# The Role of the Money Stock in Conducting Monetary Policy

## SUMMARY[1]


### 1. Introduction

Examining economic and financial developments since the 1990s, this paper discusses (1) the role of the money stock within the Bank of Japan's monetary policy and (2) why the relationship between the money stock and economic activity has been unstable in Japan.

### 2. The Characteristics of the Money Stock

The money stock is conceptually defined as the total amount of money circulating in the whole economy. Although specific components vary depending on the time and the country, money is generally composed of financial assets with high liquidity (where liquidity refers to the convenience with which an asset may be used to make payment). Movements in the money stock depend on the interaction between the credit creation behavior of financial institutions that take deposits, make loans, and invest in securities and the money demand of firms and households. A central bank implements market operations, targeting the short-term interest rate or current account balances at the central bank, and these influence the money stock as financial institutions, firms, and households change their respective financial portfolios.

### 3. Historical Changes in the Role of the Money Stock within Monetary Policy in Major Countries

In the 1970s, many major central banks in Europe and North America used the money stock as an intermediate monetary policy target; however, this type of policy was abandoned during the 1980s and the 1990s. The currently accepted wisdom is that it is operation on the short-term interest rate that influences the real economy, and thereby achieves price stability.

Although the money stock may no longer be adopted as an intermediate target of monetary policy, it is nevertheless used as an "information variable" for the following reasons. First, conceptually, the money stock may be considered to offer a reasonable reflection of the overall level of economic activity in the sense that all economic transactions involve the transfer of funds. It is also widely accepted that "inflation is a monetary phenomenon" in the long run. Second, in an environment in which there exists some uncertainty about the economic structure and the transmission mechanism of monetary policy, analysis of the money stock is generally considered useful in cross-checking assessments of the economic situation generated using other economic variables.

The importance attached to the money stock as an information variable in conducting monetary policy depends on the extent to which the money stock contains useful information regarding future price developments that cannot be derived from other financial and real economic indicators. Where the money stock contains such unique information, it is considered to have a certain role to play within monetary policy. Specifically, the economic outlook formed on the basis of the money stock is especially effective as a cross-check of outlooks that depend mainly on developments in the real economy and other financial indicators. In the alternative case, in which the money stock merely tracks movements in the real economy and prices induced by central bank operation on the short-term interest rate, the money stock is treated as just one of many economic indicators. While the European Central Bank (ECB), adopting the former view, attaches relatively high importance to the money stock, the Board of Governors of the Federal Reserve System (FRB) considers the money stock just one of many economic indicators because the relationship between the money stock and economic activity has been unstable in the United States.

### 4. Relationship between the Money Stock and Economic Activity in Japan

During the 1970s and the early 1980s, in spite of two oil shocks, long-run relationships that evince both stability and causality may be observed between the money stock and the real economy and between the money stock and prices in Japan. However, with the emergence of the bubble in the latter half of the 1980s, the relationship between the money stock and economic activity became harder to discern. Taking an overview of the whole period of the emergence and bursting of the bubble, movements in asset


*1.* This is an English translation of the original paper released in Japanese on December 24, 2002. Opinions presented here are based on data and information available when the original was written. For a key to the symbols and abbreviations used in this article, see page 52.

prices ultimately had a significant impact on the real economy, albeit with a long lag, so that the observation that large fluctuations in the money stock imply large fluctuations in economic activity still holds. In contrast, however, during the period since the mid-1990s, although movements in the money stock have been relatively small, economic activity has fluctuated considerably. For this reason, it is currently impossible to detect a long-run stable relationship (a long-run equilibrium relationship) between the money stock and economic activity.

In Japan's economy since the 1990s, there are two factors in particular that are deemed responsible for the failure of corporate demand for loans to rise in spite of the aggressive monetary easing. These are reductions in the excess liabilities of firms; and downward pressure on financial institutions' capital due to the disposal of nonperforming loans (NPLs), both of which have been seen since the early 1990s. Both are thought to have suppressed the growth rate of the money stock.

The first reason why the long-run stable relationship between $M_2$+CDs and economic activity has broken down springs from the reductions in the excess liabilities of firms and from the NPL problems that stemmed from the emergence and bursting of the bubble. These have continuously influenced Japan's economy, and the anxieties over the financial system emerged through late 1997 and 1998, causing a large increase in precautionary demand.

The second reason is the large shifts of funds from assets outside the money stock to those within the money stock, which has occurred as a result of the extremely low level of short-term interest rates since 1999. The Bank adopted the so-called "zero interest rate" policy in 1999, and since 2001 has maintained the so-called "quantitative easing" policy where the main target of market operations has been the outstanding balance of current accounts at the Bank. As a result of this, large shifts of funds to deposits from other financial assets have been observed because short-term interest rates have declined to virtually zero and money demand has been very elastic vis-à-vis the opportunity cost. Moreover, it is highly likely that such fund-shifts have been encouraged by the increasing demand for risk-free assets, which has reflected various factors including financial system problems.

## 5. Current Role of the Money Stock in Conducting Monetary Policy

As mentioned above, the relationship between the money stock and economic activity has recently been unstable in Japan.

While the growth rate of the monetary base has risen substantially since the adoption of the "quantitative easing" policy, that of the money stock has not risen correspondingly. For the money stock to increase in line with increasing economic activity presupposes, at the very least, that the financial intermediation function of financial institutions is restored, that the transmission mechanism of monetary policy is fully functional, and that the private sector resumes its fund-raising activities, while it also depends to a certain extent on the operation and effectiveness of fiscal policy.

In the current situation, it is difficult not only to collect important information about current and future economic developments from movements in the growth rate of the money stock, but also to see the effects of monetary policy. In order to evaluate the effects of monetary policy, it is therefore deemed appropriate to look closely at the prices of various financial assets, real economic variables, price developments, and also the fund-raising behavior of firms and households.

The money stock, however, is considered to have the characteristic of being a comprehensive indicator that reflects activity in the economy as a whole. The relationship between the money stock and economic activity may be expected to stabilize in the future if the financial intermediation function of financial institutions is fully restored and short-term interest rates rise significantly above zero. No one could deny that, in such a case, the price information contained in the money stock would once again become important in conducting monetary policy, given that uncertainty exists regarding the economic structure and the monetary policy transmission mechanism. Bearing these possibilities in mind, the Bank intends not only to carry on analyzing movements in the money stock, but also to continue examining the appropriateness of individual components of the money stock and updating the role of the money stock in the conduct of monetary policy.

## I. Introduction

In discussions regarding the economic outlook and monetary policy, the money stock is an important variable. When the discussion turns to the money stock in Japan, there seem to be, broadly speaking, two points of interest.

The first concerns the relation between the money stock and monetary policy. Questions of interest range from the role of the money stock within the Bank's monetary policy, to why the monetary stock is not increasing in line with the increases made to the monetary base as part of the "quantitative easing" policy, and whether or not the Bank ought to increase the money stock further in order to escape from deflation.

The second point relates to how the recent lack of stability in the relationship between the money stock and economic activity should be understood. The year-on-year growth of $M_2$+CDs (Chart 1), the representative indicator of the money stock in Japan, has remained, since the mid-1990s, within a relatively narrow range around 3 percent, with a high of 5 percent (first quarter of 1998) and a low of 2 percent (third quarter of 2000). In contrast, the year-on-year growth of real GDP has experienced severe fluctuations during the same period, with a high of 4 percent (second quarter of 2000) and a low of –3 percent (first quarter of 2002). The year-on-year rate of increase in the consumer price index (CPI) has declined continuously since its peak of 1 percent in the fourth quarter of 1997 and has been hovering around –1 percent recently. Meanwhile, land prices have fallen considerably since the bursting of the bubble. To sum up, the relationship between the money stock and economic activity has been unstable recently. Whereas previously large movements in the growth rates of the real economy, prices, and land prices had roughly corresponded in the long run to movements in the growth rate of the money stock, this no longer appears to be the case (Chart 2).

The relationships between the money stock and monetary policy and between the money stock and economic activity have been actively discussed not only in Japan but also in other major countries. Through the experience of trial and error, understanding of the money stock in the major central banks has also undergone a change. Bearing in mind these experiences, this paper looks at the recent relationships between the money stock and the real economy and between the money stock and the prices, and also discusses the role of the money stock within the Bank's monetary policy. The paper is composed as follows. Section II describes the composition of the money stock. Section III refers to the experiences of the major central banks to explain how understanding of the role of the money stock within monetary policy has changed. Section IV examines empirically the relationship between the money stock and economic activity in Japan. Section V analyzes the reasons for the relatively low growth rate of the money stock in Japan since the mid-1990s and explains the background of the recent unstable relationship between the money stock and economic activity. Concluding remarks are presented in Section VI.

## II. Composition and Basic Characteristics of the Money Stock

### A. Definition of the Money Stock

The money stock is conceptually defined as the "total amount of money circulating in the economy as a whole." Specific components used in compiling the money stock statistics are not necessarily standardized internationally due to institutional and historical differences between countries. The following points are, however, common across international definitions.

- The money stock (or money) is composed of financial assets with high liquidity, i.e., those which can most conveniently be used for payment purposes, while broader definitions of the money stock include less liquid financial assets.
- All economic agents are basically classified into one of the following three categories: "money issuers" that issue those financial assets included in the definition of money stock; "money holders" that hold such assets; and the central government.
- Basically, the central bank and private depositary institutions are usually defined as "money issuers," and all economic agents except money issuers and the central government are defined as "money holders."

The following provides an overview of the money stock statistics in Japan based on the framework detailed above.

**1. Financial assets composing the money stock**

The Bank currently compiles and releases four money stock indexes: $M_1$, $M_2$+CDs, $M_3$+CDs, and

broadly-defined liquidity (Chart 3).[2] $M_1$ includes cash currency, which is the most liquid of financial assets, and demand deposits, whose liquidity is the second highest. The figure for average $M_1$ outstanding in March 2002 was 298 trillion yen. $M_2$+CDs comprises $M_1$ and, in addition, time deposits, certificates of deposit (CDs), etc., which are relatively highly liquid but not as liquid as the components of $M_1$. The figure for average $M_2$+CDs outstanding in March 2002 was 663 trillion yen. $M_3$+CDs comprises $M_2$+CDs and, in addition, deposits of post offices, other savings and deposits with financial institutions, and money trusts. The corresponding figure for $M_3$+CDs was 1,119 trillion yen. Broadly-defined liquidity is composed of $M_3$+CDs and investment trusts, bank debentures, Japanese government securities (JGSs), and other assets with lower liquidity than the components of $M_3$+CDs. The corresponding figure for broadly-defined liquidity in March 2002 was 1,314 trillion yen.

**2. Money issuers**

Money issuers that issue those financial assets included in the money stock comprise banks that issue deposits, the central bank that issues cash currency, post offices that provide postal savings accounts similar to private deposits, and so on. More specifically, the money issuers of $M_1$ and $M_2$+CDs include the Bank, domestically licensed banks (banking accounts only), foreign banks in Japan, *shinkin* banks, the Shinkin Central Bank, the Norinchukin Bank, and the Shoko Chukin Bank (Chart 4). The money issuers of $M_3$+CDs comprise the issuers of $M_2$+CDs and, in addition, post offices, the financial institutions with whom "other savings and deposits with financial institutions" are held (e.g., credit cooperatives), and domestically licensed banks (trust accounts). The money issuers of broadly-defined liquidity include, in addition to those of $M_3$+CDs, the central government, foreign bond-issuing organizations, etc.

**3. Money holders**

Money holders that hold the financial assets composing the money stock usually include all resident agents, except money issuers and the central government. In Japan, their scope is defined to include corporations, individuals, local public authorities, municipal enterprises, and public corporations, excluding money issuers of $M_2$+CDs, the central government, and financial institutions involved in loan businesses (Chart 4).

While the definitions of the money stock used in the United States and the euro area[3] possess many of the same features as that used in Japan, some differences can also be found (Chart 5). For example, in the United States the classification of some financial assets into money stock categories is carried out based on the face value of the asset in question or the identity of the holder. Specifically, while small-denomination time deposits in amounts of less than 100,000 U.S. dollars and retail money market mutual funds (MMMFs) are included in $M_2$, large-denomination time deposits in amounts of 100,000 U.S. dollars or more and institutional money funds are included in $M_3$. In the euro area, while deposits and bonds with maturities of up to two years are included in the money stock, those with maturities longer than two years are not. This distinction in the euro area reflects the underlying thinking that components of the money stock should not be chosen with reference only to the extent of their liquidity, but that efforts should be made to exclude those financial assets held mainly for the purposes of storing value.

## B. Factors Determining Movements in the Money Stock: Interaction between the Central Bank, Private Financial Institutions, and Money Holders

Cash currency provided by the central bank is only a small part of the money stock. The greater part consists of deposits that are provided by financial institutions such as banks. Deposits are created through the credit creation process in which financial institutions provide funds to the nonfinancial sector in the form of loans and securities investment. Therefore, movements in the money stock depend in part on the credit creation behavior of financial institutions. Although the determinants of financial institutions' credit creation behavior are complicated, the following factors at least are influential. The first factor is the fund-raising costs of financial institutions. When the short-term interest rate changes, fund-raising costs also change, and this in turn affects the credit creation behavior of financial institutions. The second factor is the risk-adjusted rate of return on loans and securities investment.

2. Bank of Japan, Research and Statistics Department (2001) explains the definition and compilation of these money stock indexes in detail.
3. Hereafter, the euro area refers to countries that participate in Economic and Monetary Union (EMU) unless otherwise noted.

Credit creation behavior becomes less aggressive when there are fewer attractive opportunities for investment. The third factor is financial institutions' liquidity positions. The term structure of financial institutions' assets and liabilities is usually characterized by liabilities with shorter maturities and assets with longer maturities. When financial institutions become conscious of liquidity risk, they tend to increase their cash currency holdings and their current account balances at the central bank and to become more conservative in extending credit to the nonfinancial private sector. The fourth factor relates to the condition of financial institutions' capital that acts as a buffer in case of unexpected loss. A financial institution whose level of capital is not sufficient behaves less aggressively in credit creation.

In addition to being affected by the credit creation behavior of financial institutions, the money stock is also greatly influenced by the demand for money of money holders such as firms and households. While the determinants of firms' and households' demand for money are complicated, the following factors at least are influential. The first factor relates to the scale of transactions and the total amount of income and assets. The second factor is the opportunity cost of holding money. When there is a general decline in the level of interest rates, and thus in the opportunity cost of holding money, this causes the demand for money to increase. The third factor relates to preferences for the liquidity service that money provides. For example, money demand increases in situations when financial system instability makes it likely that obtaining additional liquidity in the future will be more difficult.

To sum up, movements in the money stock depend on the interaction between the credit creation behavior of financial institutions and the money demand of firms and households. The central bank's monetary policy thus influences the money stock by affecting the credit creation behavior of financial institutions and the selections made by firms and households among assets and liabilities.

## III. Historical Changes in the Role of the Money Stock in Conducting Monetary Policy

In Japan and the other major countries, monetary policy aims to contribute to the sound development of the national economy through the pursuit of price stability. In conducting monetary policy, central banks make use of a number of different pieces of information to put together a careful picture of the current and future economic outlook. The following section uses the experience of the major countries in Europe and North America as an illustration to explain the role played by the money stock, and the use to which it is put in conducting monetary policy.

### A. Role as Intermediate Target

This subsection explains the treatment of the money stock as a "policy variable," and especially as an "intermediate target" (Chart 6). A policy variable is an economic variable that is treated as a target in conducting monetary policy. To treat the money stock as an intermediate target, the following preconditions have to be satisfied.

- **Stable relationship between the money stock and the "primary objective" of monetary policy:** The relationship between the money stock and price level, whose stability is the "primary objective" of monetary policy, should be stable or at least predictable.
- **Controllability by the central bank:** The central bank should be able to control movements in the money stock precisely by operating on policy instruments such as the short-term interest rate and current account balances held at the central bank.

Given these preconditions, treating the money stock as an intermediate target implies that, in implementing monetary policy, the central bank targets the growth rate of the money stock, operating on its policy instruments (e.g., the short-term interest rate or current account balances held at the central bank) to achieve a growth rate of the money stock within the range consistent with "price stability." This monetary policy strategy is generally called "monetary targeting."

Monetary targeting was employed by the major central banks in Europe and North America during the 1970s and the 1980s, although there existed some differences in the extent to which it was rigidly applied (Chart 7). In the case of the FRB, the Federal Open Market Committee (FOMC) stated in a directive to the Federal Reserve Bank of New York issued in March 1970: "To implement this policy, the Committee desires to see moderate growth in money and bank credit over the months ahead." In April 1975, the FRB officially announced for the first time the growth ranges for the coming year and, as

required by the Humphrey-Hawkins Act (the Full Employment and Balanced Growth Act of 1978), which Congress passed in August 1978, the FRB adopted growth targets for the money stock each year and reported to Congress twice a year on the relationship between these targets and the economic outlook. From October 1979 to September 1982, the FRB employed non-borrowed reserve targeting in order to control the growth rate of $M_1$, tolerating substantial volatility in the short-term interest rate. In West Germany, the Bundesbank announced the adoption of monetary targeting in December 1974 and chose the growth of the central bank money stock as the target. Both the Bank of Canada (BOC) in January 1975 and the Bank of England (BOE) in July 1976 adopted monetary targeting for the purpose of slowing inflation.

There is, however, no central bank in any major country that now considers the second of the above preconditions to be satisfied. Likewise, regarding the first precondition, relationships between the money stock and the primary objective have become to a greater or lesser degree unstable, following financial deregulation and technological innovations in financial sectors since the latter half of the 1980s. While the relationship with some broader measures of the money stock may exhibit stability, another problem then emerges, in that the broader the definition of the money stock the lower the degree of controllability.[4] Given this situation, treating the money stock as an intermediate target was judged not to enhance the credibility of monetary policy in terms of its transparency and accountability. Therefore, major central banks in Europe and North America abandoned monetary targeting one after another during the 1980s and the 1990s (Chart 7).[5]

In the United States, the relationship between the money stock and economic activity has been unstable since the early 1990s, when the development and spread of new financial assets was seen to produce a large upward drift in the velocity of money.[6] Given this situation, Chairman Greenspan pointed out in his testimony to the Congress in July 1991:[7] "This uncertainty about the credit intermediation process is one of the factors that could possibly make movements in $M_2$ somewhat difficult to interpret in the short run." In his testimony to the Congress in July 1992, he stated that "slower money growth has not tended to show through percentage point for percentage point to reduce expansion of nominal gross domestic product," showing a gradual dwindling in the weight attached to the money stock in conducting monetary policy. He finally announced in his testimony to the Congress in July 1993: "The historical relationships between money and income and between money and the price level have largely broken down, depriving the aggregates of much of their usefulness as guides to policy. At least for the time being, $M_2$ has been downgraded as a reliable indicator of financial conditions in the economy."

The relationship between the policy interest rate and the money stock has been obscure for the major countries since the 1990s (Chart 8).

## B. Role of the Money Stock within Monetary Policy Today

### 1. Role of the money stock within the transmission mechanism, and as an information variable

The dominant monetary policy model adopted by major central banks is one within which price stability is pursued by the central bank by operating on the short-term interest rate to influence the real economy. Within this framework, the money stock is not treated as a target variable of monetary policy.

This framework embodies the view that it is the output gap which determines price movements in the short and medium runs, and that a route along which the money stock has a direct influence upon prices is nonexistent or very narrow if it exists (Chart 9; see Box 1 on page 46 for theoretical details of this view). This view has recently become increasingly standard in theoretical research on monetary policy.[8]

4. See European Central Bank (1999).
5. Gerald Bouey, former Governor of the BOC, explained the background against which the BOC dropped monetary targeting in 1982: "We did not abandon $M_1$, $M_1$ abandoned us" (Bank of Canada [2001]).
6. The velocity of money is the ratio of nominal GDP to the money stock. To adopt the money stock as an intermediate target, the velocity is required to be either stable or predictable.
7. See Board of Governors of the Federal Reserve System (1991). See also Board of Governors of the Federal Reserve System (1992, 1993) for the testimonies to the Congress.
8. Central banks in major countries utilize econometric models based on this view in order to stress the role of the real economy in analyses of the effectiveness of monetary policy. Specifically, see Brayton and Tinsley (1996), Fagan *et al.* (2001), Bank of England (1999),

If this view is fully adopted, it seems that it is not necessary to analyze the money stock independently. In conducting its monetary policy, however, every central bank analyzes movements in the money stock, treating the money stock as an "information variable." An information variable is an economic variable that a central bank analyzes because it may provide information potentially important in identifying the appropriate monetary policy for the successful pursuit of price stability. There are two mutually related reasons why a central bank pays attention to movements in the money stock.

The first reason stems from the nature of the money stock. Conceptually the money stock is thought to provide a comprehensive reflection of total economic transactions even if the relationship between the money stock and the price level is unstable, or it is impossible to identify causality from the money stock to the price level in the short run. Behind this idea lies the fact that the money stock, which is a measure of the total money circulating through the economy, captures the fund transactions that accompany all economic transactions. Because it possesses this quality, the money stock is a useful indicator for analyzing and understanding the state of the real economy and the behavior of financial institutions. There is also the underlying view that inflation is a monetary phenomenon in the long run. When this view is subscribed to, the money stock cannot be omitted from the central bank's analysis.

