, and the cost of withdrawing and depositing them. The recent slowdown in the growth rate of banknotes in circulation is partly due to the fact that the effect of additional demand for banknotes stemming from the decrease in the opportunity cost of holding them has been subsiding during the prolonged period of extremely low interest rates, and partly because the financial system is regaining stability. Against this background, the growth rate of banknotes in circulation is likely to continue to follow a moderate downtrend.

### Introduction

Banknotes are printed at the National Printing Bureau<sup>1</sup> and are issued by the Bank of Japan. They enter circulation when financial institutions obtain them at the head office and branches of the Bank by debiting their current accounts at the Bank. Households and firms obtain them by debiting their accounts at financial institutions. Banknotes are used as a means of payment for the purchase of goods and services and small-value financial transactions between firms. Thus, developments in banknotes are closely related to overall economic activity. In addition, developments in banknotes, which are financial assets, are influenced by returns on and prices of other financial assets.

The outstanding amount of banknotes issued is currently at around 70 trillion yen, of which households hold slightly more than 50 percent, firms a little less than 40 percent, and financial institutions about 10 percent. By denomination, 10,000 yen notes account for about 90 percent in value, 1,000 yen notes about 5 percent, 5,000 yen notes about 3 percent, and 2,000 yen notes about 1 percent. At present, banknotes account for about 65 percent of the monetary base (the total of banknotes and coins in circulation and the current accounts held at the Bank).

This paper discusses recent developments in banknotes in circulation and their background. Specifically, it points out features of recent developments in banknotes, summarizes factors that have influenced

demand for banknotes, and analyzes the background to the recent decline in the growth rate of banknotes. Lastly the outlook for banknote growth is discussed.

### Recent Features of Banknotes in Circulation

#### *Downtrend of the Growth Rate*

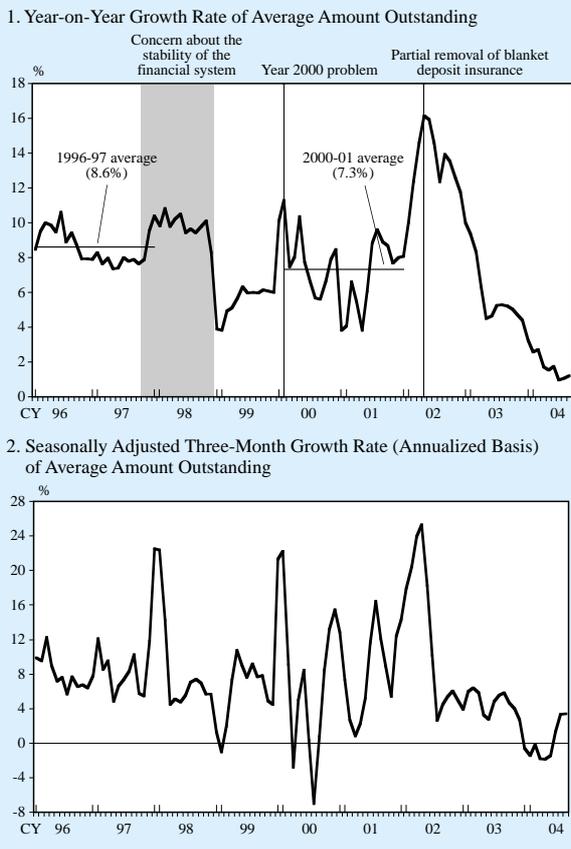
The year-on-year growth rate of banknotes in circulation has been on a downtrend and is recently at around 1 percent. Looking at the year-on-year growth rate of banknotes in circulation, it surged during the period before the partial removal of the blanket deposit insurance in April 2002,<sup>2</sup> then fell sharply until around spring 2003. Since then, the growth rate has been declining at a moderate pace and is recently at around 1 percent (Chart 1).