The second reason is the view that, to avoid serious mistakes in conducting monetary policy, a central bank should not rely exclusively on one assessment of the economic outlook based on information derived from real economic indicators (such as the output gap, etc.), but should cross-check it with another assessment of the outlook based on information contained in financial indicators such as the money stock. Given a policy environment in which there exists uncertainty regarding both the economic structure and the monetary policy transmission mechanism, central banks have recently evinced a tendency to use the full range of information and economic models available to them, in order to avoid serious monetary policy mistakes that produce, for examples, large fluctuations in business cycles or prices. This view of how to conduct monetary policy appeals to what is referred to as "robustness."[9] Based on this view, assessments of the economic outlook based solely on real economic indicators are not sufficient, but should be complemented by assessments that make use of variables such as the money stock which illustrate different aspects of the economy and so provide a cross-check to understanding (Chart 10).

Two preconditions are required in order to make practical use of assessments based on the money stock to provide such a cross-check: the relationships between the real money stock and the real economy, and between the money stock and the price level, need to be stable;[10] and the money stock as an information variable must provide some unique information about economic activity, which cannot be derived from other economic indicators (Chart 11). In a little more detail, what these conditions imply is that analysis which makes use of the money stock is able to contribute to more accurate projections regarding future price developments because the money stock provides information that is both useful and unique (i.e., it cannot be obtained from any interest rate or real economic indicator). This takes into account the possibility that monetary policy may influence the real economy and prices not only through the transmission mechanism assumed in the real economy view but also via some other mechanism and through factors other than the short-term interest rate. For example, if the level of the money stock diverges from that corresponding to the level of economic activity, it is possible that such a shortage or excess of

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etc. For a discussion of the basics of these models, see Meyer (2001). For more academic research, see Taylor (1993), Clarida *et al.* (1999), Romer (2000), etc.

9. "Robustness" in conducting monetary policy can be interpreted from two different perspectives. The first concerns the establishment of policy objectives, that is, the policy objectives should be established in such a way as to avoid significant failure even if doing so necessitates the abandonment of some small benefits that might otherwise be attained (see Onatski and Stock [2000], Hansen and Sargent [2001], etc.). The second concerns the implementation of policy, that is, the monetary policy should be conducted so as to look at as broad a range of conceivable future economic outlooks as possible, and then to choose the policy with a view both to minimizing the chances of committing any significant mistakes and to achieving the most generally desirable outcome. This paper takes the second perspective when interpreting "robustness." This perspective is explained further in European Central Bank (2000a, 2001a). Major central banks work to achieve "robustness" in conducting monetary policy in the light of their own circumstances.

10. Even those who choose to stress the role of the real economy do not disregard the possibility that a stable relationship between the real money stock and the real economy or between the money stock and the price level may be found.

liquidity may affect economic activity through credit or financial markets. While views on the mechanism that works through factors other than the short-term interest rate have not converged, it is nevertheless assumed that movements in the money stock may represent influences which work through these mechanisms.[11] It is a considerable empirical question whether or not the money stock actually possesses this property.

**2. Actual cases: major central banks in Europe and North America**

This subsection provides an overview of the role of the money stock, discussing also the degree to which major central banks in Europe and the United States attach importance to this variable in conducting monetary policy. As mentioned later, there are differences in the importance attached to the money stock by individual central banks, because relationships between the money stock and economic activity differ according to each country's financial and economic circumstances.

a. European Central Bank

The ECB recognizes that the relationship between the money stock and economic activity is stable in the long run and thus, from the viewpoint of robustness in the conduct of monetary policy, it puts a greater emphasis on the money stock than other major central banks.

The monetary policy strategy of the ECB for achieving its primary objective of "price stability" comprises three elements.[12]

(1) A quantitative definition of "price stability."
(2) Analysis according a prominent role to money (which is the general term for all quantitative monetary indicators such as the money stock and loans).[13] This element is called the "first pillar" of "two pillars," which organize the information and analysis underlying policy discussions.
(3) Analysis focusing on a wide range of other economic and financial indicators. This element is termed the "second pillar."

The ECB does not rely on one specific view in conducting monetary policy, but cross-checks one assessment against the other in order to attain robustness in monetary policy (Chart 10).[14] The "second pillar" assesses the economic outlook without making the explicit assumption of a feedback mechanism from money to economic activity (Chart 9). On the other hand, the "first pillar" illustrates the other type of assessment of the economic outlook, in which the money stock and other monetary and credit aggregates are presumed to contain unique information about the real economy and prices (Chart 11). The ECB points out the following three reasons why money is assigned a prominent role.

(1) One of the most remarkable regularities in macroeconomics is the stable long-run relationship between the price level and money, particularly when the latter is measured using broad monetary aggregates.
(2) Monetary developments contain information about future price developments and can therefore help in the overall assessment of risks to price stability.
(3) Monetary and credit aggregates may also play a role in the transmission mechanism of monetary policy to the price level.

b. Bank of England and Bank of Canada

In conducting monetary policy, the BOE and the BOC treat the money stock as follows. The BOE points out that "data on monetary aggregates—lending, deposits, and cash—are helpful in the formation of monetary policy, as they provide corroborative, or sometimes leading, indicators of the course of spending behavior, and they are available in advance of much of the national accounts data."[15] The BOC also states that "the monetary aggregates [thus] provide a useful cross-check on other projections of output and inflation."[16] Against this background, at the BOC, the monetary analysis is presented to the decision-making body, the Governing Council, in

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*11.* On this point, King (2002) commented, "My own belief is that the absence of money in the standard models which economists use will cause problems in future . . ."
*12.* See European Central Bank (2001b).
*13.* For details of the analyses, see Masuch *et al.* (2000) in European Central Bank (2000b).
*14.* See European Central Bank (2001a). Wim Duisenberg, Governor of the ECB, said at the press conference on December 5, 2002, "We have decided, in the course of next year, to come up with a serious evaluation, not necessarily a change, because we are still happy with our strategy. But we will make a serious assessment and evaluation of the monetary strategy in the course of, I think, the first half of next year."
*15.* See Bank of England, The Monetary Policy Committee (2000). Hauser and Brigden (2002) give an introduction to how the BOE utilizes information on money and credit in the quarterly economic projection.
*16.* See Bank of Canada (2001).

parallel with the conventional forecast.[17] Both of the banks share the recognition that "rapid growth in these [monetary] aggregates that is inconsistent with the economic situation and cannot be accounted for by specific financial developments can be an early warning signal of the need to tighten monetary conditions."[18]

c. Board of Governors of the Federal Reserve System

The FRB places less emphasis on the money stock as an information variable than the central banks mentioned above.

As mentioned above, the FRB announced in the Chairman's testimony to the Congress in July 1993 that $M_2$ had been downgraded as a reliable indicator of the state of the economy because the historical relationship between the money stock and economic activity had been unstable since the early 1990s. The FRB also points out in its "Purposes and Functions" (1994), an official FRB publication, that "the usefulness of the monetary aggregates for indicating the state of the economy and for stabilizing the level of prices has been called into question by frequent departures of their velocities from historical patterns." Furthermore, in June 2000 the FOMC of the FRB ceased specifying ranges for the growth of money and debt over the coming years, since the Humphrey-Hawkins Act, under which the FRB had been legally required to set and announce such ranges, had expired at the end of 1999. At present, the FRB gives a clear indication of its stance with regard to the money stock in the words of Chairman Greenspan: "We [the FRB] do obviously follow it [the money stock] like we follow all financial variables."[19]

### C. Historical Changes in the Role of the Money Stock in Japan's Monetary Policy

This subsection reviews historical changes in the role played by the money stock within the Bank's monetary policy. In July 1975, the Bank made its first official announcement of the importance of the money stock, emphasizing the property of the money stock (and especially $M_2$) as a leading indicator of future price developments.[20] In July 1978, contributing to further public understanding about the importance of the money stock, the Bank started producing projections for the growth rate of $M_2$ (later $M_2$+CDs) over the coming quarter (including the month of announcement), releasing these quarterly projections four times a year (in January, April, July, and October). Since then, the Bank has continued to point out that, in the context of conducting monetary policy, the money stock has a useful role to play as an information variable. The degree of its usefulness has changed, however, in line with the changes in the stability of the relationship between the money stock and economic activity. The following sections analyze the relationship between the money stock and economic activity since the mid-1990s and explain how the Bank sees the role of the money stock in monetary policy.

## IV. Relationship between the Money Stock and Economic Activity in Japan

As mentioned in the preceding section, major central banks in Europe and North America and the Bank itself all treat the money stock as an information variable in conducting monetary policy. The degree of importance attached to the money stock as an information variable, however, varies according to the country and the particular period under examination. The more stable the long-run relationship between the real money stock and the real economy or between the money stock and the price level, and the stronger the causality from the money stock to economic activity, the more useful the money stock is as an information variable in conducting monetary policy. In other words, should a stable long-term relationship between the money stock and economic activity be observed then, if the money stock diverges from the level consistent with this long-run relationship, it may be thought to pull economic activity in the direction that restores the long-run equilibrium. If this were the case, the relationship could be used to project future developments in economic activity and the price level from movements in the money stock, and the money stock would therefore be a useful variable in conducting monetary policy. This section examines whether or not the money stock in Japan possesses such a property.

17. See Selody (2000) in European Central Bank (2000b).
18. See Bank of Canada (2001) for details. Bank of England, The Monetary Policy Committee (2000) also refers to this along the same lines.
19. See Greenspan (2001).
20. See Bank of Japan, Research Department (1975).

### A. Overview

This subsection provides an overview of the relationships among the money stock, real GDP, the price level, and asset prices since 1970, with a view to identifying the properties of the money stock in Japan (Chart 2). $M_2$+CDs is chosen as the representative indicator of money stock. Chart 2 shows that in the past, although it was certainly not the case that every small fluctuation in each individual economic indicator reflected a corresponding movement in the money stock, nevertheless a relationship is observed in which large fluctuations in the money stock and those in economic activity corresponded in the long run. The details of what moves in response to such large fluctuations in the money stock are not fixed: it may be real GDP or the price level that moves; it may be asset prices. Large fluctuations in the money stock are not necessarily reflected in large fluctuations in the same economic activity in every circumstance.

For example, the large movements of the money stock in the 1970s implied movements in real GDP and the price level. In the same period, asset prices also underwent substantial fluctuations.

During the period of the emergence and bursting of the bubble, from the latter half of the 1980s to the first half of the 1990s, the growth rate of real GDP fluctuated significantly, while price developments were relatively stable. The money stock increased faster than real GDP during the emergence of the bubble. Consequently, the velocity of money, measured as the ratio between $M_2$+CDs and nominal GDP, nominal GDP/$M_2$+CDs, suffered a significant one-time decline, and it seemed that the relationship between the money stock and nominal GDP had collapsed (Chart 12).

During this period, against the backdrop of progressing deregulation of deposit interest rates, the lending stance of financial institutions was so aggressive that short-term interest rates on large-denomination time deposits exceeded the short-term average contracted interest rate on new loans and discounts. As a result, both loans and deposits increased and a fund-shift from the JGSs and medium-term government securities funds, etc., to large-denomination time deposits occurred, which worked as one of the factors making the relationship between the money stock and economic activity unstable during the emergence of the bubble. It was the substantial rise in asset prices and the adjustment that followed, more than the fund-shift due to financial deregulation, which induced the money stock to rise sharply and then decline rapidly during the emergence and bursting of the bubble. It seemed that the relationship between the money stock and nominal GDP had broken down during the emergence of the bubble, because the growth of nominal GDP had been relatively small while the year-on-year growth rates of both land and stock prices had been in double digits. Asset prices, however, started to fall in 1990 and the growth rate of real GDP started to decline gradually more than one year later. In the end, during the whole period of the emergence and bursting of the bubble, it is reasonable to conclude that fluctuations in asset prices did indeed influence movements in real GDP and prices. Looking at that period in this light, a rough relationship can be said to be maintained in which rapid growth in the money stock indicates some kind of "overheating" in economic activity. As reviewed in the later section, however, the reductions in the excess liabilities of firms and the NPL problem, both of which owe their origins to the emergence and bursting of the bubble, continue to influence economic activity in Japan and may have altered the economic structure and the behavior of the money stock somehow. On this point, Japan's experience during this period is considered to have been different in nature from the experience of the United States in which the relationship between the money stock and economic activity had been unstable due to technological innovations in the financial sector.

Since the mid-1990s, the relationship between the money stock and economic activity has been different from that observed in the 1970s or during the emergence and bursting of the bubble. That is, as mentioned above, the year-on-year growth of the money stock has remained within a relatively narrow range, around 3 percent, while that of real GDP has experienced substantial fluctuations, moving between 4 percent and –3 percent. The rate of increase in the CPI (year on year) has declined continuously and has reached almost –1 percent recently, although movements in the money stock have been comparatively stable. Consequently, the velocity of money has undergone a significant decline and, in contrast to the period during which the bubble emerged, asset prices have declined consistently. To sum up, the relationship between the money stock and economic activity seems to have been unstable recently.

### B. Analyses of Stability and Causality

In full awareness of the facts described above, this subsection uses statistical techniques to examine whether or not there exists a long-run equilibrium relationship between the money stock and economic activity in Japan. The term "long-run equilibrium relationship" describes the relationship between a number of economic variables that do not move independently of one another but maintain some linear relationship in the long run, even if some of the variables diverge from this long-run relationship for brief periods. In statistics, this relationship is referred to as "cointegration" among the variables being analyzed. The current paper analyzes whether or not there exists a long-run equilibrium relationship between three variables: the real money stock, real GDP, and the opportunity cost (measured as the difference between the interest rate on the money stock and that on other financial assets).[21] It is important in assessing the relationship between the money stock and economic activity to analyze not only changes in the money stock but also the level of the money stock.[22] Therefore, this paper takes into account the level of the money stock when examining the long-run equilibrium relationship (see Box 2 on pages 47–48 for details).

If a long-run equilibrium relationship exists between the real money stock, real GDP, and the opportunity cost, this would be expected to manifest itself as a relationship in which money demand rises in line with increases in real GDP or declines in the opportunity cost. The results of our examination of whether a long-run equilibrium relationship can be found in a three-variable vector error correction model[23] are reported in the "cointegration rank"[24] in Chart 13. The results are as follows.

- A long-run equilibrium relationship between real $M_2$+CDs, real GDP, and the opportunity cost can be found in the sample period before late 1997, when anxieties over the financial system emerged.
- This long-run equilibrium relationship, however, can no longer be detected in the sample period that includes the data from late 1997 onward.

For $M_2$+CDs and broadly-defined liquidity, an economically meaningful long-run equilibrium relationship is found only for $M_2$+CDs, for the sample period ending in late 1997. To put it in more concrete terms, it is only the long-run equilibrium model for real $M_2$+CDs estimated using a sample period ending in late 1997 that satisfies all the sign conditions on the system[25] (see the shaded areas in Chart 13). For broadly-defined liquidity, a long-run equilibrium relationship can be found statistically in the sample period both excluding and including the data after the end of 1997. It does not, however, satisfy the sign conditions and so may not be considered economically meaningful.

Next, the causal relationship between $M_2$+CDs and the price level is examined. Chart 14 compares the year-on-year rate of increase in prices with the deviation of real $M_2$+CDs from its estimated long-run equilibrium level (for the sample period ending in late 1997). This comparison is based on the view that if the money stock exceeds (falls short of) this long-run equilibrium level, a rise (fall) in prices will be observed later. In Chart 14, a causal relationship is found in which deviation of real $M_2$+CDs from this equilibrium leads to a rise in the year-on-year rate of increase in prices. It is, however, impossible to find such a causal relationship in the period after late 1997, since the long-run equilibrium relationship had by this time broken down.

If the causality from the money stock to the real economy and prices exists, then it would be expected that the movements of the money stock lead those of the latter. In the 1970s, a period of substantial economic fluctuation, there is a clear tendency for the money stock to act as a lead for the real economy and prices (Chart 2). Such a tendency is also observed to some extent from the latter half of the 1980s

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*21.* Based on the preceding research (e.g., Coenen and Vega [1999]), the spread between long- and short-term interest rates as a proxy for the opportunity cost is utilized.

*22.* See Bank of Japan, Research Department (1975) and Sriram (1999).

*23.* The vector error correction model (VECM) explicitly assumes that there is a stable linear relationship in the long run (the long-run equilibrium relationship) among several economic variables, and that economic agents' actions responding to deviations from this long-run equilibrium produce short-run dynamics.

*24.* If the "cointegration rank" is one, there is one long-term equilibrium relationship among the economic variables employed. If the cointegration rank is zero, there is no long-term equilibrium relationship.

*25.* Two conditions are required for the long-run equilibrium relationship to be economically meaningful. (1) If the relationship between the real money stock, real GDP, and the opportunity cost diverges from the long-run equilibrium, then these variables should move in such a way as to converge to the long-run equilibrium. (2) The long-term equilibrium relationship that is found is one in which the real money stock rises in line with increases in real GDP and with decreases in the opportunity cost. Fulfillment of these conditions is achieved when the signs on all the estimated parameters in Chart 13 are positive.

through to the first half of the 1990s, although it is somewhat less distinct. However, whether or not the money stock always leads developments in the real economy and prices is not clear. To determine whether such causality actually exists, the cross-correlation coefficients are examined and the so-called Granger causality test[26] is applied. The results are as follows (Chart 15).

- For the sample period between 1971 and mid-1997, a tendency for $M_2$+CDs to act as a lead for nominal GDP and the CPI can be found (see the shaded areas in Chart 15). It is also confirmed that $M_2$+CDs acted as a lead for land prices over the same sample period.
- It is for the sample period since the 1990s (i.e., the sample period for which there is a relatively high proportion of the data after late 1997) that $M_2$+CDs finally ceases to demonstrate its leading properties for any of the other variables.

The above statistical methods show that the relationship between the money stock and economic activity demonstrated the long-run stability up to the mid-1990s, but has been unstable recently.

## V. Features Characterizing Movements in the Money Stock since the Mid-1990s

This section seeks to uncover the reason why the relationship between the money stock and economic activity has been unstable since the mid-1990s. The year-on-year growth of $M_2$+CDs has remained within a relatively narrow range around 3 percent since the mid-1990s. In early 2000, it showed a decline but soon began to increase again, although at a gradual pace (Chart 1). In examining the background of changes in $M_2$+CDs, it is useful to look at a decomposition of movements in "cash and deposits plus CDs" (taken from the Flow of Funds Accounts) which are approximately parallel to those of $M_2$+CDs (Chart 16). This factor decomposition is an analytical method used for decomposing changes in the money stock into their component changes, in the fund-raising behavior of money holders, in investment-saving balances and in the choices made among financial assets, from the viewpoint of identifying the source of funds behind cash and deposits (see Box 3 on pages 49–50 for details).

The most distinctive feature of Chart 16 is the sluggishness apparent in the "amount of fund-raising" done by firms, households, and other money holders since the beginning of the 1990s. Since, all other conditions being equal, a decrease in the "amount of fund-raising" implies a decrease in cash and deposits held by money holders, this may be understood as a factor reducing the growth rate of $M_2$+CDs. On the other hand, the "fiscal factor," which captures the fiscal deficit of the central government, has been a positive factor contributing to the growth of the money stock since the mid-1990s. Other conditions being equal, this would imply an increase in cash and deposits held by money holders, since the disposable income of firms and households should increase in line with the fiscal deficit. The "others" factor, which represents mainly the fund-shift to $M_2$+CDs from other financial assets, has also been a positive factor contributing to the growth of the money stock, implying that firms and households have displayed an increasing tendency to select financial assets that comprise $M_2$+CDs in preference to other financial assets. Summing up, the net effect of all of these factors may be understood to have contributed to the stabilizing of the year-on-year growth rate of $M_2$+CDs at around 3 percent since the mid-1990s. If this is indeed the case, the following three questions need to be answered.

- Why has the amount of fund-raising of firms, households, and other money holders been so sluggish?
- Why has the fund-shift become so large?
- How have the sluggishness of the amount of fund-raising and the expansion of the fund-shift influenced the relationships between real $M_2$+CDs and real GDP and between $M_2$+CDs and prices?

With regard to the first question, it is explained in Section V.A.1 that reductions by firms in their excess liabilities have, together with the NPL problem of financial institutions, combined to suppress the amount of fund-raising done by firms, households, and other money holders, and have thus acted to restrain the growth of $M_2$+CDs. Turning to the factors (listed in Section II.B) that cause changes in the money stock, this paper analyzes the effects upon the money stock of the downward revision in the expectations of firms and households regarding the

26. In the Granger causality test, *A* is said to "Granger cause" *B* if there exists a statistical relationship between economic variables *A* and *B* such that *A* contains information relevant to future movements in *B*, regardless of whether or not there is a structurally causal relationship between *A* and *B*.

scale of transactions, and also of movements in factors affecting the credit creation behavior of financial institutions. As for the second question, analysis of firms' and households' liquidity preferences and of the opportunity cost of holding money points to several factors that may be working to augment the fund-shift: the anxieties, stemming from the NPL problem, over the financial system (Section V.A.2); the zero interest rate; and the increasing demand for risk-free assets (Section V.B). The third question is considered simultaneously with the discussion of the first and second questions.

## A. Reductions in Firms' Excess Liabilities and Financial Institutions' NPLs

### 1. Reductions in firms' excess liabilities since the early 1990s

The most distinguished feature of movements in $M_2$+CDs since the mid-1990s has been the influence of the dramatic change in firms' borrowing behavior and financial institutions' lending behavior since the bursting of the bubble. During the emergence of the bubble, when firms' bullish expectations of future economic growth were at their strongest, their liabilities increased substantially. With the bursting of the bubble, efforts to reduce these liabilities intensified. Since then, these efforts to reduce the excess liabilities of firms have continued, with Japan's expected economic growth rate declining in both the first and latter halves of the 1990s. NPLs at financial institutions also expanded in line with the excess liabilities of firms. Furthermore, the continuous fall in the collateral value of land (land prices) caused the accumulation of NPLs at financial institutions to accelerate.