The seasonally adjusted three-month growth rate (on an annualized basis) of banknotes declined to around 4 percent in the middle of 2003 after having surged around spring 2002. However, the downtrend in the growth rate became distinct from the latter half of 2003, and it temporarily fell below zero percent. Recently, it has been increasing slightly.

#### *The Extremely High Ratio of the Amount of Banknotes in Circulation to Nominal GDP*

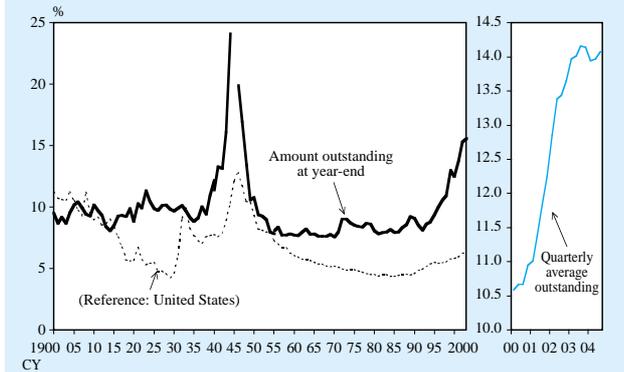
The amount of banknotes in circulation is recently at extremely high levels. The long-term trend of the ratio of the amount of banknotes in circulation to nominal GDP

### Chart 1 Banknotes in Circulation



had been stable at around 8 percent until the first half of the 1990s (Chart 2). However, the ratio surged from the second half of the 1990s and recorded 15.4 percent at the end of 2003, the highest level since World War II. Although the growth rate has been declining slightly since its peak in 2003, it is still extremely high compared with its long-term trend.

### Chart 2 Ratio of Banknotes in Circulation to Nominal GDP

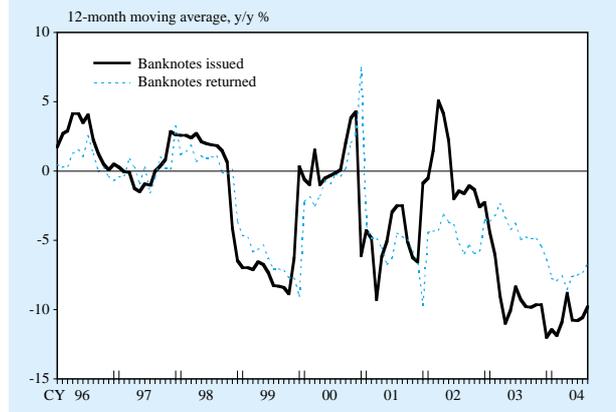


### A Drop in Banknotes Issued by and Returned to the Bank

Both the amounts of banknotes withdrawn from and returned to the Bank by financial institutions have been declining substantially.<sup>3</sup> They both increased in 2000

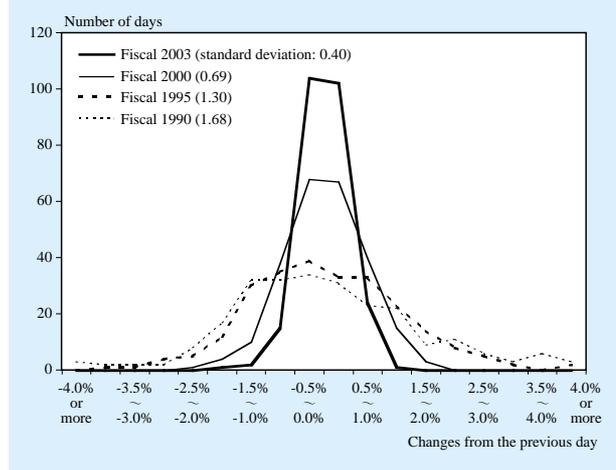
after having declined in 1999, but they started to decline again from 2001. Recently they have been declining by around 10 percent on a year-on-year basis (Chart 3).