Looking at firms' balance sheets, the ratio of the outstanding balance of interest-bearing liabilities to value-added rose up until 1993 and then began to decrease. It has recently returned to the level it was at in the mid-1980s, that is, before the emergence of the bubble (Chart 17). The speed of reduction, however, varies by industry. For example, nonmanufacturing industries, such as the construction, real estate, wholesale, and retail industries, have achieved a moderate reduction in their liabilities. The average figure for outstanding liabilities in these industries is still higher than in 1985, i.e., before the emergence of the bubble. On the other hand, other nonmanufacturing industries have managed to reduce their liability ratios to 1985 levels, while that of the manufacturing industry is currently below the level it was at in 1985. These industries are thought to have kept business fixed investment well within the limits of cash flow, using the surplus to reduce their interest-bearing liabilities, and to have enhanced their capital positions by improving profitability. One reason why the speed of reduction varies by industry is that among those nonmanufacturers achieving only a moderate reduction in their liabilities some had typically not only borrowed quite aggressively during the emergence of the bubble, but had also been affected by the continuous fall in the value of their real estate collateral. While many firms within various industries made progress on the whole in adjusting their excess liabilities, nevertheless there are some firms whose absolute level of liabilities remains quite large. The other reason relates to the effects of structural changes in Japan. As structural changes have progressed, some corporations have been slow to change their profit structures and have therefore been burdened with liabilities that are relatively heavy in comparison to their profitability. The corporate sector as a whole still continues to reduce liabilities with surplus cash flow (Chart 18), and it is mainly because of this that money demand has been sluggish.

As for the balance sheets of financial institutions, the amount of NPLs remains high (Chart 19). Financial institutions have continued their disposals of NPLs since the 1990s, causing their levels of capital to decrease. Such a decrease in capital, which works as a buffer, induces financial institutions to become more conservative with regard to credit creation.[27]

Of course, it is also true that factors such as the economic recession and various structural problems have contributed to the decline in the borrowing demand of firms and households. However, the

27. It is sometimes pointed out that conservative credit creation behavior has had a negative effect on lending to small and medium-sized enterprises, based on the Lending Attitude of Financial Institutions Diffusion Index (DI) in various surveys. Although it is true that the Lending Attitude DI is affected by changes in both the conditions of borrowers' businesses and the lending strategies of financial institutions, nevertheless, bearing in mind the fact that the small business DI has deteriorated throughout the 1990s and the equivalent index for small and medium-sized enterprises has been negative since the latter half of the 1990s, the decline in financial institutions' ability to take risks is considered to have played a part (Chart 19).

behavior of firms and financial institutions mentioned above is also considered to have played a part in the failure to stimulate borrowing demand in spite of aggressive monetary easing by the Bank. If loans by financial institutions decrease, deposits also typically decrease by the same amount. This mechanism implies that, since the bursting of the bubble in the early 1990s, both reductions in firms' excess liabilities and financial institutions' NPL problems have worked to restrain the growth of loans, deposits, and, by extension, $M_2$+CDs. These factors have not only caused a slowdown in the growth of the money stock and of the real economy, but they are also considered to have caused gradual changes in the relationship between the money stock and economic activity through changes in the behavior of financial institutions, and to have worked to make the relationship unstable. It should be noted, however, that when we replace $M_2$+CDs as a quantitative indicator of monetary conditions with the amount of fund-raising by the private sector (including bank loans),[28] then, even for the sample period after late 1997 when the anxieties over the financial system rose, in direct contrast to the results for $M_2$+CDs, a stable long-run equilibrium relationship can be found between real GDP, asset prices, and the real amount of fund-raising (Chart 20). With this result in mind, it is difficult to conclude that reductions in firms' excess liabilities and financial institutions' NPL problems should have been the trigger causing the statistical breakdown of the long-run equilibrium relationship between the money stock and economic activity.

**2. Anxieties over the financial system during the latter half of 1997 and 1998**

Why then is the relationship between the money stock and economic activity since late 1997 found to be unstable statistically? The first reason is thought to relate to the NPL problems, stemming from the emergence and bursting of the bubble, which caused anxieties over the financial system and was responsible for a drastic increase in precautionary money demand by firms and households.

Reviewing in more detail the specifics of this process, it is noted first how anxieties over the state of the financial system was exacerbated by the failures of the Hokkaido Takushoku Bank and Yamaichi Securities in the autumn of 1997. This expansion in anxieties is demonstrated clearly by the rise in the risk premium on fund-raising by financial institutions that took place from autumn 1997 to 1998 (Chart 21). In the face of these failures, firms and households became anxious about both the future availability of funds and their future income, with the result that precautionary demand for liquidity suddenly increased as they prepared for the worst. Firms and households sought to hold as much cash and deposits as possible, since these represented the most liquid financial assets available to them (Chart 22), while at the same time they made substantial cuts in their expenditure in order to further secure liquidity. The increasingly cautious lending stance of financial institutions in the face of liquidity risk also served to reduce firm expenditure, particularly on business fixed investment. Looking at the factor decomposition of "cash and deposits plus CDs" (from the Flow of Funds Accounts; see Chart 16), while nominal GDP growth suffered a drastic decline, the growth rate of the money stock actually rose, as a result of the small increase in the "others" factor representing mainly fund-shifts from other financial assets. Normally, money demand increases with increases in transaction scale and decreases with rises in the opportunity cost. In this period, money demand increased, although the transaction scale (nominal GDP) contracted and the opportunity cost changed little.

After autumn 1998, the Bank eased monetary policy further, facilitating firms' financing activities, and providing necessary liquidity directly or indirectly for bankrupt financial institutions to continue business until final disposal was completed. The government created a new legal framework to help stabilize the financial system, including the injection of public funds and added public investment. In consequence of these measures, from early 1999 the anxieties of firms and households were seen gradually to dissolve and, as pent-up demand for private consumption and business fixed investment occurred, the economy started to recover.

Looking back over this process, anxieties over the financial system can be put forward as one of the reasons why the relationship between $M_2$+CDs and economic activity became unstable and the long-run equilibrium relationship could no longer be found.

*28.* This specification of the relationship follows previous research, such as Bank of England (2000), etc.

### B. Money Demand under Zero Interest Rate

The second reason why the long-run equilibrium relationship between the money stock and economic activity has been unstable is thought to relate to the fund-shift between various financial assets that occurred against the background of extremely low short-term interest rates.

Since 1999, the Bank has adopted an aggressive monetary easing policy, with a view to avoiding further recession, putting a stop to deflation, and preventing the spread of anxieties over the financial system. Since February 1999, the Bank has pushed down the (overnight) uncollateralized call rate, encouraging it to stay as low as possible and keeping short-term market interest rates at virtually zero. Since March 2001, the Bank has been pursuing monetary easing within the framework of the so-called "quantitative easing" policy,[29] as a consequence of which the various short-term interest rates have all declined to virtually zero.

The opportunity cost of holding the monetary base (i.e., the effective cost of the "liquidity service" provided by the monetary base) has been extremely low, since interest rates on short-term financial assets have been virtually zero.[30] The monetary base (ratio of monetary base to nominal GDP) has stood at its highest level since World War II, against the backdrop of the abundant provision of current account balances and an opportunity cost of holding cash that has been virtually zero (Chart 23). As a result, the money multiplier ($M_2$+CDs/monetary base), which describes the relationship between the monetary base and the money stock, has declined substantially. In addition, with interest rates at virtually zero, it largely fluctuates relatively easily with slight changes in economic agents' subjective assessments of risk and in interest rates. For these reasons, in spite of the large increase in the monetary base, there has been little change in the growth rate of the money stock and the relationship between the two has recently become highly unstable.

On the other hand, the current situation has meant that, for firms and households, the opportunity cost of holding the financial assets which comprise $M_2$+CDs has declined considerably. In such a situation, a large fund-shift to $M_2$+CDs tends to occur because the financial assets composing $M_2$+CDs possess higher liquidity than other financial assets. In Chart 16, the "others" factor, which mainly represents fund-shifts measured within the Flow of Funds Accounts, has shown an increase since 2001 and has helped maintain a certain level of growth in $M_2$+CDs. The substantial fund-shift to $M_2$+CDs that took place during 2001 can be attributed both to shifts from postal *teigaku* (fixed-amount) deposits, a large number of which matured at about this time, and also to shifts out of investment trusts which suffered large withdrawals after some MMFs fell below par (Chart 24).

To get a better sense of this backdrop of $M_2$+CDs maintaining a relatively high growth rate in comparison with nominal GDP, it is helpful to look at the demand curve for money. As mentioned above, money demand increases as transaction scale increases and decreases as the opportunity cost rises. In the recent environment in which short-term interest rates have been virtually zero, the opportunity cost of holding $M_2$+CDs has also been close to zero. In order to examine the effect of small interest rate movements when rates are already virtually zero, Chart 25 illustrates the relation between money demand and the call rate, where the latter is regarded as the opportunity cost of holding the money stock, i.e., the cost of obtaining the liquidity service. In Chart 25, it may be observed that the slope of the money demand curve has flattened out since the call rate reached 0.5 percent in 1995, and since 1999 when it became virtually zero. Thus, a large fund-shift between various financial assets is likely to occur in response to only a slight change in the interest rate or the risk premium, and money demand is likely to be unstable.

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*29.* The framework of the "quantitative easing" policy consists of the following four factors:
(1) The changing of the main operating target for money market operations from the uncollateralized overnight call rate to the outstanding balance of the current accounts at the Bank. Provision by the Bank, under the new procedures, of ample liquidity far exceeding legally required reserves.
(2) The commitment by the Bank to keep the new procedures for money market operations in place until the CPI (excluding perishables, and based on nationwide statistics) registers stably either zero percent year-on-year growth or an increase.
(3) Increases in the Bank's outright purchases of long-term government bonds, in case it considers the increase necessary for providing liquidity smoothly.
(4) The introduction by the Bank of a standby lending facility ("Lombard-type" lending facility) through which the Bank extends loans at the requests of counterparties with the conditions pre-specified by the Bank.

*30.* See Bank of Japan, Policy Planning Office (2002) for a detailed discussion of the monetary base.

The so-called "quantitative easing" policy adopted in March 2001 has been effective in preventing further deterioration of Japan's economy, both by removing the liquidity concerns of participants in the short-term money markets and by ensuring the markets' stability. Thanks to this, the current situation completely differs from that between late 1997 and 1998 when the risk premium rose in the short-term money markets (Chart 21). Outside of the short-term money markets, however, there still exists considerable uncertainty concerning the progress of resolution of the structural problems of Japan's economy, including those in the financial system, and the future growth of the world economy. Firms, households, and financial institutions have therefore increased their demand for risk-free assets such as cash, demand deposits, and the JGSs. For example, as touched on above, when some MMFs fell below par, this induced a reevaluation of the risks inherent in investment trusts and other financial assets; and in a similar way, the partial removal of the blanket deposit insurance (for time deposits, etc.) also encouraged a new awareness of risk among depositors. When interest rates are extremely low, as at present, even a slight change in perceptions concerning risk causes a large increase in the demand for risk-free assets. Chart 26 demonstrates how the proportion of risk-free assets in total financial assets has recently undergone a substantial rise.

To sum up, the large fund-shift to $M_2$+CDs has occurred because the opportunity cost of holding the financial assets that comprise $M_2$+CDs has declined drastically with short-term interest rates at virtually zero. It is highly likely that this fund-shift has been encouraged by the recent increasing demand for risk-free assets that has occurred against the backdrop of problems in the financial system and various other factors. These reasons have also contributed to instability in the relationship between $M_2$+CDs and economic activity and to the fact that a long-run equilibrium relationship can no longer be found.

## VI. The Current Role of the Money Stock in Conducting Monetary Policy

This final section provides some concluding remarks, picking up some points deemed of interest in the debate surrounding the money stock.

### A. The Unstable Relationship between the Money Stock and Economic Activity

The first point of interest is how to understand the recent instability in the relationship between the money stock and economic activity in Japan. Since the bursting of the bubble in the early 1990s, both reductions in the excess liabilities of firms and the NPL problem are thought to have acted as a constant restraint upon the growth of the money stock in Japan and to have contributed to the lack of stability in the relationship between the money stock and economic activity. Two reasons are put forward as having a direct effect on this unstable relationship: the mounting anxieties over the financial system; and the increased shift of funds in favor of the financial assets that comprise the money stock, which has occurred as a result of extremely low interest rates. In a little more detail, these have not only exerted a continuous downward pressure on economic activity since the bursting of the bubble, but they were also responsible for the increased anxieties over the financial system between late 1997 and 1998, which in turn increased the precautionary demand of firms and households, encouraging them to maintain large holdings of cash and deposits. In addition, with the Bank's monetary easing since 1999 driving short-term interest rates to virtually zero, the opportunity cost of holding the money stock has fallen to extremely low levels, and this has caused an acceleration of the shift of funds in favor of the financial assets that comprise $M_2$+CDs. In such an environment, a breakdown in the stable relationship between the money stock and economic activity may be deemed inevitable.[31]

### B. Conditions Required for Acceleration in the Growth of the Money Stock

The second issue regards the conditions under which the growth rate of the money stock will rise in parallel to that of the monetary base. Since the adoption of the "quantitative easing" policy, the monetary base has increased by 38 percent (the growth rate from March 2001 to November 2002). If the money multiplier were constant, such an increase in the monetary base would bring about a proportional increase in the money stock. The growth rate of the money stock during the same period, however, was as low as +5 percent, while nominal GDP actually

*31.* It should be noted that since the relationship between the money stock and economic activity has been unstable, it is difficult not only to extract information regarding future economic developments from movements in the money stock, but also to project future movements in the money stock.

decreased (Chart 27). Under what conditions, then, would the money stock be expected to increase in parallel to the monetary base? Looking at the factor decomposition discussed above (Chart 16), one possible case would be when the amount of fund-raising in the private sector increases. If the "quantitative easing" policy were to be highly effective in encouraging economic activity, the resulting increase in business fixed investment and private consumption would bring about a concomitant increase in the amount of fund-raising and hence of the money stock. On the other hand, should firms persist in reducing their liabilities, then the "amount of fund-raising" would become a negative factor influencing movements in the money stock. Another possible case would arise if, in the face of continuing structural reform and an opportunity cost of holding money that is close to zero, increases in precautionary demand caused an acceleration in the shift of funds toward deposits in financial institutions. Such a shift toward deposits and an increase in the money stock, however, are not thought to contribute to the recovery of the economy. The final case is the extreme one in which financial institutions' purchases of the JGSs are so aggressive that the outstanding balance of JGSs held by households and firms decreases correspondingly. If the constraints of fiscal reconstruction restrict the overall volume of JGSs issued, the fiscal factor will offer no contribution to the growth of the money stock. In such a case, it is hard to see aggressive purchases of the JGSs by financial institutions alone having a clear influence on the real economy. For the money stock to increase in line with brisk economic activity depends, in part, on the operation and effectiveness of fiscal policy; however, there are some minimum preconditions without which such increases will not take place: the restoration of the transmission mechanism of monetary policy to full effectiveness with the revival of the financial intermediation function of financial institutions, and the galvanization of private-sector fund-raising.

### C. Role of the Money Stock in Conducting Monetary Policy

The third issue concerns the current role of the money stock in the conduct of monetary policy in Japan. At present, like other major central banks, the Bank treats the money stock as an information variable, not as an intermediate target. In this capacity, the role of the money stock as an information variable is considered as follows.

From the standpoint stressing the effect of the real economy on prices, the existence of a large output gap suggests that it would at present be difficult to engineer a rapid escape from the current deflationary situation. On the other hand, for the purposes of maintaining the robustness of monetary policy, it is also considered useful to view the situation from a position that stresses the role of the money stock.[32] A cross-check of the relationship between the money stock and economic activity reveals that the level of real $M_2$+CDs exceeds that implied by its long-run relationship with real GDP, as estimated for the sample period ending in late 1997 (Chart 14). Assuming that a stable long-run relationship were maintained between $M_2$+CDs and economic activity, such an excess of real $M_2$+CDs would imply an upward pressure on prices. As mentioned above, however, when the data after 1997 are included in the sample, the long-run stable relationship between $M_2$+CDs and economic activity can no longer be found. It is not, therefore, considered appropriate at present to judge that the relatively excessive level of $M_2$+CDs indicates upward pressure on the price level. In the current circumstances, it is difficult to obtain information about current and future economic developments or prices and furthermore about the effect of monetary policy from movements in the money stock. Thus, to evaluate the current effectiveness of monetary policy, it is considered appropriate to carefully check the relative yields of various financial assets as well as to look at developments in the real economy and prices.

Even so, the Bank, like other major central banks, continues to treat the money stock as an information variable and to monitor its movements carefully. The grounds for doing so can be summarized in the following two points.

The first stems from the unique feature of the money stock discussed in Section III.B.1. Conceptually, because every economic activity is settled with money, the money stock acts as a

32. Analyses from this different standpoint are presented at Monetary Policy Meetings. For example, in the *Monthly Report of Recent Economic and Financial Developments* published on December 18, 2002, it was stated that "the money stock and the monetary base maintain high growth rates relative to that of economic activity as a whole" (p. 17). The same *Monthly Report* also carried a comprehensive chart of monetary indicators and economic activity.

comprehensive indicator of the overall economic activity. Analysis based on the money stock is therefore considered useful as a check of what is happening within the real economy and the financial area. In addition, the importance of the money stock in relation to economic activity and especially to price developments in the very long run should be kept in mind.[33]

Secondly, the fact that the long-run equilibrium relationship between the money stock and economic activity cannot be found at present does not necessarily imply that such a relationship will remain undetectable forever. A central bank must keep in mind not only the short-term fluctuations in economic activity but also the risk that the economy may depart from the long-run path of stable prices and potential growth. Currently, efforts to increase the pace of disposal of NPLs and to promote corporate revival are being strengthened in Japan. If the financial intermediation function of financial institutions recovers sufficiently and interest rates rise sufficiently above zero, then it would not be unreasonable to expect large fluctuations in the money stock to once again imply large fluctuations in economic activity. For example, while estimates suggest that the current level of $M_2$+CDs exceeds the level consistent with its historical relationship with nominal GDP, should this stable relationship be restored, it would then be necessary to pay attention to possible changes in developments of the money stock over time, or to what such a level of the money stock implies. In such a case, it is also anticipated that evaluating the effectiveness of monetary policy from information contained in the money stock would also become easier.

As financial technology has developed and the economic structure has changed, the meaning of the money stock has also changed. Although beyond the scope of the current paper, advances in computing and other innovations in information and communication technology are bringing about a revolution in all money markets and financial businesses. Examples include the development of new devices and services that can be used for payments and settlements, as well as the appearance of electronic money.[34] Although developments in financial technology will not alter the underlying concept that the "amount of money" circulating through the economy is important in economic analysis and the conduct of monetary policy, they may transform what constitutes money. For this reason, the Bank needs both to specify the constituents of the "amount of money" and to examine continuously the role of the money stock in conducting monetary policy. Recognizing such needs, the Bank considers it necessary to continue its research on the money stock.

33. On this point, it may be argued that, because there exists a long-run equilibrium relationship between the amount of private-sector fund-raising and economic activity, it would be sufficient for a central bank to look at the levels of private-sector fund-raising and lending, and to ignore the money stock. Since, however, there are a number of aspects to economic activity, it is desirable to use a more comprehensive indicator when examining the long-run relationships between quantitative monetary indicators and economic activity, and especially between such indicators and prices. Thus, the money stock derives its potential importance from its characteristic as one of the most comprehensive quantitative monetary indicators.