### Chart 3 Developments in Banknotes Issued by and Returned to the Bank



The decline reflects low levels of transactions of banknotes between financial institutions and the Bank. This is basically because transactions of banknotes between financial institutions on one hand and households and firms on the other are declining; households and firms do not seem to be depositing or withdrawing banknotes so frequently. As a result of the decline in the amount of banknotes withdrawn from and returned to the Bank, daily fluctuations in banknotes in circulation have been gradually becoming smaller (Chart 4).

### Chart 4 Distribution of Daily Changes in Amount Outstanding of Banknotes in Circulation



### Factors Influencing Demand for Banknotes

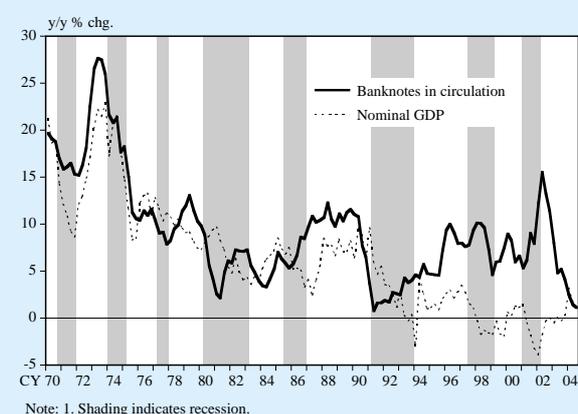
#### Basic Factors

#### Transaction Demand

Banknotes are a widely used payment instrument for various economic transactions, and they are used

especially for small-value payments.<sup>4</sup> One would therefore expect a strong correlation between economic activity and demand for banknotes: demand for banknotes rises as buoyant economic activity increases transaction value. In fact, the amount of banknotes in circulation and nominal GDP generally showed a positive correlation until the early 1990s: banknotes in circulation increased during periods of economic expansion while they declined during recessions (Chart 5). However, since the second half of the 1990s, no positive correlation has been observed, because the impact of the opportunity cost of holding banknotes and financial system stability has been greater than that of transaction demand.

**Chart 5 Banknotes in Circulation and Nominal GDP<sup>1</sup>**

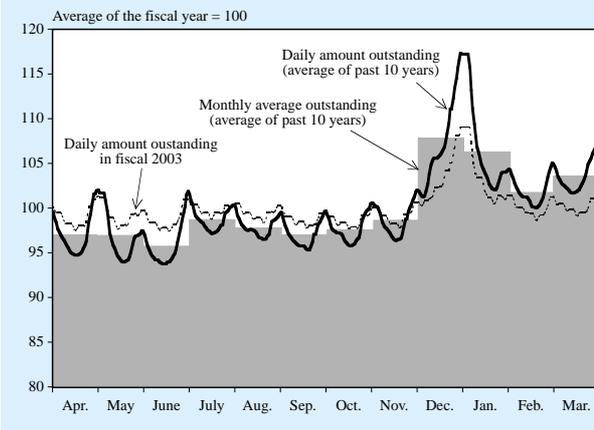


Transaction demand produces a distinct seasonal pattern in banknotes in circulation (Chart 6). On a weekly basis, the amount of banknotes in circulation increases before the weekend, reflecting increased demand for use in shopping and leisure activities on Saturdays and Sundays, while the amount decreases at the beginning of the week. On a monthly basis, the amount of banknotes in circulation increases during the last few days of the month when payroll payments and settlement of various transactions increase, while the amount decreases early in the following month. On a yearly basis, the amount of banknotes in circulation increases in December due to payment of winter bonuses and withdrawal of extra cash to prepare for the end of the year and the New Year. It also increases during the weeks in late April and early May which include several national holidays, due to demand for cash to spend during that period. However, as a result of the decline in banknotes withdrawn from and returned to the Bank, the seasonal pattern in banknotes in circulation has become less distinct since the 1990s.

#### *Opportunity Cost of Holding Banknotes*

Banknotes do not bear interest, so there is an opportunity cost involved in holding them. The

**Chart 6 Seasonal Pattern of Banknotes in Circulation**

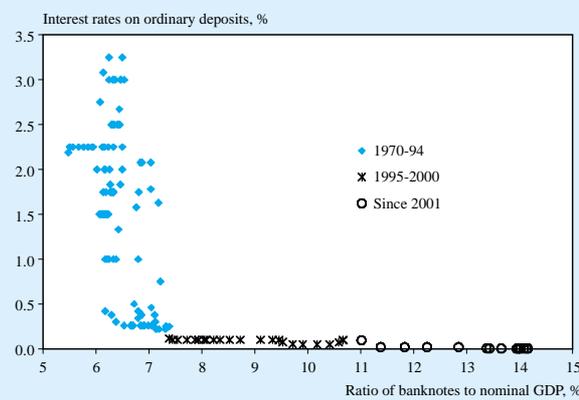


opportunity cost is the return which could have been obtained by investing in other assets instead of holding banknotes. Thus, demand for banknotes declines when the opportunity cost increases and vice versa.

For households and firms, the opportunity cost is the return on financial assets which can be substituted for banknotes. One of the most common opportunity costs is the interest rate on ordinary deposits, which have high substitutability for banknotes. Interest rates on term deposits, yields on government bonds, and gains from stocks can be an opportunity cost, although they have lower substitutability for banknotes than ordinary deposits. Furthermore, demand for banknotes can be influenced by changes in the return on real assets due to fluctuations in the economic growth rate and the inflation rate.<sup>5</sup>

Looking at the relationship between demand for banknotes and the opportunity cost, the ratio of banknotes in circulation to nominal GDP is negatively correlated with interest rates on ordinary deposits: demand for banknotes increases as interest rates decline (Chart 7). Particularly since the middle of the 1990s, the downward slope has become almost flat with extremely low interest rates, indicating that a small decline in interest rates substantially increases demand for banknotes.

**Chart 7 Interest Rates on Ordinary Deposits and Banknotes in Circulation**



## *Stability of the Financial System*

Demand for banknotes is influenced by changes in confidence in financial system stability as perceived by households and other economic agents and by changes in the environment surrounding the financial system. For example, if a bank failure raises concerns about the financial system, economic agents tend to withdraw deposits from banks to increase their banknote holdings. On the other hand, if confidence in financial system stability increases, banknotes held by economic agents will shift back to bank deposits.

Such demand for banknotes can also be considered as demand based on a kind of opportunity cost: the return on deposits adjusted for risks. In other words, the expected return falls in proportion to the extent of the decline in depositors' confidence in the safety of bank deposits. Thus, the decline in the opportunity cost of holding banknotes increases demand for them.

### *Costs of Withdrawing and Depositing Banknotes at Banks*

The cost of adjusting the balance of banknotes, i.e., the cost involved in withdrawing and depositing banknotes, also influences demand for banknotes.

For example, if fees for withdrawing cash from automated teller machines (ATMs) decline, households will withdraw banknotes more frequently as the need arises, not holding more banknotes than necessary at home. In this case, the average amount of banknotes in circulation declines. A reduction in traveling costs would influence demand for banknotes in a similar way.

In addition, the cost involved in the safekeeping of banknotes influences demand for them. Even though banknotes are individually very light, large numbers weigh a considerable amount. There is also the risk of loss or theft during safekeeping and transportation. These costs rise as the number of banknotes held increases, and therefore an increase in banknotes in circulation has in itself a dampening effect on demand for banknotes.

### *The Relationship between Extremely Low Interest Rates and Demand for Banknotes*

In the current situation where interest rates are extremely low, it should be noted that developments in demand for banknotes are quite different from those under normal circumstances.

When interest rates are extremely low, the opportunity cost of holding banknotes is close to zero, and thus a shock that boosts demand for banknotes may easily trigger a large shift from deposits to banknotes. For

example, in a situation where there is concern about financial system stability, depositors may consider the risk-adjusted return on deposits to be extremely low when interest rates are low. In such a situation, demand for banknotes, which are risk-free assets, will surge even though the return on banknotes is nil.