34. See Tachi (2002) for details.

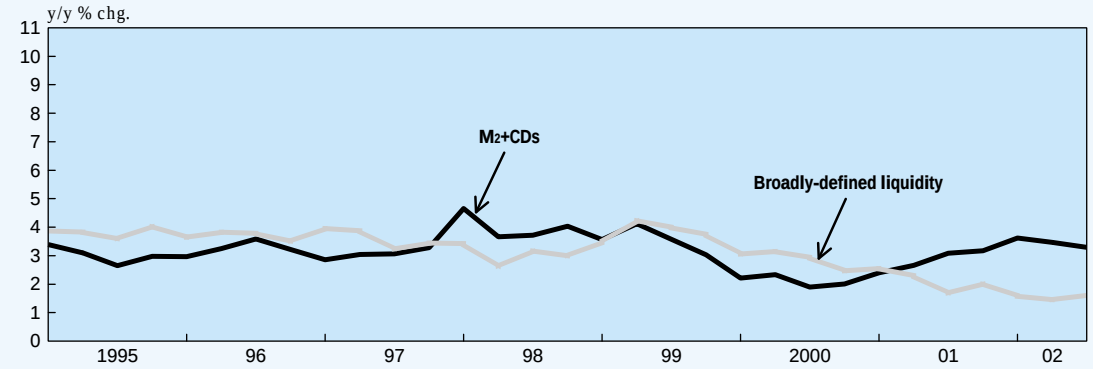
Chart 1

Money Stock and Economic Activity since the Mid-1990s

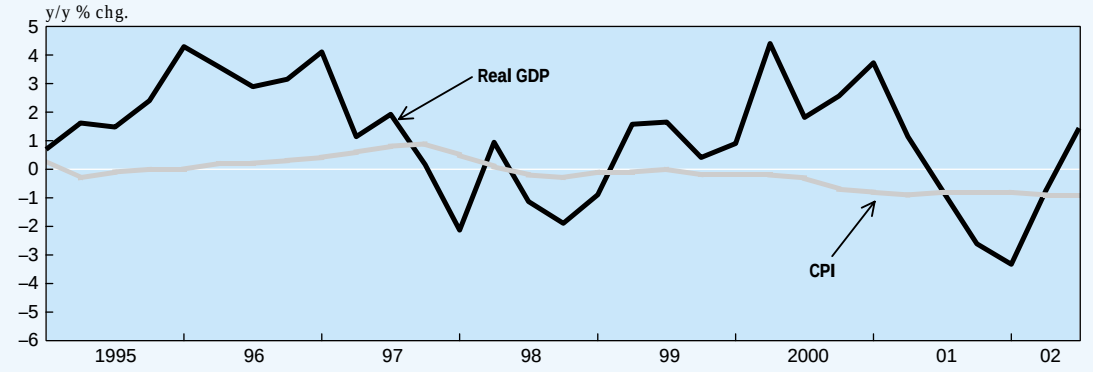
1995/Q1–2002/Q3, y/y % chg.

| | Mean | Minimum | Maximum | Std. dev. |
|---|---|---|---|---|
| **$M_2$+CDs** | **3.2** | **1.9** | **4.7** | **0.6** |
| **Broadly-defined liquidity** | **3.1** | **1.4** | **4.2** | **0.8** |
| **Real GDP** | **1.1** | **–3.3** | **4.4** | **2.1** |
| **CPI** | **–0.1** | **–0.9** | **0.9** | **0.5** |

**(1) Money Stock**




**(2) Real GDP and CPI (General, Excluding Perishables and Adjusted for Effects of Consumption Tax)**




**(3) Stock Prices and Land Prices**

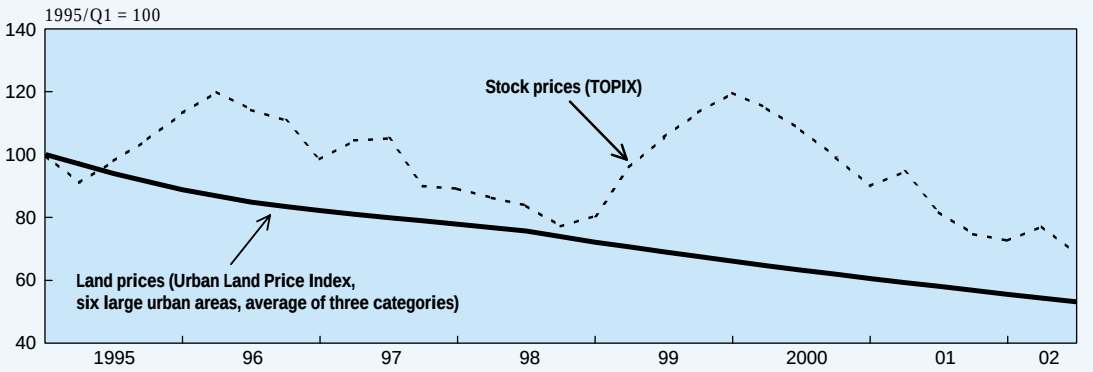
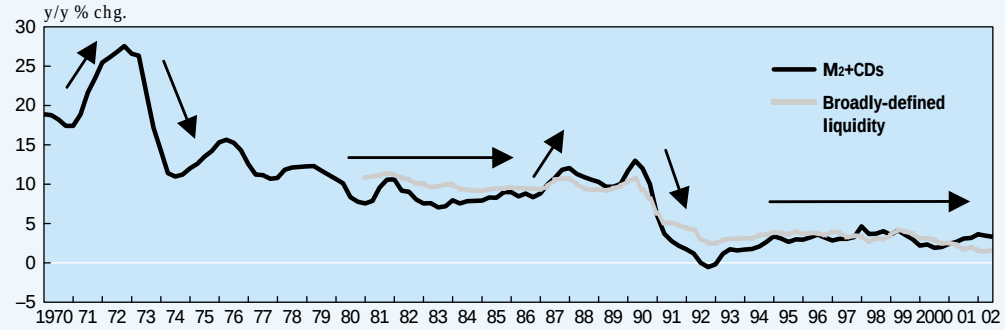


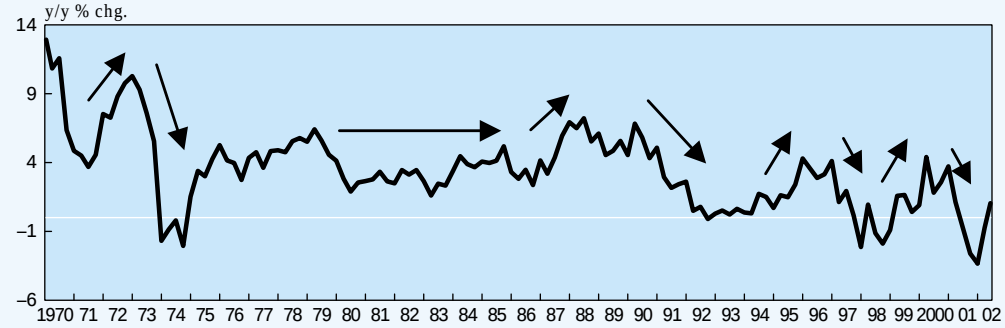
Chart 2

Money Stock, Real GDP, CPI, Stock Prices, and Land Prices

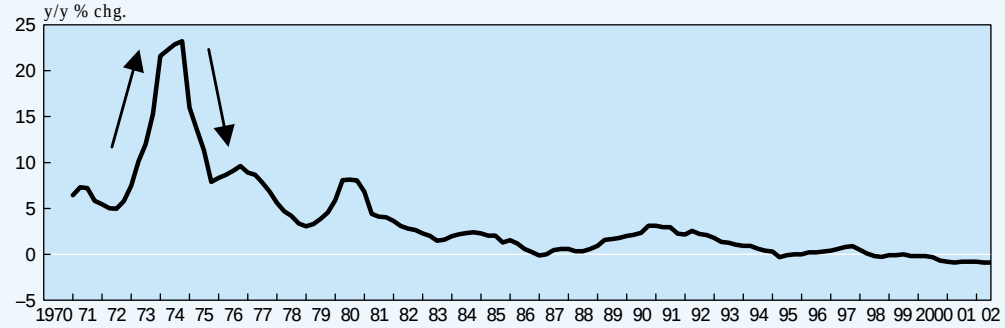
**(1) Money Stock**




**(2) Real GDP**




**(3) CPI (General, Excluding Perishables and Adjusted for Effects of Consumption Tax)**




**(4) Stock Prices and Land Prices**

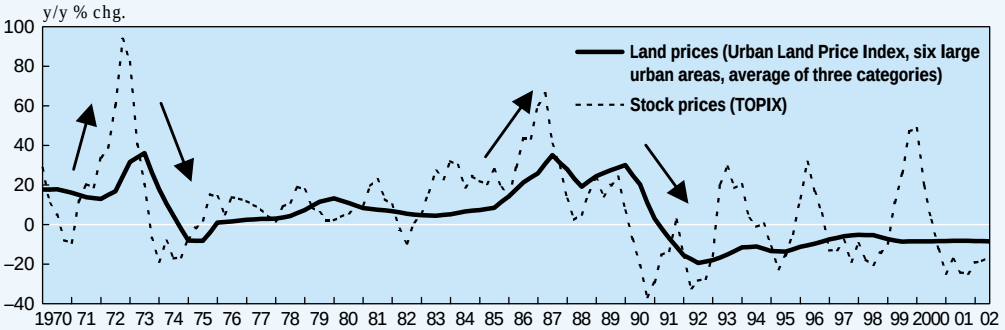


Chart 3

Definition of the Money Stock Statistics in Japan

| | | | | Average outstanding in March 2002 (tril. yen) | Share (percent) | Definition of indexes and financial instruments |
|---|---|---|---|---|---|---|
| Broadly-defined liquidity | M3+CDs | M2+CDs | M1 | 62.9 | ( 4.8) | Cash currency in circulation (banknotes in circulation + coins in circulation) |
| | | | | 235.3 | ( 17.9) | Deposit money (demand deposits – checks and notes held by the surveyed financial institutions) |
| | | | | 298.2 | ( 22.7) | |
| | | | | 342.5 | ( 26.1) | Quasi-money (time deposits, fixed savings, installment savings, nonresident yen deposits, foreign currency deposits) |
| | | | | 22.5 | ( 1.7) | CDs |
| | | | | 663.2 | ( 50.5) | |
| | | | | 239.8 | ( 18.2) | Deposits of post offices |
| | | | | 105.9 | ( 8.1) | Other savings and deposits with financial institutions[1] |
| | | | | 110.2 | ( 8.4) | Money trusts |
| | | | | 1,119.0 | ( 85.1) | |
| | | | | 5.9 | ( 0.5) | Pecuniary trusts other than money trusts |
| | | | | 32.3 | ( 2.5) | Investment trusts |
| | | | | 22.3 | ( 1.7) | Bank debentures |
| | | | | 1.2 | ( 0.1) | CP issued by financial institutions |
| | | | | 27.8 | ( 2.1) | Repurchase agreements and securities lending with cash collateral |
| | | | | 71.5 | ( 5.4) | Government bonds and FBs |
| | | | | 34.4 | ( 2.6) | Foreign bonds |
| | | | | 1,314.4 | (100.0) | |

Note: *1.* Includes deposits with credit cooperatives, the Shinkumi Federation Bank, labor credit associations, the National Federation of Labor Credit Associations, agricultural cooperatives, credit federations of agricultural cooperatives, fishery cooperatives, and credit federations of fishery cooperatives.

Chart 4

## Money Issuers and Money Holders in Japan

| | | Money issuers | Money holders |
|---|---|---|---|
| Broadly-defined liquidity | $M_3$+CDs | Bank of Japan | Individuals |
| | $M_1$/$M_2$+CDs | Domestically licensed banks[1] | General corporations |
| | | Foreign banks in Japan | Local public entities |
| | | *Shinkin* banks | Municipal enterprises |
| | | Shinkin Central Bank | Public corporations |
| | | Norinchukin Bank | Special status corporations (excluding government financial institutions) |
| | | Shoko Chukin Bank | Banking associations |
| | $M_3$+CDs | Post offices | Securities companies |
| | | Credit cooperatives | Securities finance companies |
| | | Shinkumi Federation Bank | Stock exchanges |
| | | Labor credit associations | *Tanshi* companies |
| | | National Federation of Labor Credit Associations | Deposit insurance corporation |
| | | Agricultural cooperatives | Credit guarantee corporation |
| | | Fishery cooperatives | Investment trust management companies |
| | | Credit federations of agricultural cooperatives | Nonbanks |
| | | Credit federations of fishery cooperatives | Financial futures exchange |
| | | Trust accounts of domestically licensed banks | Funds (excluding public pensions) |
| | | Central government, insurance companies[2]<br>Government financial institutions<br>Bank and insurance holding companies | Foreign bond-issuing organizations |
| | | Securities companies[3]<br>Securities finance companies<br>General corporations<br>*Tanshi* companies<br>Government pension investment fund<br>Foreign bond-issuing organizations | |

Notes: *1.* Includes city banks, regional banks, regional banks II, trust banks, long-term credit banks, the Resolution and Collection Corporation, the Kii Deposit Management Bank (dissolved on March 31, 2002), and the Bridge Bank of Japan.

*2.* Central government, insurance companies, government financial institutions, and bank and insurance holding companies are neither money issuers nor money holders in the definition of $M_3$+CDs. In the definition of broadly-defined liquidity, however, they are money issuers of government bonds and FBs, CP issued by financial institutions, and repurchase agreements and securities lending with cash collateral.

Government financial institutions include the Japan Bank for International Cooperation, the Development Bank of Japan, the National Life Finance Corporation, the Housing Loan Corporation, the Agriculture, Forestry and Fisheries Finance Corporation, the Japan Finance Corporation for Small Business, the Japan Finance Corporation for Municipal Enterprises, and the Okinawa Development Finance Corporation.

*3.* Securities companies, securities finance companies, general corporations, *tanshi* companies, the Government Pension Investment Fund, and foreign bond-issuing organizations are money holders in the definition of $M_3$+CDs. In the definition of broadly-defined liquidity, however, they are money issuers of repurchase agreements and securities lending with cash collateral, and foreign bonds.

Chart 5

Definitions of the Money Stock Statistics in the United States and Euro Area

**(1) United States**

US$ bil.

| | | | Avg. outstanding in March 2002 | Share (percent) | Definition of indexes and financial instruments |
|---|---|---|---|---|---|
| M3 | M2 | M1 | 595 | ( 7.3) | Currency |
| | | | 8 | ( 0.1) | Travelers checks |
| | | | 322 | ( 3.9) | Demand deposits |
| | | | 262 | ( 3.2) | Other checkable deposits[1] |
| | | | 1,187 | ( 14.6) | |
| | | | 2,436 | ( 29.9) | Saving deposits |
| | | | 939 | ( 11.5) | Small-denomination time deposits[2] |
| | | | 982 | ( 12.0) | Balances in retail MMMFs |
| | | | 5,544 | ( 68.0) | |
| | | | 1,198 | ( 14.7) | MMMFs held by institutional investors |
| | | | 815 | ( 10.0) | Large-denomination time deposits[3] |
| | | | 375 | ( 4.6) | Repos (in amount of 100,000 U.S. dollars or more) |
| | | | 220 | ( 2.7) | Eurodollars |
| | | | 8,152 | (100.0) | |

**(2) Euro Area**

bil. euros

| | | | Avg. outstanding in March 2002 | Share (percent) | Definition of indexes and financial instruments |
|---|---|---|---|---|---|
| M3 | M2 | M1 | 252 | ( 4.6) | Currency in circulation |
| | | | 1,917 | ( 35.1) | Overnight deposits[4] |
| | | | 2,169 | ( 39.7) | |
| | | | 1,095 | ( 20.1) | Deposits with agreed maturity up to two years |
| | | | 1,396 | ( 25.6) | Deposits redeemable at notice up to three months |
| | | | 4,660 | ( 85.4) | |
| | | | 231 | ( 4.2) | Repurchase agreements |
| | | | 427 | ( 7.8) | MMF shares/units and money market paper[5] |
| | | | 142 | ( 2.6) | Debt securities up to two years |
| | | | 5,459 | (100.0) | |

Notes: *1.* Includes negotiable order of withdrawal (NOW) accounts, automatic transfer services balances, and share draft balances in credit unions that provide interest and are commonly used for transaction purposes.
*2.* Indicates deposits of less than 100,000 U.S. dollars. Retail repos held by non-institutional investors are also included.
*3.* Large-denomination deposits are deposits issued in amounts of 100,000 U.S. dollars or more.
*4.* Indicates the item that can be immediately converted into currency or used for cashless payments.
*5.* Money market paper includes CDs, transferred bonds, floating debt securities, central bank certificates, etc.

Chart 6
Framework of Monetary Targeting

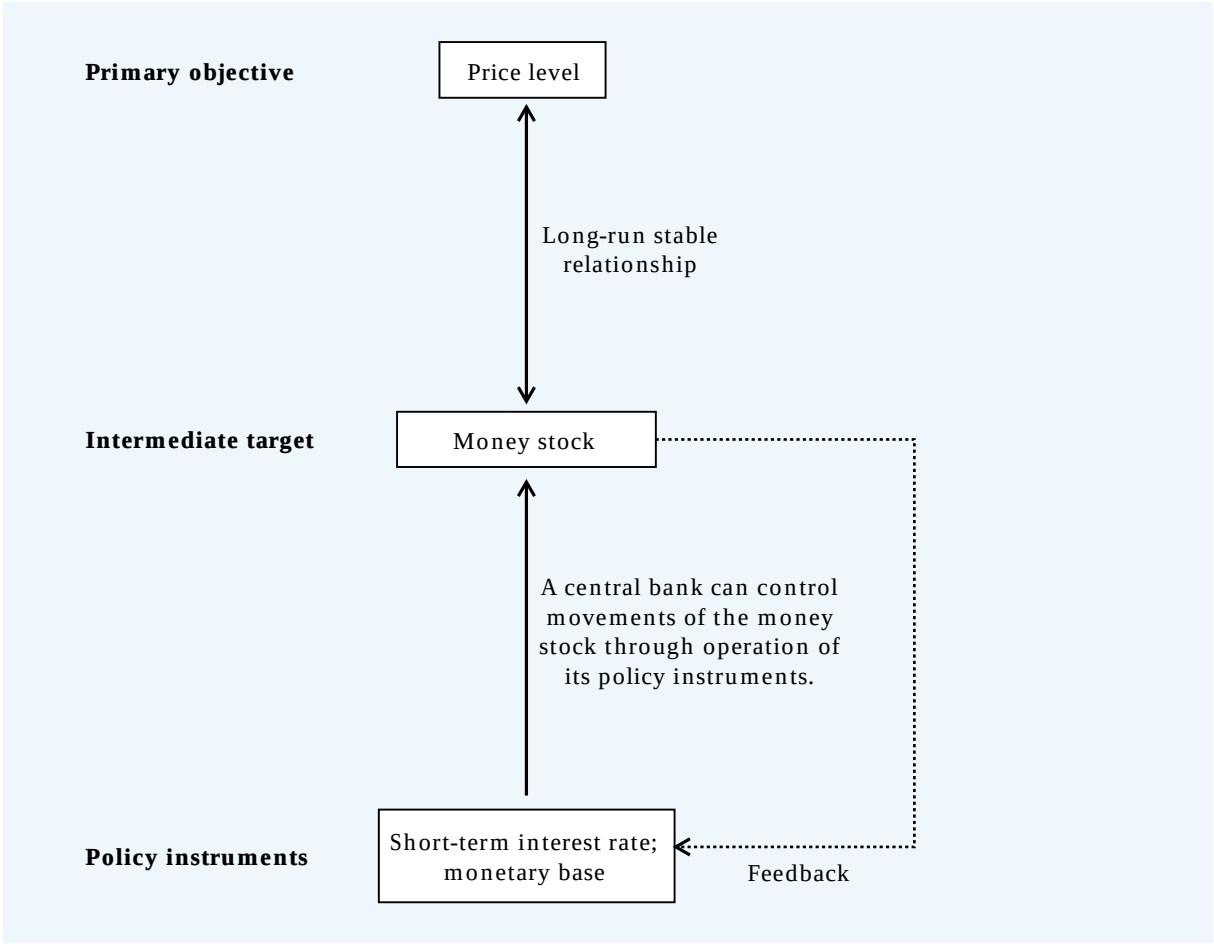


Chart 7

Historical Changes in the Frameworks for Conducting Monetary Policy Used by Major Central Banks

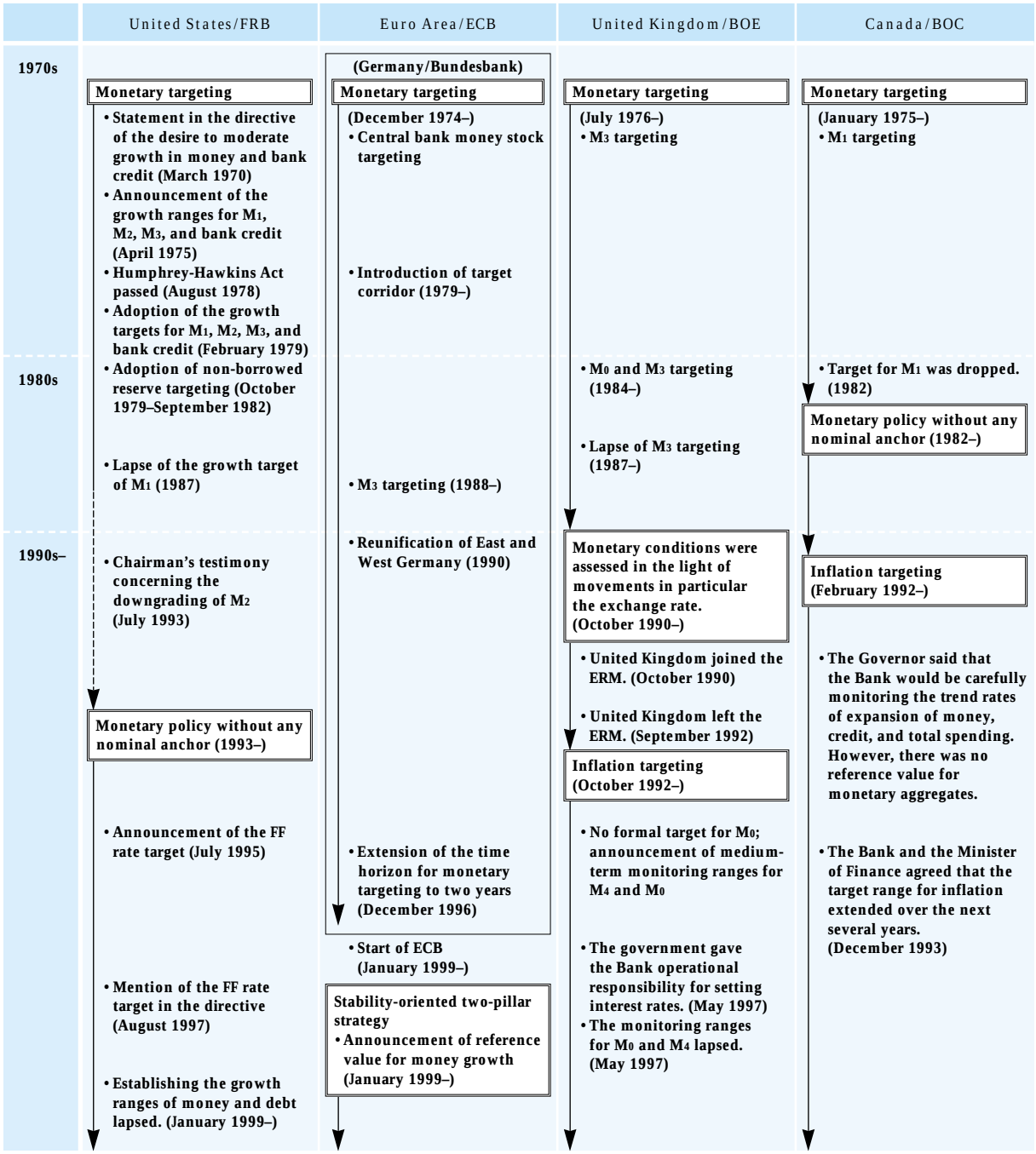
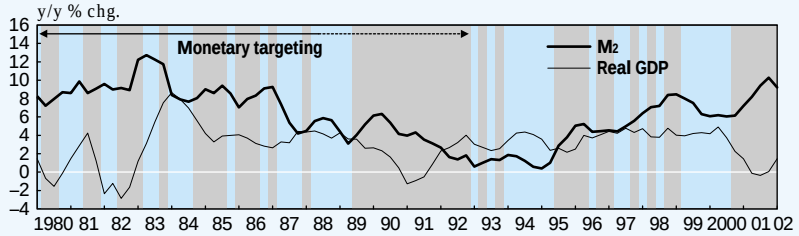


Chart 8

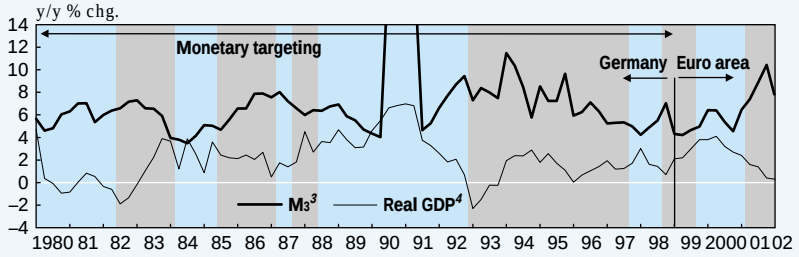
## Monetary Policy, the Money Stock, and Real GDP in the Major Countries

**(1) United States[1,2]**



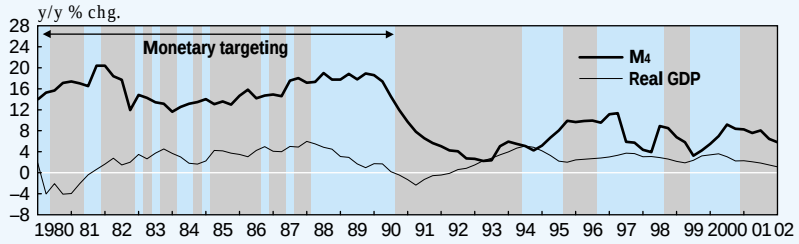

Notes: *1.* Shaded areas represent periods in which the policy rates decreased.
*2.* Policy rate: FF rate.