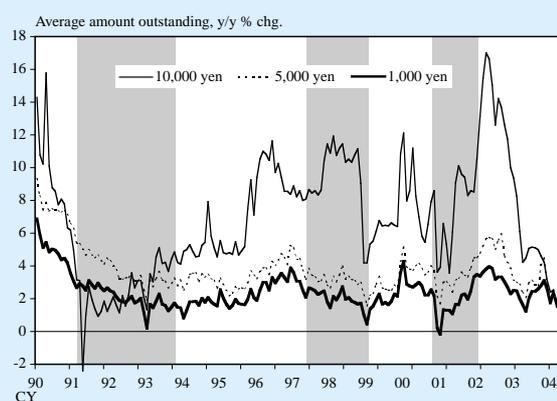
On the other hand, once a large amount of banknotes enters circulation, the amount outstanding will not decline easily even after the effects of a shock that boosts demand subside. This is because, given that the opportunity cost of holding banknotes is extremely small, the return on deposits adjusted for the cost related to depositing banknotes is negative, and it pays to hold banknotes at home.

## **Factors behind the Recent Fluctuations in Banknotes in Circulation**

Recent fluctuations in banknotes in circulation can be explained by the following factors.

First, demand for banknotes stemming from transaction demand seems to be increasing in line with the economic recovery. 1,000 yen notes—which are more easily influenced by transaction demand and have a relatively strong correlation with economic activity—continue to show relatively stable growth while growth of 10,000 yen notes and 5,000 yen notes has become sluggish (Chart 8).<sup>6</sup>

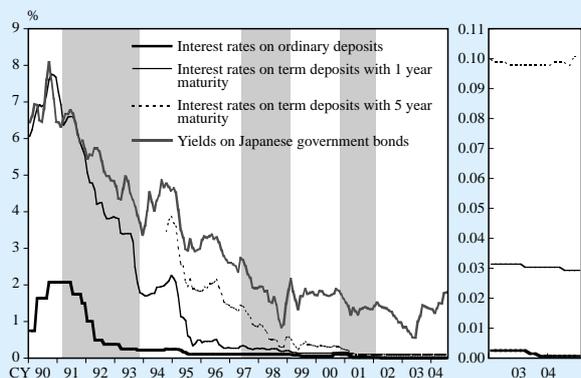
**Chart 8 Amount of Banknotes in Circulation by Denomination**



Second, the effect of additional demand for banknotes stemming from the low opportunity cost is subsiding recently. Looking back in the 1990s, the decline in the opportunity cost reflecting the decrease in interest rates on deposits increased demand for banknotes. Particularly since the second half of the 1990s, a slight decline in interest rates has substantially boosted demand for banknotes because the opportunity cost has declined to

almost zero. However, in recent months, the effect on banknotes in circulation of additional demand for banknotes is subsiding gradually in a prolonged period of extremely low interest rates. Interest rates on term instruments declined moderately throughout the 1990s, but they have hardly changed since around 2001 (Chart 9). Some interest rates have declined slightly, for example those on ordinary deposits in 2003, but there has been no further decline since then. Furthermore, it is possible that the increase in stock prices and long-term interest rates since 2003 has somewhat reduced demand for banknotes by raising the opportunity cost.

**Chart 9 Opportunity Cost of Holding Banknotes<sup>1, 2</sup>**



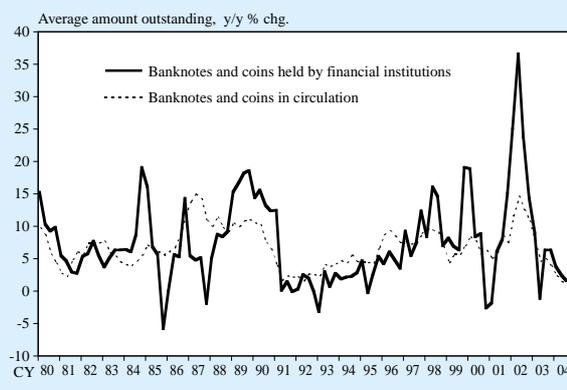
Notes: 1. Interest rates on term deposits through February 1994 are the weighted average of new receipts, and those from March 1994 are interest rates offered at banks' counters.  
 2. Interest rates on term deposits are for those of less than 3 million yen. Interest rates on term deposits are for those of more than 10 million yen until October 1991, and for those of more than 3 million yen but less than 10 million yen during November 1991 and May 1993.

Third, demand for banknotes due to concern about financial system stability seems to be declining. During 1997-1998 when concern about financial system stability increased, demand for banknotes surged. It also surged when the blanket deposit insurance was partially removed in 2002 (Chart 1). The increase in demand for banknotes stemming from concern about financial system stability was especially large at the time of the partial removal of the blanket deposit insurance since the opportunity cost of holding banknotes had already declined considerably.<sup>7</sup> Recently, however, demand for banknotes due to concern about financial system stability seems to be declining. This is because the financial system is regaining stability and households' and firms' confidence in financial system stability seems to have improved thanks to progress in the disposal of nonperforming loans, the recovery in banks' profits, and the rise in bank stock prices.

If confidence in financial system stability were to decrease, as when blanket deposit insurance was partially removed, not only households and firms but also financial institutions would increase their holdings of banknotes. Recently, the growth rate of banknotes held by financial

institutions has been slowing sharply due to the increase in confidence in financial system stability, and this has contributed to the decline in the growth rate of banknotes in circulation (Chart 10).

**Chart 10 Currency Held by Financial Institutions**



It should be noted that, although the financial system is regaining stability, the pace of decline in the growth rate of banknotes in circulation has been very slow. In fact, the amount of banknotes in circulation as a percentage of nominal GDP has recently risen to about 14 percent from slightly less than 13 percent at the time before the partial removal of the blanket deposit insurance. This is due to a peculiarity of demand for banknotes when interest rates are extremely low, as described earlier. Given that the opportunity cost of holding banknotes is almost zero and there are costs involved in withdrawing and depositing banknotes, households and firms are reluctant to go to banks frequently to deposit extra banknotes that they hold. For this reason, daily fluctuations in banknotes in circulation are small, and the amount of banknotes in circulation has remained at a high level.

Lastly, net changes in the costs of withdrawing and depositing banknotes are not clear. For example, while major banks charge fees for using ATMs on Saturdays, they have reduced the fees for selected customers. In addition, as the number of ATMs placed by banks and ATM management companies at convenience stores has increased, it has become more convenient to withdraw and deposit banknotes, thereby reducing the cost, although it is difficult to measure quantitatively.<sup>8</sup> Meanwhile, the cost of holding and safekeeping banknotes is rising in line with the increase in banknotes in circulation.

To summarize, the recent decline in the growth rate of banknotes in circulation is mainly due to the following factors: the effect of increased demand for banknotes due to the decline in interest rates is gradually falling off; and the financial system is regaining stability. At the same time, the pace of decline in the growth rate of banknotes

in circulation is slow despite increased financial system stability because interest rates are extremely low.

## The Outlook

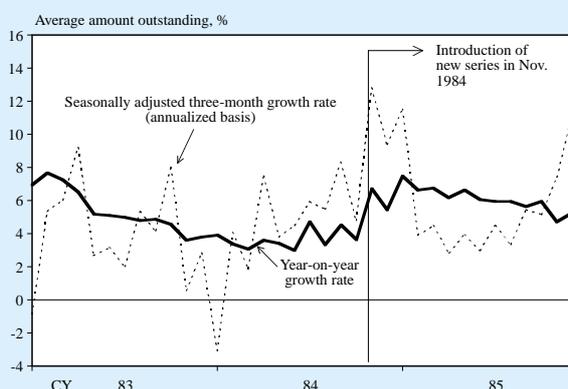
Although transaction demand is expected to continue increasing as the economy continues to recover, the growth rate of banknotes in circulation is likely to continue to follow a moderate downtrend, as long as the financial system continues to regain stability and households' and firms' confidence in financial system stability increases. This is against the background that low interest rates on deposits have been continuing for a long time and the opportunity cost of holding banknotes is increasing slightly as seen in higher long-term interest rates and stock prices.