**(2) Euro Area[1,2]**



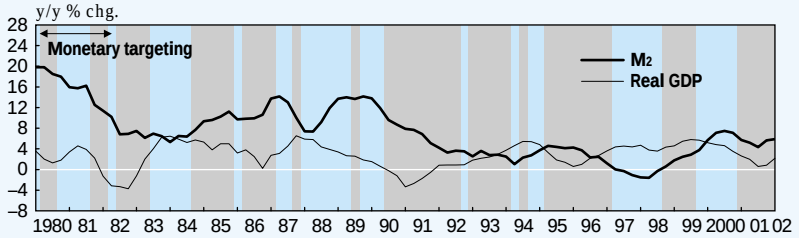

Notes: *1.* Shaded areas represent periods in which the policy rates decreased.
*2.* Policy rate: main refinancing operations rate. Before 1992/Q3, German official discount rate; from 1992/Q4 to 1998/Q4, German repurchasing rate.
*3.* M3: euro area. Before 1998/Q4, M3 in Germany. The steep increase from 1990/Q2 to 1991/Q1 was due to the reunification of East and West Germany.
*4.* Real GDP: euro area. Before 1991/Q4, West Germany; from 1992/Q1 to 1998/Q4, Germany.

**(3) United Kingdom[1,2]**




Notes: *1.* Shaded areas represent periods in which the policy rates decreased.
*2.* Policy rate: official rate (repo rate). Before 1972/Q3, bank rate; from 1972/Q4 to 1981/Q2, minimum lending rate; from 1981/Q3 to 1997/Q1, minimum band 1 dealing rate.

**(4) Canada[1,2]**




Notes: *1.* Shaded areas represent periods in which the policy rates decreased.
*2.* Policy rate: overnight rate target; before 1992/Q3, bank rate.

Chart 9
View Stressing Role of the Real Economy

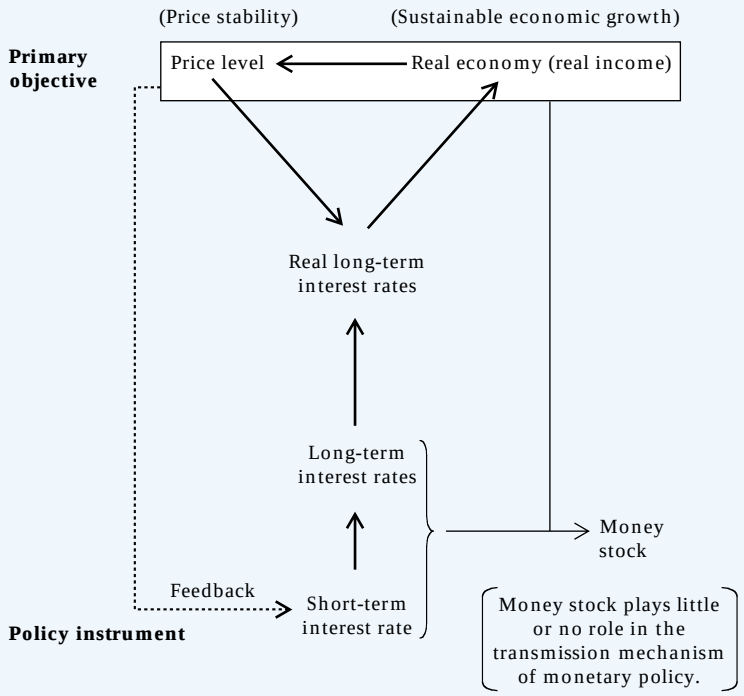



Chart 10
Framework for Achieving "Robustness" in Monetary Policy

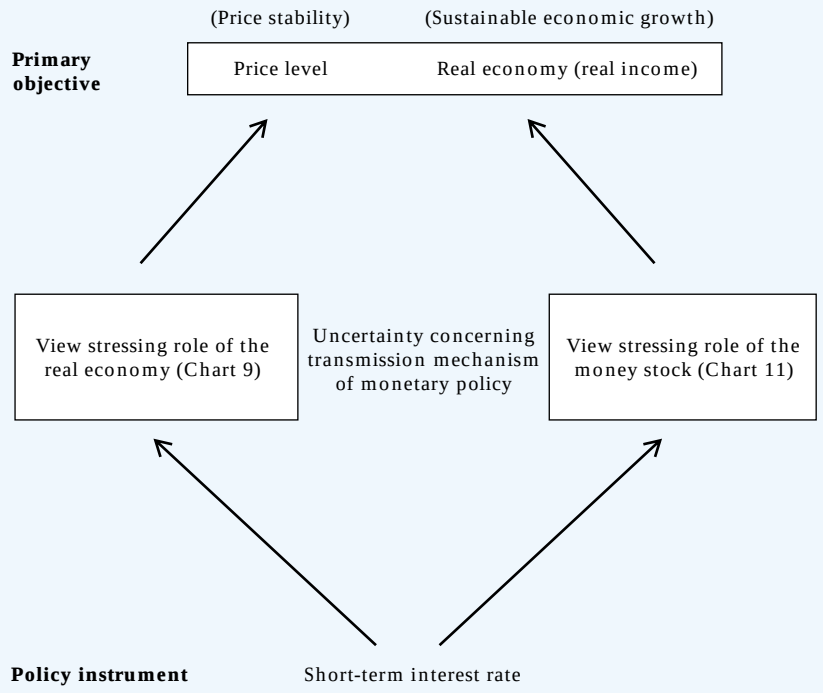


Chart 11

View Stressing Role of the Money Stock

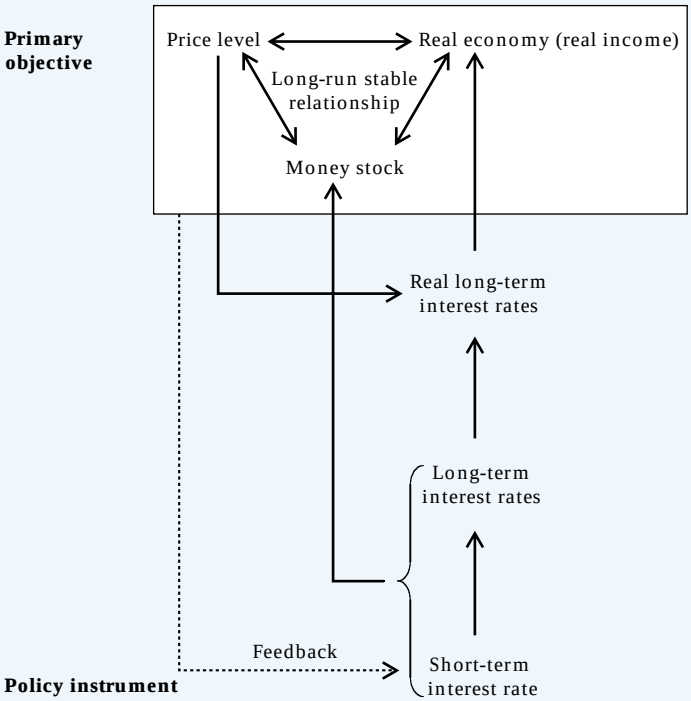
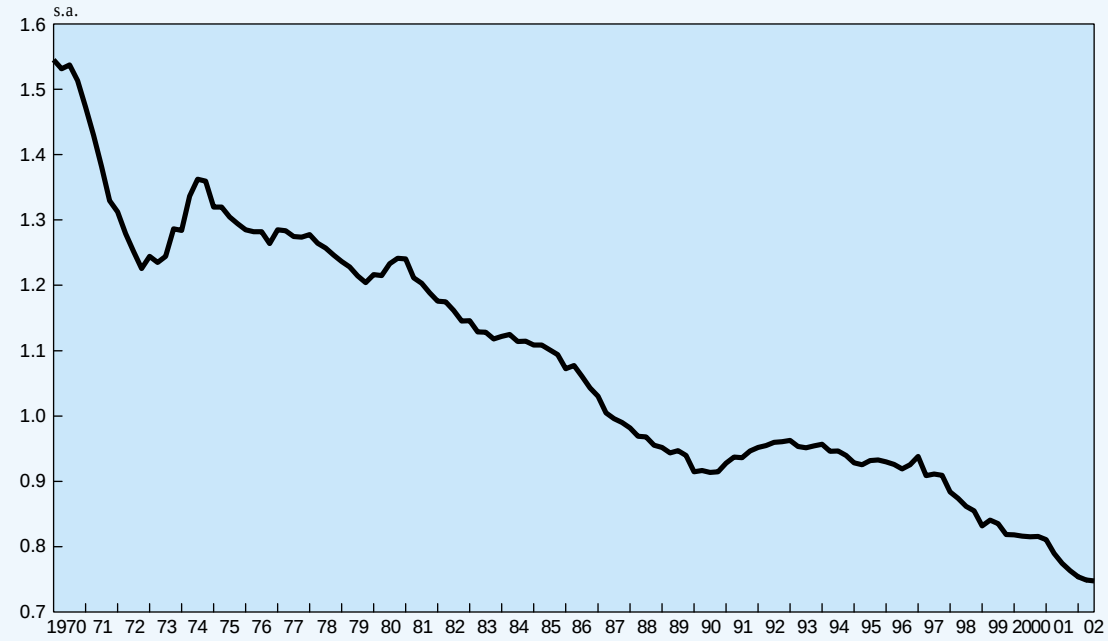


Chart 12
Velocity (Nominal GDP/Money Stock)

**(1) $M_2$+CDs**




**(2) Broadly-Defined Liquidity**

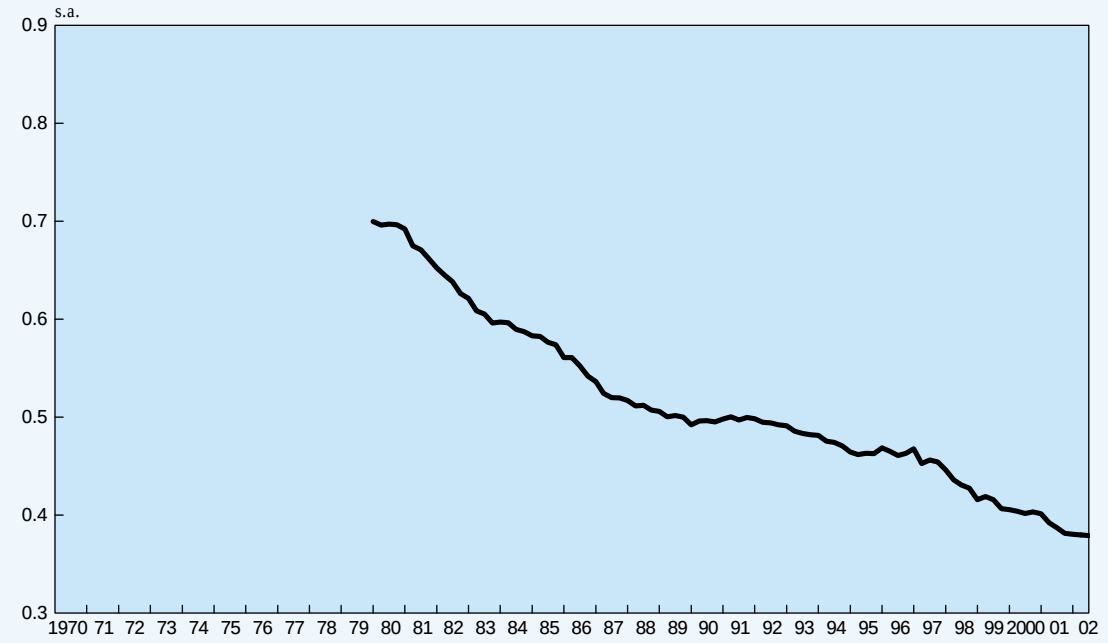


Chart 13

## Long-Run Equilibrium Relationship between the Money Stock and Economic Activity

The vector error correction model comprises three variables: the real money stock (deflated by the GDP deflator, $rm$), real GDP ($y$), and the interest rate spread (government bond yield [10-year] minus the 3-month CD rate, $sp$). $EC$ is the error correction term, representing the deviation from long-run equilibrium.

$$\Delta rm_t = -\alpha_{rm} EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{rm} \Delta rm_{t-i} + \sum_{i=1}^{n} \theta_i^{rm} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{rm} \Delta sp_{t-i} + c_{rm} + \varepsilon_t^{rm}. \quad (1)$$

$$\Delta y_t = \alpha_y EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{y} \Delta rm_{t-i} + \sum_{i=1}^{n} \theta_i^{y} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{y} \Delta sp_{t-i} + c_y + \varepsilon_t^{y}. \quad (2)$$

$$\Delta sp_t = \alpha_{sp} EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{sp} \Delta rm_{t-i} + \sum_{i=1}^{n} \theta_i^{sp} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{sp} \Delta sp_{t-i} + c_{sp} + \varepsilon_t^{sp}. \quad (3)$$

$$EC_t = rm_t - \beta_y y_t + \beta_{sp} sp_t. \quad (4)$$

**(1) M2+CDs**[1,2,3,4]

| | Sample period | Cointegration rank | Estimated parameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $\beta_y$ | $\beta_{sp}$ | $\alpha_{rm}$ | $\alpha_y$ | $\alpha_{sp}$ |
| 1 | 1971/Q1–1997/Q3 | 1 | 1.582<br>(0.022) | 0.021<br>(0.004) | 0.059<br>(0.030) | 0.054<br>(0.021) | 0.112<br>(0.033) |
| 2 | 1971/Q1–2002/Q3 | 0 | 1.654<br>(0.077) | 0.063<br>(0.014) | 0.018<br>(0.009) | –0.007<br>(0.010) | 0.418<br>(0.097) |
| 3 | 1981/Q1–1997/Q3 | 1 | 1.604<br>(0.043) | 0.031<br>(0.006) | 0.010<br>(0.006) | 0.033<br>(0.004) | 0.818<br>(0.212) |
| 4 | 1981/Q1–2002/Q3 | 0 | 0.973<br>(0.447) | 0.210<br>(0.072) | 0.004<br>(0.003) | –0.008<br>(0.004) | 0.509<br>(0.184) |

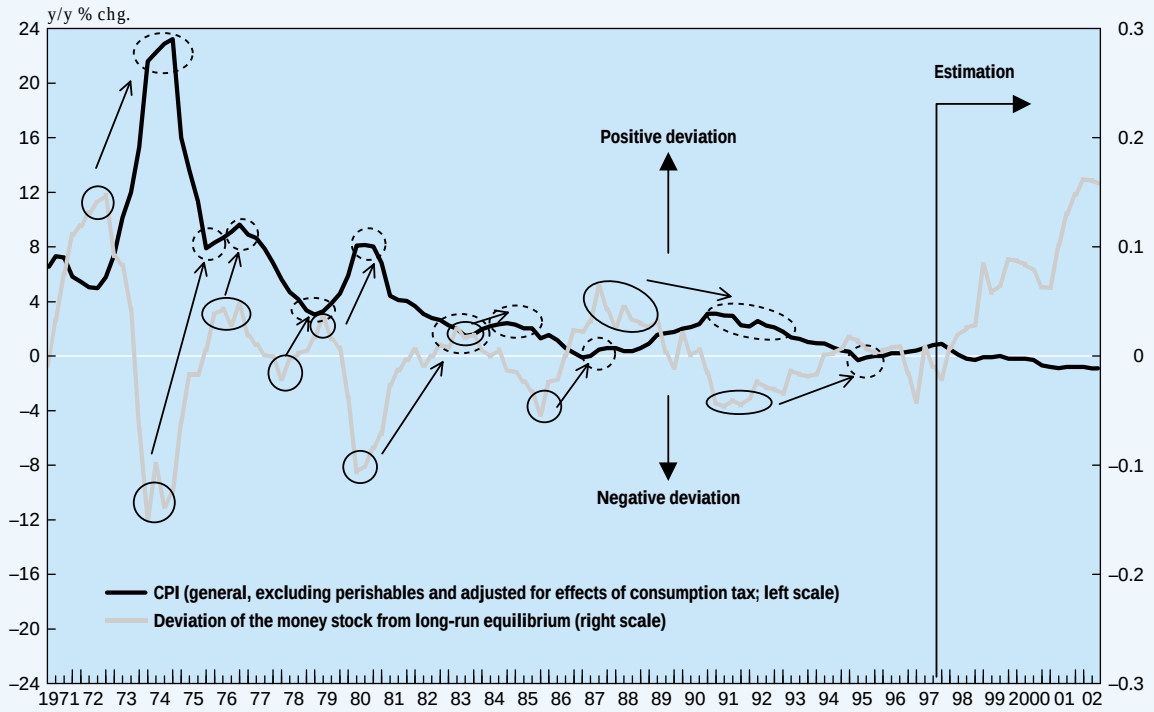
**(2) Broadly-Defined Liquidity**[1,2,3,4]

| | Sample period | Cointegration rank | Estimated parameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $\beta_y$ | $\beta_{sp}$ | $\alpha_{rm}$ | $\alpha_y$ | $\alpha_{sp}$ |
| 5 | 1981/Q1–1997/Q3 | 1 | 1.940<br>(0.043) | 0.003<br>(0.005) | –0.105<br>(0.020) | 0.077<br>(0.031) | 0.132<br>(0.186) |
| 6 | 1981/Q1–2002/Q3 | 1 | 2.567<br>(0.142) | 0.016<br>(0.020) | –0.028<br>(0.005) | 0.017<br>(0.010) | –0.070<br>(0.477) |

Notes: *1.* Shaded areas represent cases in which all sign conditions are satisfied.
*2.* Cointegration rank is tested by Johansen's procedure (both maximal eigenvalue test and trace test).
*3.* Values in parentheses are standard deviations.
*4.* Lags of the model are determined by likelihood ratio (LR) test.

Chart 14

The CPI and the Deviation of the Money Stock from Long-Run Equilibrium[1,2]




Notes: *1.* Deviation is based on the cointegrating equation (Chart 13 [1]; sample period: 1971/Q1–1997/Q3).
*2.* Out-of-sample deviation (1997/Q4–2002/Q3) is estimated by extrapolation, using in-sample parameters.

**Examination of the In-Sample Relationship between the CPI and the Deviation of the Money Stock from Long-Run Equilibrium**

• Lagged-correlation (sample period: 1971/Q1–1997/Q3)

| | Deviation of the money stock from long-run equilibrium[1] |
|---|---|
| **y/y % chg. in the CPI** | **0.47 (–8)** |

Note: *1.* Indicated value is the largest cross-correlation coefficient within ±8 periods. Value in parentheses is the lag number (negative sign indicates that deviations of the money stock lead changes in the CPI).

• Granger causality test (sample period: 1971/Q1–1997/Q3)

**Deviation of the Money Stock from Long-Run Equilibrium Granger-Causes Changes in the CPI**
—The hypothesis that deviation of the money stock Granger-causes changes in the CPI is not rejected at the one-sided 5 percent significance level. On the other hand, the hypothesis that changes in the CPI Granger-cause deviation of the money stock is rejected at the same level.

Chart 15

Estimation of Lead/Lag Relationships between the Money Stock and Economic Activity[1,2,3,4]

**(1) M2+CDs**

| | | 1971/Q1–1997/Q3 | 1992/Q1–2002/Q3 |
|---|---|---|---|
| M2+CDs | Nominal GDP | 0.93 (–5) → | 0.29 (+8) × |
| | Real GDP | 0.71 (±0) → | 0.63 (+8) × |
| | CPI | 0.85 (–5) → | –0.35 (+8) × |
| | Stock prices | 0.53 (+1) ← | 0.44 (+8) × |
| | Land prices | 0.72 (–1) → | 0.81 (+1) ← |

**(2) Broadly-Defined Liquidity**

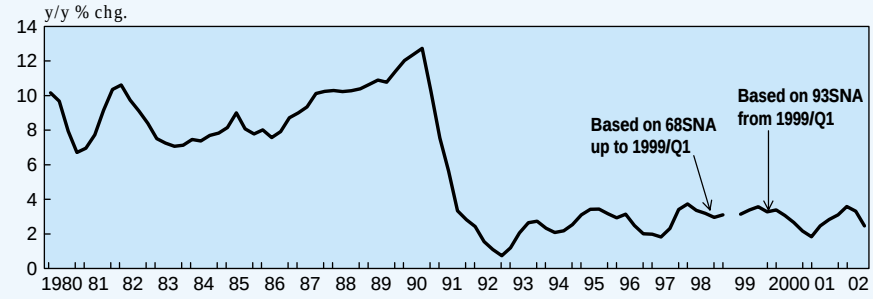
| | | 1981/Q1–1997/Q3 | 1992/Q1–2002/Q3 |
|---|---|---|---|
| Broadly-defined liquidity | Nominal GDP | 0.86 (–2) → | 0.59 (±0) × |
| | Real GDP | 0.72 (–2) → | 0.47 (+1) × |
| | CPI | 0.61 (–8) × | 0.49 (+8) × |
| | Stock prices | 0.66 (+7) ← | 0.31 (+1) × |
| | Land prices | 0.84 (+1) ← | 0.48 (+2) ← |

Notes: *1.* Shaded columns in the tables indicate that the money stock leads economic activity.
*2.* All data are the year-on-year changes of quarterly data.
*3.* CPI is the general index, excluding perishables and adjusted for effects of consumption tax. Stock prices are given by TOPIX, and land prices by the Urban Land Price Index (six large urban areas, average of three categories).
*4.* Values in the upper section are the largest cross-correlation coefficients within ±8 periods. Values in parentheses are the lag numbers, where a negative sign indicates that the money stock leads economic activity. Arrows in the lower sections indicate the results of the Granger causality test. → means that the hypothesis that the money stock Granger-causes economic activity is not rejected at the one-sided 5 percent significance level. ← means that the hypothesis that the particular economic indicator Granger-causes the money stock is not rejected at the same level. × means that both hypotheses are rejected.

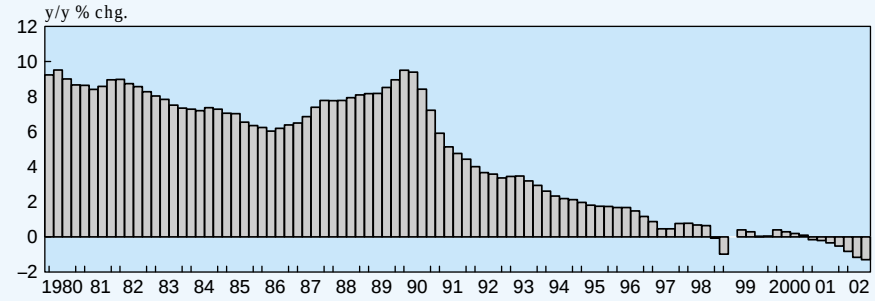
Chart 16

Factor Decomposition of "Cash and Deposits plus CDs" (Flow of Funds Accounts)[1]

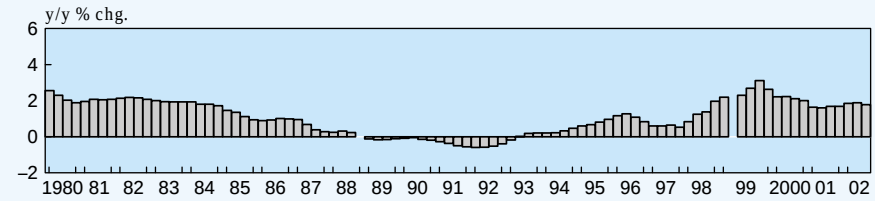
**(1) Cash and Deposits plus CDs**



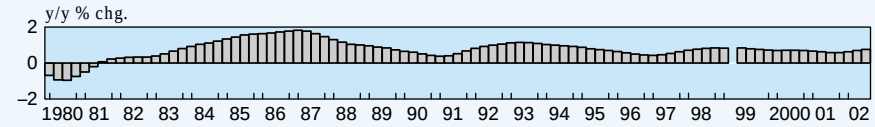

**(2) Amount of Fund-Raising (Net Amount of Fund-Raising by Money Holders)[2]**



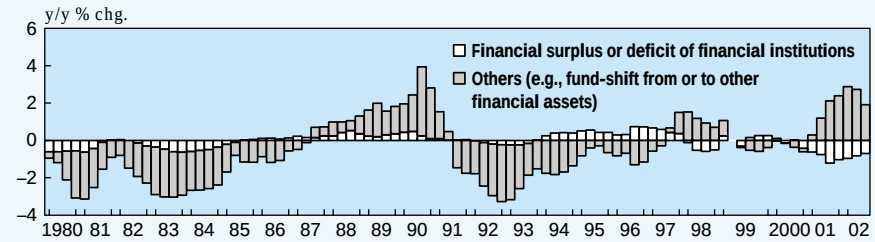

**(3) Fiscal Factor (Net Savings of Money Holders, Corresponding to Fiscal Deficit)**




**(4) Overseas Factor (Net Savings of Money Holders, Corresponding to Current Account Surplus)**




**(5) Other Factors**

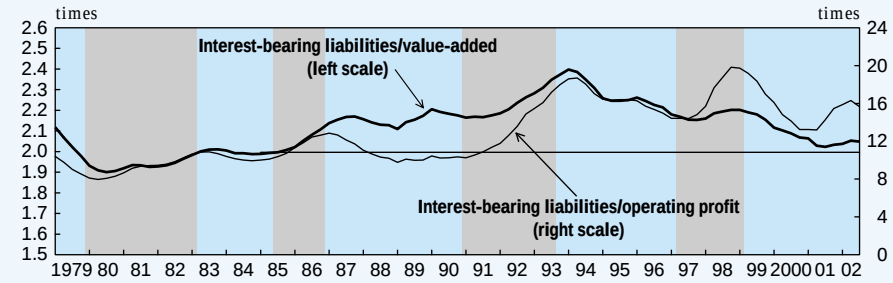



Notes: *1.* Values at 2002/Q3 are preliminary.
*2.* The "amount of fund-raising" is the sum of loans in both of private and public financial institutions and securities (including corporate bonds and CP).

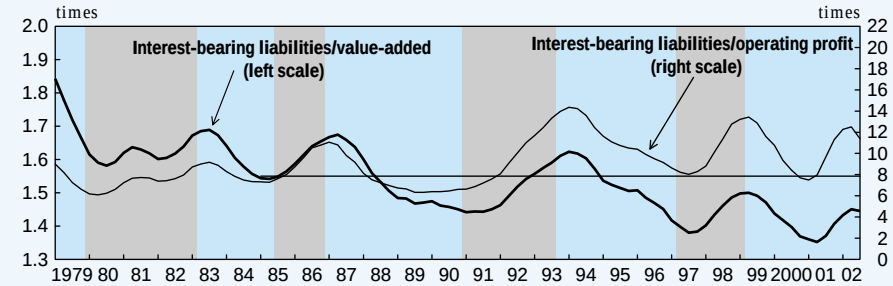
Chart 17

## Interest-Bearing Liabilities of Firms[1,2,3,4]

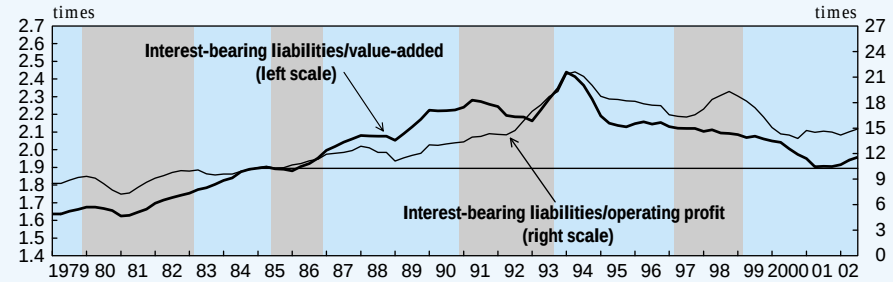
### (1) Total



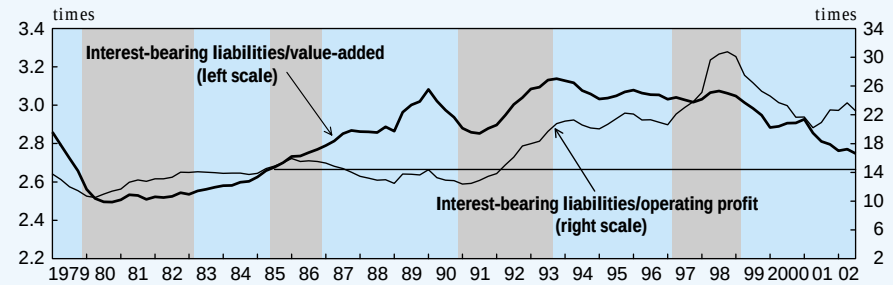

### (2) Manufacturing




### (3) Nonmanufacturing (Excluding Construction, Real Estate, Wholesale, and Retail)

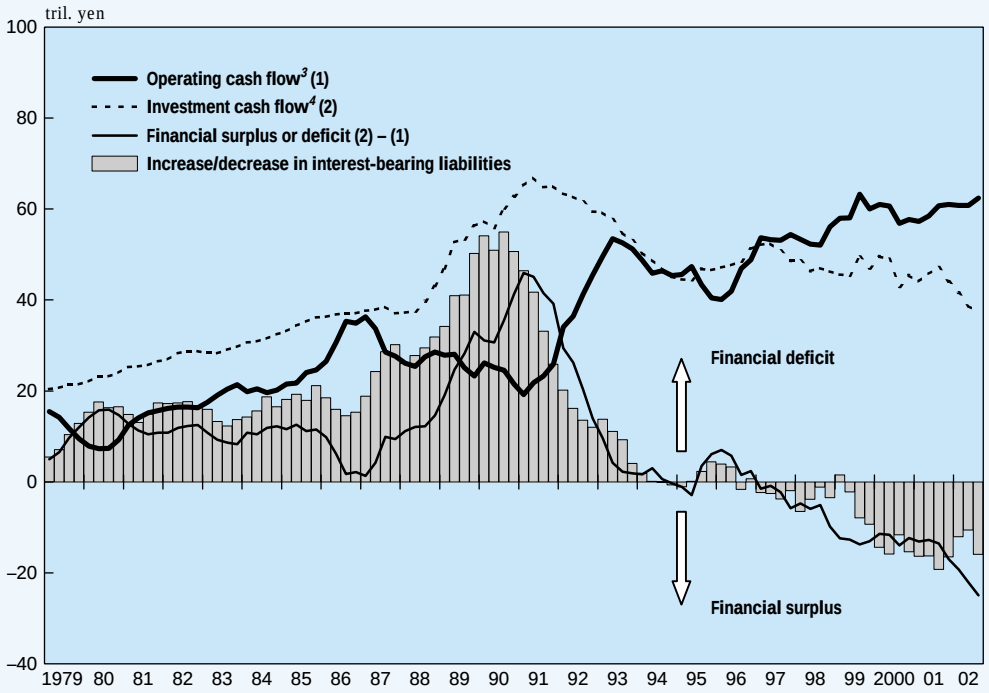



### (4) Construction, Real Estate, Wholesale, and Retail




Notes: *1*. Shaded areas indicate recessions.
*2*. Source: *Financial Statements Statistics of Corporations by Industry*. Corporations included are those whose capital exceeds 10 million yen.
*3*. Figures are adjusted for any discontinuities in the original data (ratios are calculated using four-quarter moving averages of the original data).
*4*. Value-added = operating profits + depreciation expenses + personnel expenses + interest paid.

Chart 18
Cash Flows at Firms[1,2]

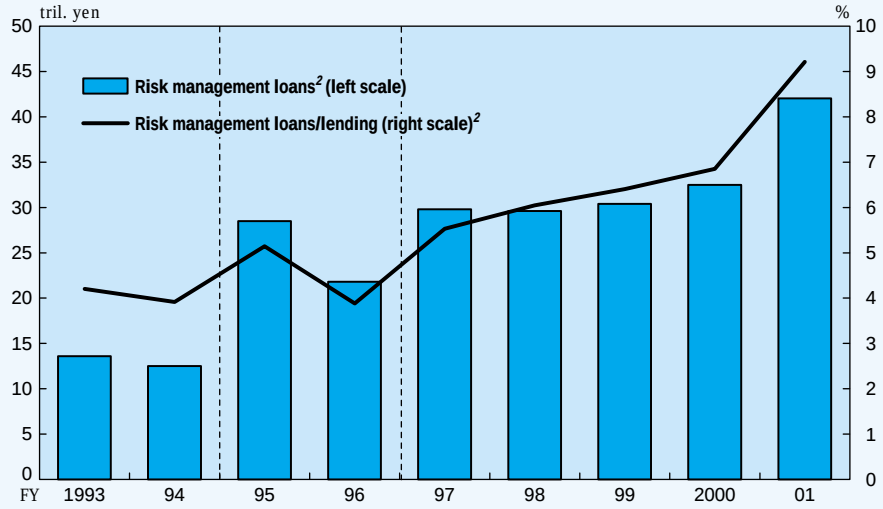



Notes: *1.* Source: *Financial Statements Statistics of Corporations by Industry*. Corporations included are those whose capital exceeds 10 million yen.
*2.* Figures are the sum of the last four quarters.
*3.* Operating cash flow:
Recurring profit × 0.5 + increase/decrease in accounts payable and provisions – increase/decrease in accounts receivable, inventories, and other current assets + depreciation.
*4.* Investment cash flow represents cash flow from investing activities:
Addition to fixed assets + purchases of intangible fixed assets and real estate for investment purposes + increase/decrease in securities investments (excluding equity) and long-term loans.

Chart 19

## NPLs and the Lending Attitude of Financial Institutions

### (1) NPLs of Domestically Licensed Banks[1]

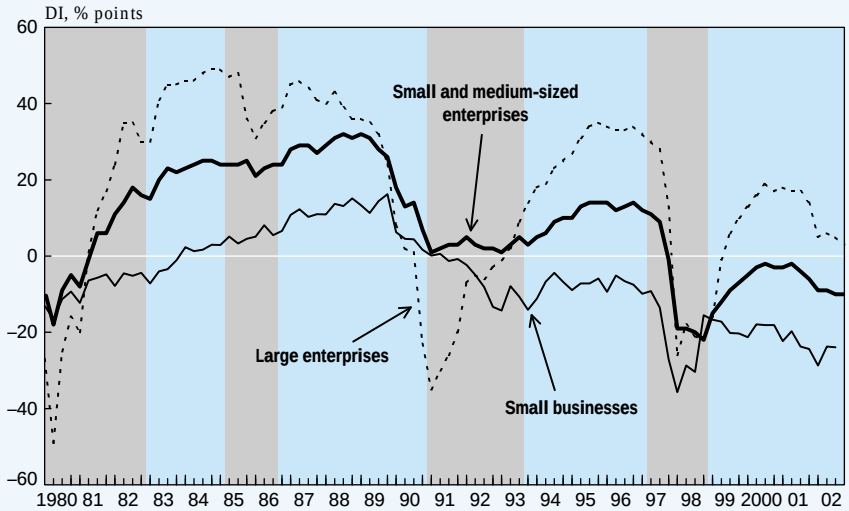



Notes: *1.* Figures from FY 1993 to FY 1994 are only for city banks, long-term credit banks, and trust banks.

*2.* Risk management loans = LBB + PDL (FY 1993, FY 1994)
= LBB + PDL + restructured loans (FY 1995, FY 1996)
= LBB + PDL + 3PDL + restructured loans (FY 1997–)

where
LBB: loans to borrowers in legal bankruptcy.
PDL: past-due loans in arrears by six months.
3PDL: past-due loans in arrears by three months or more and less than six months.

### (2) Lending Attitude of Financial Institutions DI[1]




Note: *1.* Shaded areas indicate recessions.

Sources: *Tankan (Short-Term Economic Survey of Enterprises in Japan)*, for large enterprises and small and medium-sized enterprises. *Quarterly Survey of Small Businesses in Japan*, for small businesses. % points indicate "accommodative" – "severe" for large enterprises and small and medium-sized enterprises, and "more accommodative" – "more severe" for small businesses.

Chart 20
Long-Run Equilibrium Relationship between Amount of Fund-Raising by Money Holders and Economic Activity

The vector error correction model comprises three endogenous variables and one exogenous variable: the real amount of fund-raising[1] (deflated by the GDP deflator, *rf*), real GDP (*y*), and real land prices (Urban Land Price Index deflated by the GDP deflator, *rland*). The interest rate (average contracted interest rate on new loans and discounts, *R*) is treated as exogenous. *EC* is the error correction term, representing the deviation from long-run equilibrium.

$$\Delta rf_t = -\alpha_{rf} EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{rf} \Delta rf_{t-i} + \sum_{i=1}^{n} \theta_i^{rf} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{rf} \Delta rland_{t-i} + \sum_{i=0}^{n} \rho_i^{rf} \Delta R_{t-i} + c_{rf} + \varepsilon_t^{rf}. \quad (1)$$

$$\Delta y_t = \alpha_y EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{y} \Delta rf_{t-i} + \sum_{i=1}^{n} \theta_i^{y} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{y} \Delta rland_{t-i} + \sum_{i=0}^{n} \rho_i^{y} \Delta R_{t-i} + c_y + \varepsilon_t^{y}. \quad (2)$$

$$\Delta rland_t = \alpha_{rland} EC_{t-1} + \sum_{i=1}^{n} \gamma_i^{rland} \Delta rf_{t-i} + \sum_{i=1}^{n} \theta_i^{rland} \Delta y_{t-i} + \sum_{i=1}^{n} \lambda_i^{rland} \Delta rland_{t-i} + \sum_{i=0}^{n} \rho_i^{rland} \Delta R_{t-i} + c_{rland} + \varepsilon_t^{rland}. \quad (3)$$

$$EC_t = rf_t - \beta_y y_t - \beta_{rland} rland_t. \quad (4)$$

**Results**[2,3]

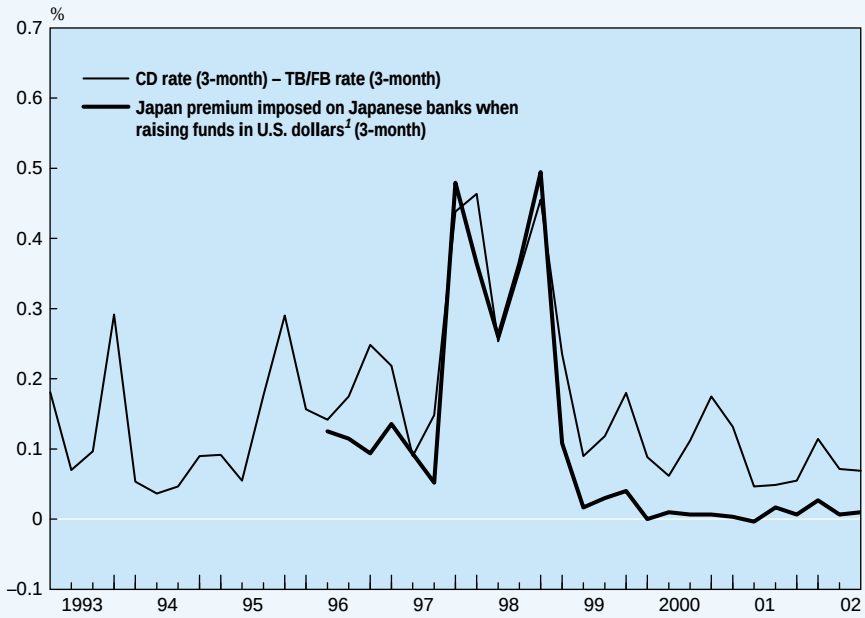
| | Sample period | Cointegration rank | Estimated parameter | | | | |
|---|---|---|---|---|---|---|---|
| | | | $\beta_y$ | $\beta_{rland}$ | $\alpha_{rf}$ | $\alpha_y$ | $\alpha_{rland}$ |
| 1 | 1971/Q1–1997/Q3 | 1 | 1.846<br>(0.060) | 0.068<br>(0.033) | 0.046<br>(0.019) | 0.053<br>(0.021) | 0.024<br>(0.020) |
| 2 | 1971/Q1–2002/Q3 | 1 | 1.846<br>(0.037) | 0.068<br>(0.021) | 0.046<br>(0.018) | 0.058<br>(0.022) | 0.025<br>(0.026) |
| 3 | 1981/Q1–1997/Q3 | 1 | 1.447<br>(0.140) | 0.180<br>(0.051) | 0.032<br>(0.015) | 0.045<br>(0.023) | 0.024<br>(0.043) |
| 4 | 1981/Q1–2002/Q3 | 1 | 1.683<br>(0.078) | 0.097<br>(0.027) | 0.042<br>(0.019) | 0.060<br>(0.033) | 0.022<br>(0.036) |

Notes: *1.* The "amount of fund-raising" by money holders is the sum of loans by private financial institutions and public financial institutions and securities (including corporate bonds and CP).
Source: *Flow of Funds Accounts*.
Figures for *rf* prior to 1998/Q1 are based on the year-on-year changes from 68SNA.
*2.* Shaded areas represent cases in which all sign conditions are satisfied.
*3.* Values in parentheses are standard deviations.