Over the long term, when the economy eventually returns to normal, the ratio of the amount of banknotes in circulation relative to nominal GDP is expected to decline to the long-term trend.

In the immediate future, however, it should be noted that banknotes in circulation may fluctuate substantially due to the issuance of a new series of banknotes in November 2004 and the full removal of blanket deposit insurance in April 2005.

When the new series of banknotes are issued, the growth rate of banknotes in circulation may rise temporarily, as it did, by a few percentage points, in November 1984, the last time when new banknotes were issued (Chart 11). On the other hand, banknotes in circulation may decline because households may deposit banknotes at banks instead of keeping them at home when the new series are issued, since their banknote holdings are already large.<sup>9</sup>

**Chart 11 Developments in Banknotes in Circulation due to Introduction of New Series in 1984**



When the blanket deposit insurance is fully removed in April 2005, the growth rate of banknotes in circulation may temporarily increase slightly, but not to the level of

the spring of 2002 when the blanket deposit insurance was partially removed, because financial system stability has increased since then.

<sup>1</sup> The Printing Bureau of the Ministry of Finance until March 31, 2003.

<sup>2</sup> The year-on-year growth rate was 16.2 percent, the highest level recorded since April 1975, in the period after the first oil shock, when it was 17.1 percent.

<sup>3</sup> The principal channel of circulation starts when financial institutions obtain banknotes at the counters of the Bank's head office and branches (this is called issuance of banknotes). Individuals and firms then obtain banknotes by withdrawing money from their deposit accounts at financial institutions. Banknotes are used for various purposes, and then they return to the Bank through financial institutions (this is called withdrawal of banknotes from circulation).

<sup>4</sup> Banknotes have the following characteristics. First, they are used to make payments for a wide range of economic transactions (general usability). Second, they are payment instruments, which finalize settlement (settlement finality). Third, they guarantee anonymity, since it is difficult to know who used them when, where, or for what purpose (anonymity).

<sup>5</sup> The relationship between demand for banknotes and the expected inflation rate is as follows. A decline in the expected inflation rate due to a fall in prices lowers nominal interest rates on financial assets, which increases demand for banknotes. Thus, changes in the expected inflation rate influence demand for banknotes through changes in nominal returns on financial assets. When nominal interest rates reach zero percent, the decline in the expected inflation rate cannot push down nominal interest rates any further. Even in this situation, if banknotes are substitutable for real assets, the decline in the expected inflation rate will raise demand for banknotes through the reduction of nominal returns on real assets. In this case, the expected inflation rate influences demand for banknotes through a channel other than nominal returns on financial assets.

<sup>6</sup> Recently, new payment instruments for small payments are increasingly used, but so far there is no evidence that they have greatly influenced demand for banknotes.

<sup>7</sup> As described earlier, even a small demand shock boosts demand for banknotes substantially when interest rates are extremely low.

<sup>8</sup> The total number of ATMs placed at convenience stores by IY Bank, Sumitomo Mitsui Banking Corporation, Lawson ATM Networks, and E-net amounts to about 19,000, about 15 percent of the total number of ATMs in Japan including those at banks.

<sup>9</sup> As described earlier, individuals are reluctant to pay the cost to deposit banknotes they hold when the opportunity cost of holding them is almost zero. However, individuals feel that they may as well deposit banknotes kept at home when they have to go to banks to obtain new banknotes.

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