Chart 21

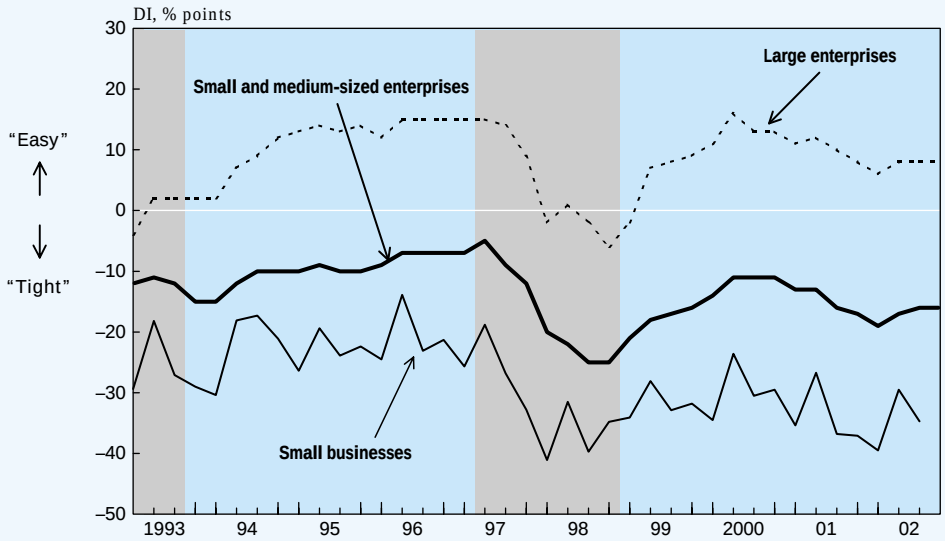
## Anxieties over the Financial System

### (1) Short-Term Money Market Rates




Note: *1.* Japan premium = interest rate quoted for Bank of Tokyo-Mitsubishi – that for Barclays Bank U.S. dollar LIBOR in the Eurodollar market (London).
Source: British Bankers' Association.

### (2) Financial Position DI[1]

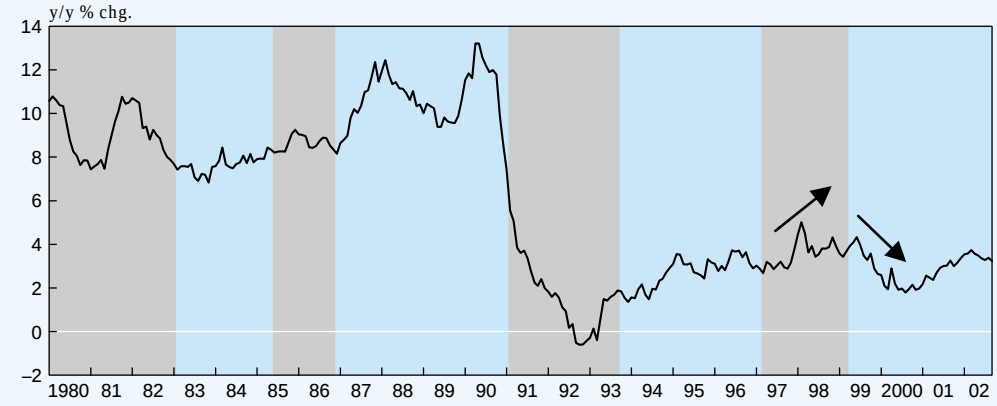



Note: *1.* Shaded areas indicate recessions.
Sources: *Tankan (Short-Term Economic Survey of Enterprises in Japan)*, for large enterprises and small and medium-sized enterprises. *Quarterly Survey of Small Businesses in Japan*, for small businesses.

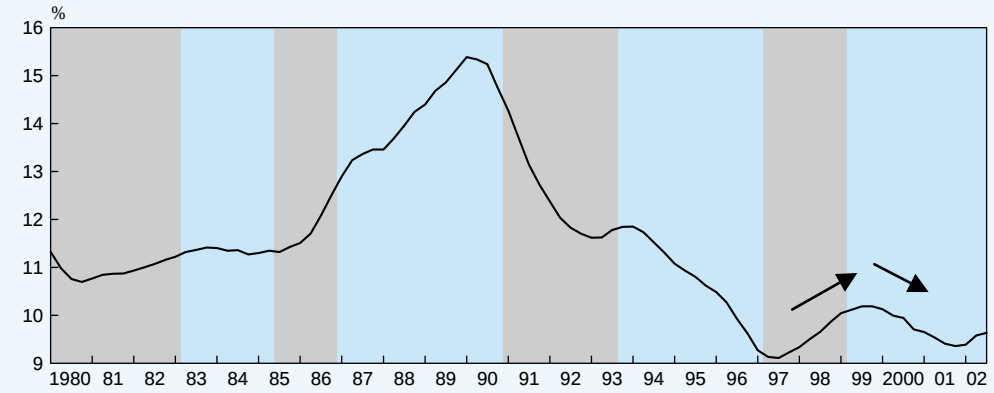
Chart 22

Effects of Anxieties over the Financial System[1,2]

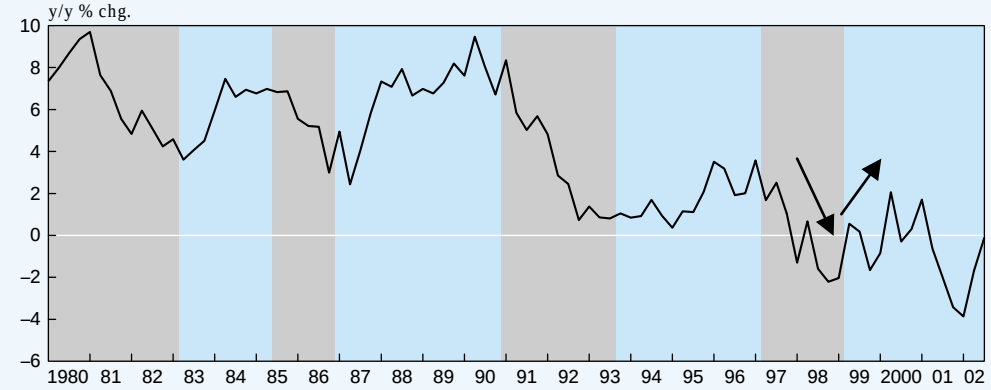
**(1) $M_2$+CDs**




**(2) Ratio of Cash and Deposits to Sales (All Industries)**




**(3) Nominal GDP**



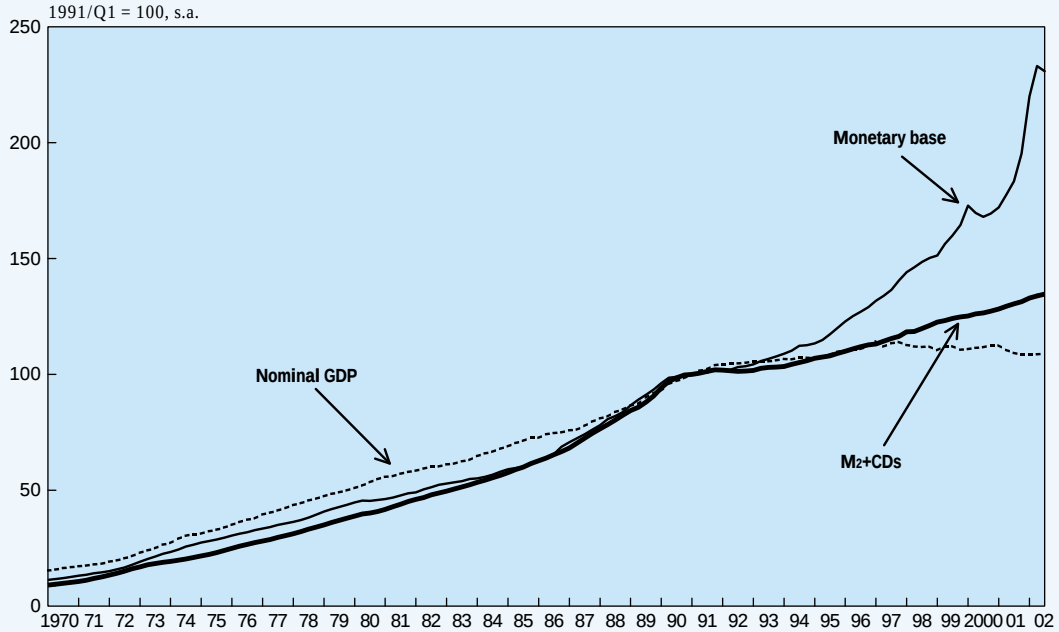

Notes: *1*. Shaded areas indicate recessions.

*2*. Source of (2): *Financial Statements Statistics of Corporations by Industry*. Corporations included are those whose capital exceeds 10 million yen. Figures are adjusted for any discontinuities in the original data. Ratio is calculated using four-quarter moving averages of the original data.

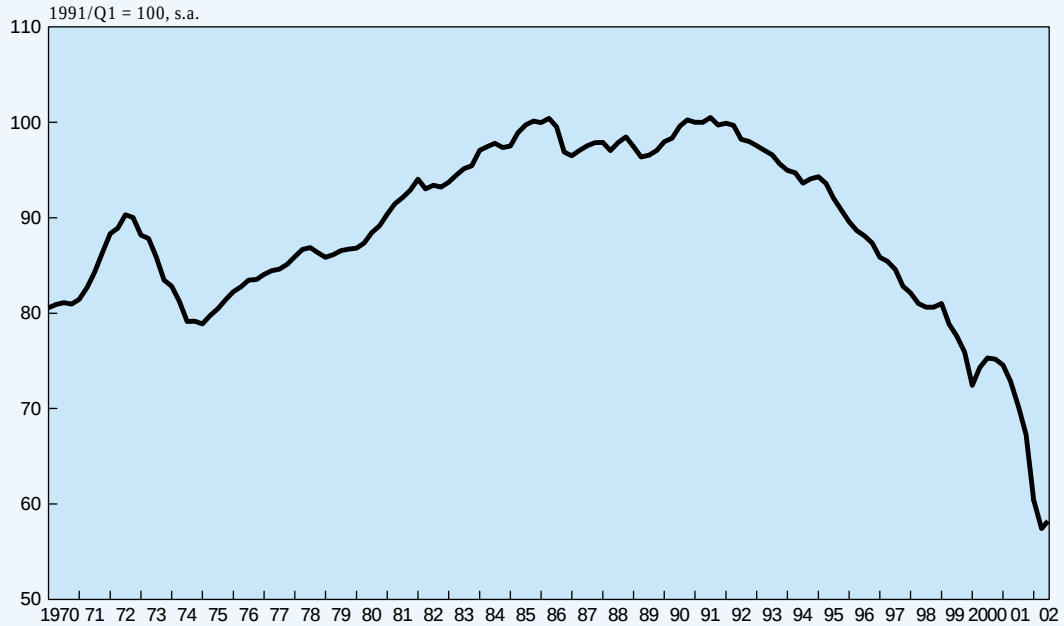
Chart 23

## $M_2$+CDs and Monetary Base[1]

**(1) $M_2$+CDs, Monetary Base, and Nominal GDP**



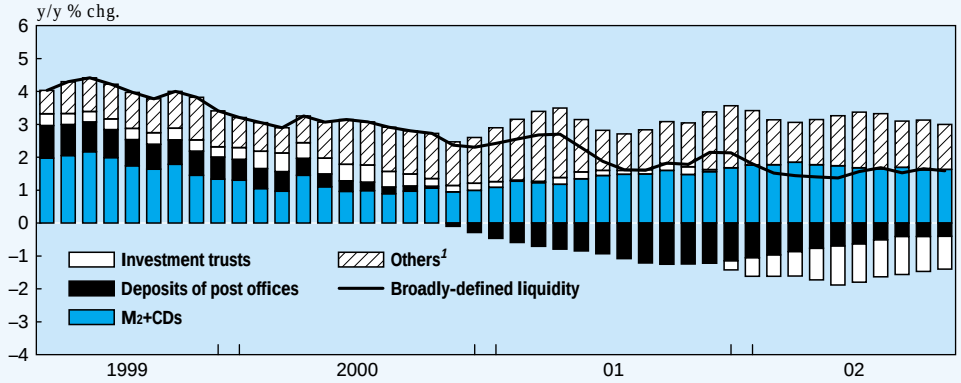

**(2) Money Multiplier ($M_2$+CDs/Monetary Base)**




Note: *1.* Figures for monetary base are adjusted for reserve requirement rate.

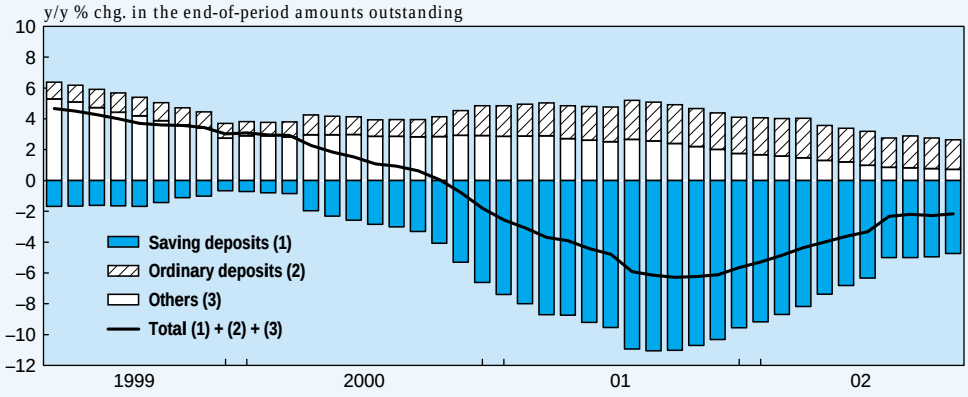
Chart 24
Fund-Shift to M2+CDs

**(1) Factor Decomposition of Broadly-Defined Liquidity**



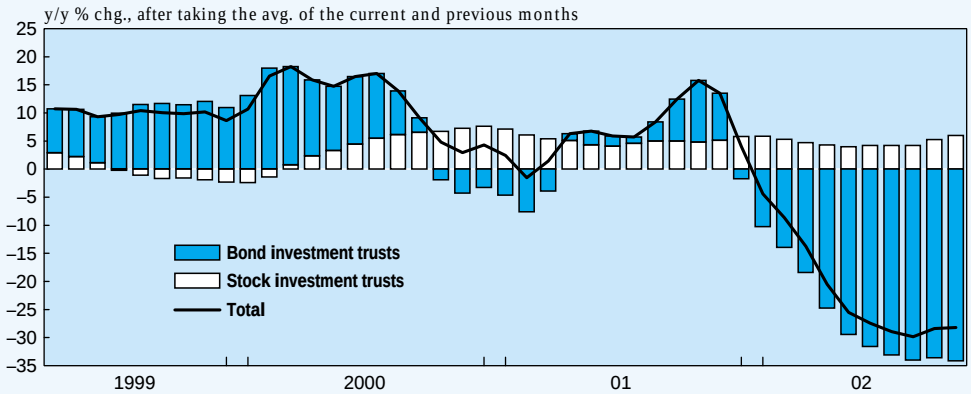

Note: *1.* "Others" includes money trusts, pecuniary trusts other than money trusts, other savings and deposits with financial institutions, bank debentures, CP issued by financial institutions, repurchase agreements and securities lending with cash collateral, government bonds and FBs, and foreign bonds.

**(2) Maturing of Large Numbers of *Teigaku* (Fixed-Amount) Deposits of the Post Office**




Source: The *Postal Saving News*.

**(3) Fund-Shift from Investment Trusts[1]**

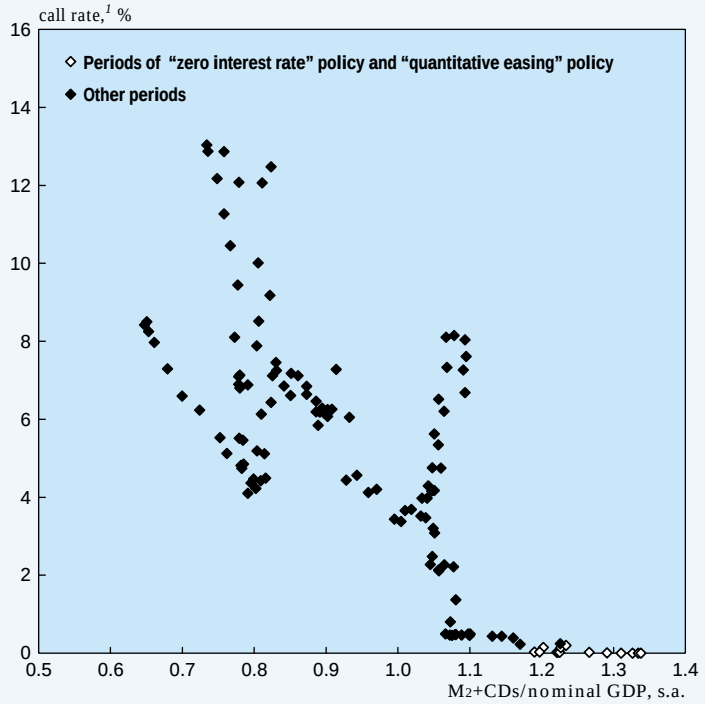



Note: *1.* "Investment trusts held by money holders" is compiled by deducting "the portion held by financial institutions" from "the total of investment trusts" in the *Principal Balance of Investment Trusts*.
Source: *Principal Balance of Investment Trusts*.

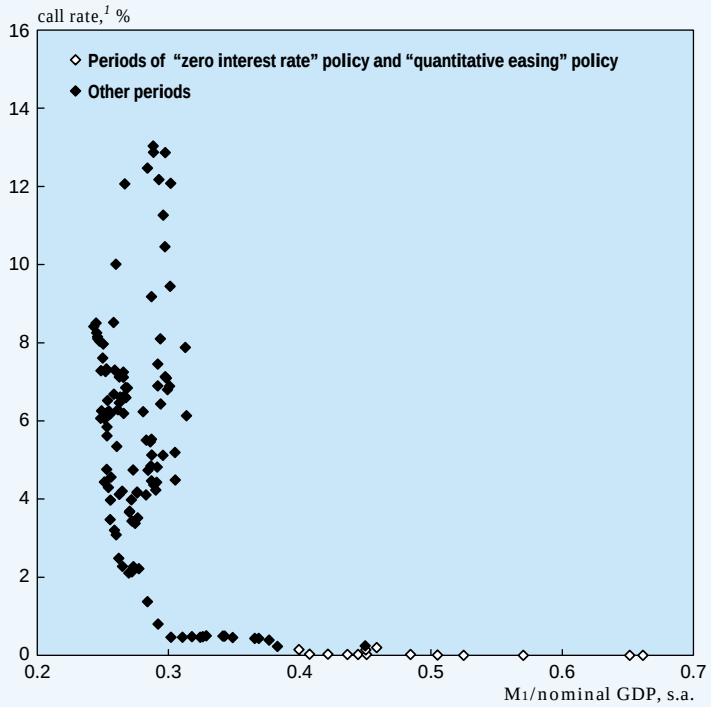
Chart 25

Money Demand Curve (1970/Q1–2002/Q3)

**(1) $M_2$+CDs**

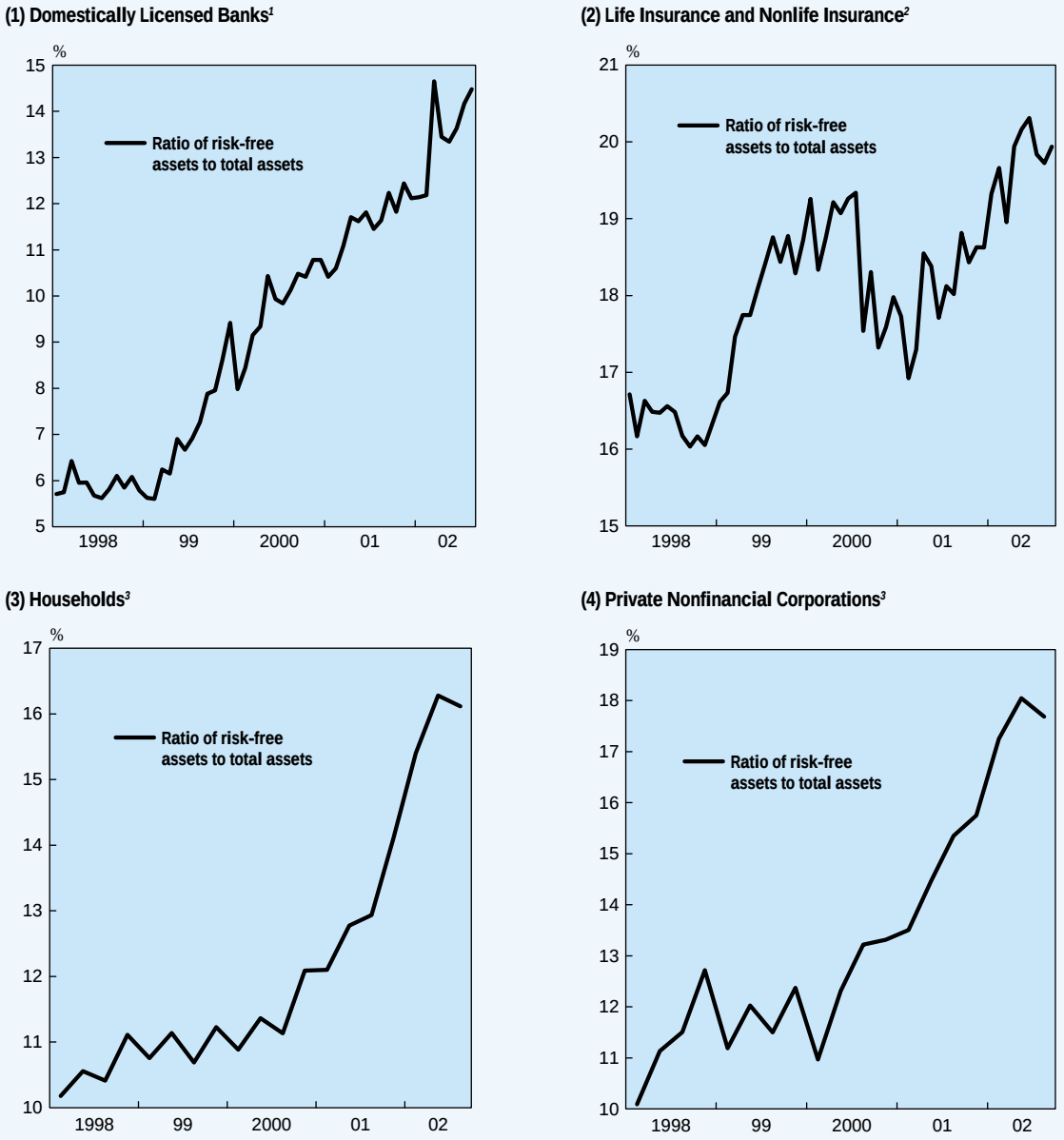



**(2) $M_1$**




Note: *1.* Call rate: uncollateralized overnight rates from 1986/Q4; before 1986/Q3, collateralized overnight rates.

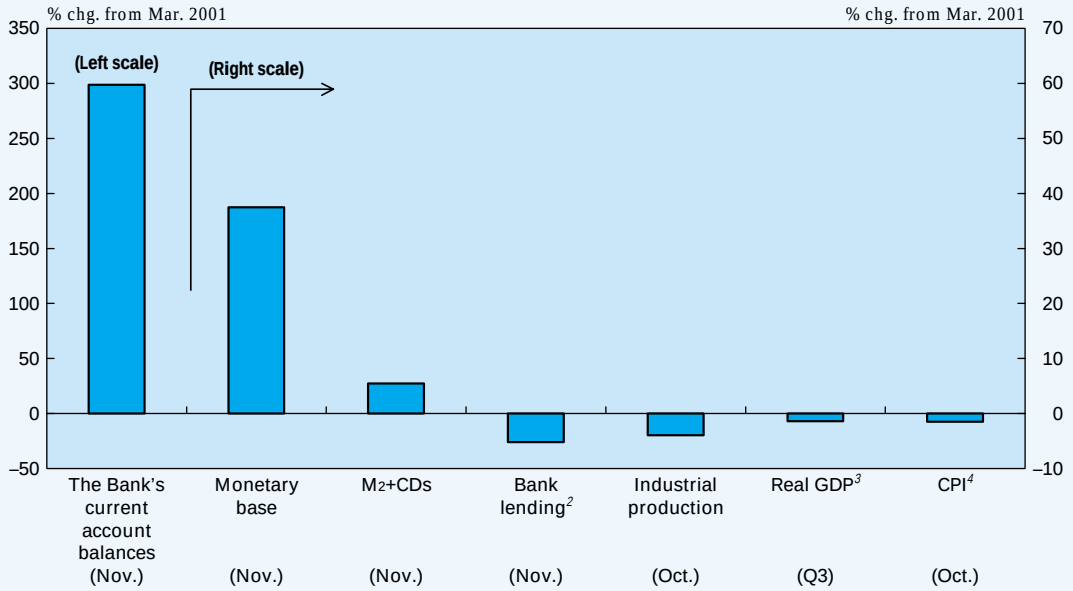
Chart 26
Increasing Demand for Risk-Free Assets




Notes: *1.* Domestically licensed banks: (cash and current account balances + government bonds)/total assets.
Source: *Assets and Liabilities of Domestically Licensed Banks (Banking Accounts).*
End of series: August 2002.
Figures for government bonds held by domestically licensed banks include estimates.
*2.* Life insurance and nonlife insurance: (cash and deposits with others + government bonds)/total operating funds.
Sources: *Principal Assets of Life Insurance Companies.*
*Principal Assets of Nonlife Insurance Companies.*
End of series: September 2002.
*3.* Households and private nonfinancial corporations: (currency + transferable deposits + government bonds)/total financial assets.
Source: *Flow of Funds Accounts.*
End of series: 2002/Q3.

Chart 27

Monetary Indicators and Economic Activity from March 2001[1]




Notes: *1*. Figures, excluding the Bank's current account balances and bank lending, are seasonally adjusted.
*2*. Figure for bank lending is adjusted to exclude special factors such as liquidation of loans.
*3*. Figure for real GDP is compared to that in 2001/Q1.
*4*. Figure for CPI is the general index, excluding perishables.

Box 1 Views on the Role of the Money Stock in the Transmission Mechanism of Monetary Policy

**1. The View Stressing the Role of the Real Economy**

Two views have been established recently on the role of the money stock in the transmission mechanism of monetary policy. The first view is the one that emphasizes the role of the real economy. In this framework, if a central bank operates on the short-term interest rate via monetary operations in the short-term money markets, then both long and short-term interest rates, asset prices, expectations concerning future economic developments, and in consequence the output gap all change. Through this mechanism, monetary policy can influence price developments. The economy can be described by a simple system of three equations: (1) the relationship between the interest rate and the output gap (IS curve); (2) the relationship between the output gap and prices (Phillips curve); and (3) the monetary policy of the central bank (monetary policy rule). The price mechanism is captured by the Phillips curve. Monetary policy influences economic activity via operation on the short-term interest rate. In this framework, there may be stable long-run relationships (long-run equilibrium relationships) among the real money stock, the real economy, and the interest rate; however, there is no transmission mechanism whereby the money stock influences prices directly. The condition that the money market be in equilibrium (the LM curve) is determined so as to be consistent with the above conditions, since it is assumed that movements in the money stock follow those of the real economy and price level passively. Thus, according to this view stressing the real economy, it is not necessary to analyze the money stock to assess the effectiveness of monetary policy. Models based on this view have dominated recent theoretical analyses of monetary policy.

**2. The View Stressing the Role of Money**

The second view is the one that emphasizes the role of money. This view has two cornerstones: (1) that the monetary policy transmission mechanism that operates via interest rates, assumed in the real economy view above, is not the sole mechanism by which monetary policy can influence the real economy and prices, but that another channel exists; and (2) that the influence of this other transmission mechanism can be represented by movements in the money stock. The basic mechanism is the following.

(1) There exist long-run equilibrium relationships between the real money stock and the real economy and between the money stock and the interest rate.
(2) The level of the money stock is likely to diverge from its long-run equilibrium from time to time because of changes in the credit creation behavior of financial institutions or because of changes in monetary policy.
(3) Once the level of the money stock diverges from equilibrium, it influences the real economy and prices on its path to regain its long-run equilibrium.

The above-mentioned system of equations may be modified to allow the money stock to have some influence on the IS curve or the Phillips curve.

Box 2 What It Means to Analyze the Money Stock in Long-Run Equilibrium

Some analyses of movements in the money stock and their influence on real economic activity and prices look only at changes in, for example, the year-on-year growth rate of the money stock. However, it is important to analyze not only changes in but also the level of the money stock. In other words, it is important to assess whether there exists a long-run stable (equilibrium) relationship between the money stock and nominal GDP; how much the level of money stock diverges from the equilibrium level; and the extent to which velocity, the ratio of nominal GDP to the money stock, diverges from its trend. Such analysis is based on the assumption that, when we look at periods long enough for business cycles to even themselves out (in long-run equilibrium), there is a stable relationship between the price level and the level of the money stock. The relationship

Money stock = price level × output/velocity

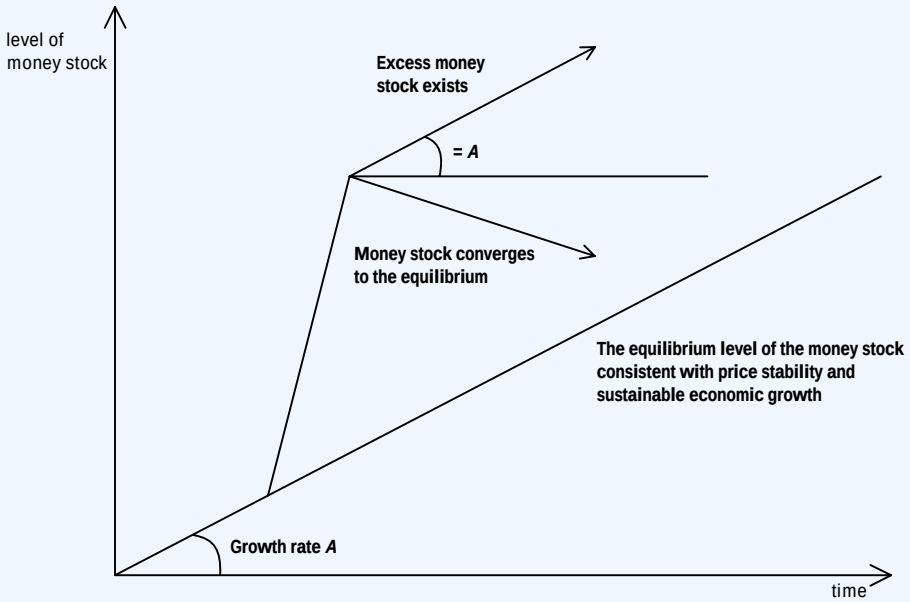
implies that the following long-run equilibrium will hold:

Money stock = price level × output/
constant (or trend term).

That is, in the long run, in which the velocity is constant or on a constant trend and output is at its potential level, changes in the price level will correspond one-to-one with changes in the money stock. Against this background, it becomes meaningful to analyze the level of money stock in case the money stock diverges from its long-run equilibrium. For example, let's assume that the economy starts in a position where the money stock is excessive relative to the level of output (i.e., it is above its long-run equilibrium; see Chart for Box 2). Assuming that, in the next period, the growth rates of the money stock and of output are equal, then, if we focus solely on these rates of change, the money stock would appear to be behaving appropriately. Inflationary pressure, however, would accumulate within the economy because the level of the money stock remains excessive. Similarly, even when the money stock grows more slowly than output, this implies only that the money stock is approaching the level consistent with sustainable economic growth within the context of stable prices. It does not imply that there has been a quantitative tightening in monetary conditions. As illustrated above, if only changes in the money stock are discussed, there is a danger of failing to notice these cumulative effects. Where the rate of change of the money stock does provide insight, however, is when attention turns to the speed at which the level of the money stock is diverging from or converging toward its long-run equilibrium, since such information is also useful in assessing developments in the real economy and prices. Therefore, to attain a firm grasp of the trend and likely influences of the money stock upon the economy, it is necessary to examine both the level and the rate of change of the money stock.

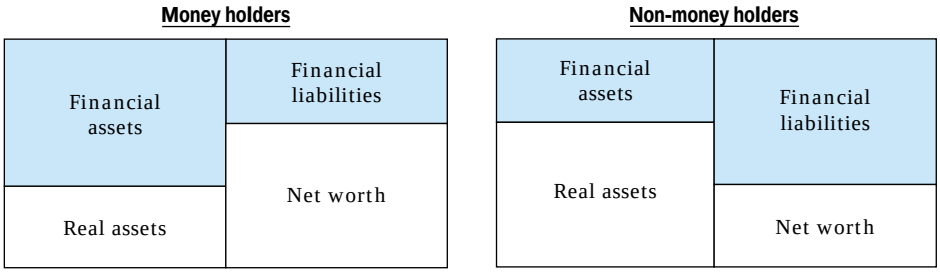
Box 2 (continued)

Chart for Box 2 Conceptualizing the Relationship between the Level and Changes in the Money Stock

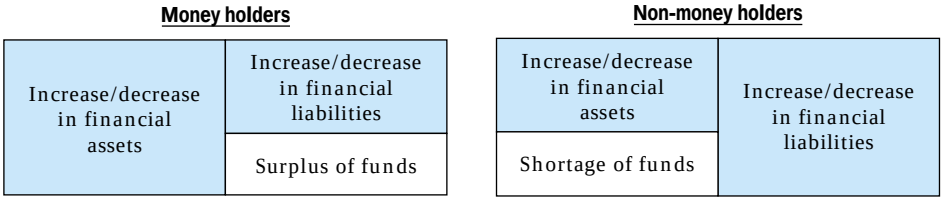


Box 3 A Brief Introduction to the Balance-Sheet Approach for Money Holders

(1) Economic agents and institutions are divided into two categories: "money holders" (firms, households, etc.)[1] and "non-money holders" (central governments, overseas and financial institutions).




(2) Turning attention to the financial assets and liabilities in the balance sheets above, the year-on-year growth rates of these items can be described as follows.




—Financial surpluses and deficits are referred to together as the "surplus or shortage of funds." Conceptually, the surplus or shortage of funds corresponds to net savings (savings minus investments), that is, the so-called IS balance.

(3) Increase/decrease in the financial assets of money holders can be transformed into the following equation.

(a) Increase/decrease in financial assets =
(b) increase/decrease in financial liabilities
+ (c) increase/decrease in the surplus of funds.[2]

(b) Increase/decrease in financial liabilities is referred to as the "amount of fund-raising." This is equal to the net amount of fund-raising by money holders, namely, the gross amount of fund-raising, including loans and issues of stocks, bonds, and CP, minus the amount of the reduction in financial liabilities.

(4) The contribution of (c), the increase/decrease in the surplus of funds, is referred to as the "net savings." This is equivalent to the amount of income (household income, firms' profit, etc.) minus tax and expenditures (consumption, business fixed investments, etc.). Money holders' "net savings" cannot be measured directly due to constraints on the availability of data. The amount of the surplus of funds held by money holders is equal to the shortage of funds for non-money holders (central government, overseas and financial institutions), because the sum of surpluses and shortages of funds held by all sectors is always zero. Based on this relationship, (c) the "net savings" can be divided into three components: (e) the "fiscal factor" (the surplus or shortage of funds held by the central government), (f) the "overseas factor" (the surplus or shortage of funds held overseas), and (g) the "surplus or shortage" of funds held by financial institutions ((c) = (e) + (f) + (g)).

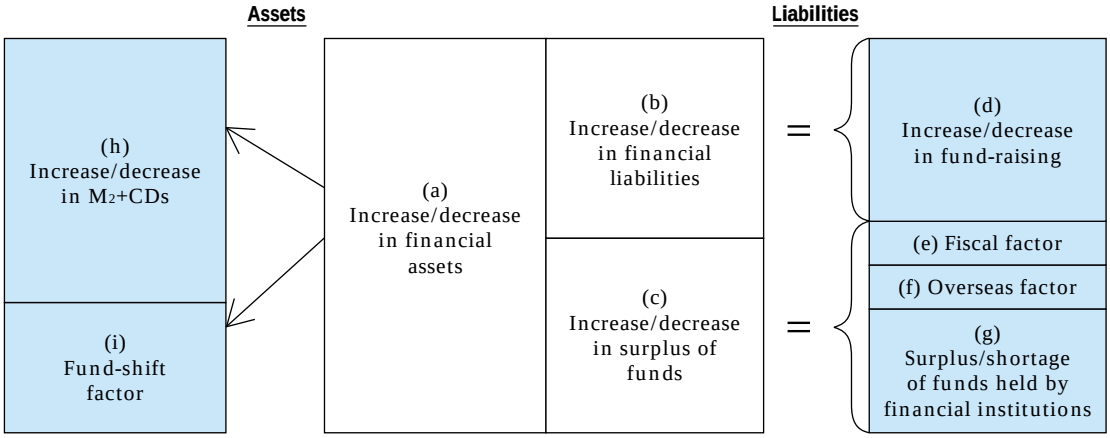
(5) Financial assets are composed of $M_2$+CDs and other financial assets. If any difference between changes in financial assets and in $M_2$+CDs is observed, this is considered to constitute a fund-shift. Specifically, the difference between

1. Strictly, money holders includes, in addition to firms and households, private nonprofit institutions serving households, local public entities, securities companies, securities finance companies, nonbanks, etc.
2. Quantities (a), (b), and (c) are similarly labeled in the box on the next page.

Box 3 (continued)

(h) the change in $M_2$+CDs and (a) the change in financial assets is defined as (i) the "fund-shift factor"[3] ((i) = (h) – (a)).

(6) Putting everything together, the increase/decrease in $M_2$+CDs can be represented in the following illustration ((h) = (d) + (e) + (f) + (g) + (i)).




(7) Using this relationship, the individual factors making up changes in $M_2$+CDs can be identified. It should be noticed, however, that this factor decomposition is based on *ex post* identities and thus does not illustrate a causal relationship.

(8) Given current economic circumstances in Japan, the conditions necessary for an expansion of the level of the money stock or an acceleration in the growth rate of the money stock in comparison with economic activity are listed below.

(i) Conditions for the "amount of fund-raising" to begin to increase

For the "amount of fund-raising," representing the net amount of fund-raising by firms, households, etc., to begin to contribute positively to growth in the money stock, two conditions are required: (1) the transaction volume in the economy as a whole must increase, as a result of Japan's economic recovery; and (2) there must be a considerable lessening of the ongoing negative impact imposed by the combination of reductions in the excess liabilities of firms and households and the NPL problems of financial institutions.

(ii) Case in which the "fiscal factor" and the "overseas factor" increase

Since the "fiscal factor" corresponds to the central government's deficit, its contribution to growth in the money stock would increase if (1) fiscal expenditure expands or (2) there is a reduction in taxes or other central government revenues. The contribution of the "overseas factor" would increase with an expansion of the trade surplus, due to an increase in exports or a decrease in imports.

(iii) Conditions for the contribution of the other factors to expand

The other factors basically represent fund-shifts to $M_2$+CDs from other financial assets. The situations under which this fund-shift would accelerate further are precisely those in which the opportunity cost of holding $M_2$+CDs undergoes a further decline. Specifically, these are (1) the situation in which interest rates on the whole fall further or (2) that in which the relative merit of holding liquidity increases due to an increase in the risk premium caused by the emergence of anxiety over the financial system.

*3.* If the growth rate of $M_2$+CDs is higher (lower) than that of financial assets, there is a shift toward (a shift out of) $M_2$+CDs. In the above illustration, since the former is lower than the latter, a shift out of $M_2$+CDs occurs.

## REFERENCES[35]


Bank of Canada (2001), "Uncertainty and the Transmission of Monetary Policy in Canada," The Thiessen Lectures delivered by Gordon G. Thiessen, Governor of the Bank of Canada, 1994 to 2001.

Bank of England (1999), "Economic Models at the Bank of England," Bank of England.

—— (2000), "Money, Lending and Spending: A Study of the UK Non-Financial Corporate Sector and Households," *Bank of England Quarterly Bulletin*, May 2000.

——, The Monetary Policy Committee (2000), "The Transmission Mechanism of Monetary Policy."

Bank of Japan, Policy Planning Office (2002), "Saikin no Manetari-Beisu no Zouka wo Donoyouni Rikaisuruka? (How Should the Recent Increase in Japan's Monetary Base Be Understood?)," *Bank of Japan Research Papers*, August 2002 (English version available in *Bank of Japan Quarterly Bulletin*, 10 (4), 2002, pp. 139–172).

*Bank of Japan, Research Department (1975), "Nihon ni okeru Mane-Sapurai no Juyosei ni tsuite (On the Importance of the Money Stock in Japan)," *Bank of Japan Research Papers*, July 1975.

*Bank of Japan, Research and Statistics Department (1992), "Saikin no Mane-Sapurai no Doko ni tsuite (Recent Developments in the Money Stock in Japan)," *Bank of Japan Research Papers*, September 1992.

—— (2001), "Guide to Japan's Money Stock Statistics," October 2001.

Board of Governors of the Federal Reserve System (1991), "Testimony on the Monetary Policy Report to the Congress," July 1991. Also (1992) in July 1992 and (1993) in July 1993.

—— (1994), "Purposes and Functions."

Brayton, Flint, and Peter Tinsley (1996), "A Guide to FRB/US, A Macroeconomic Model of the United States," *Finance and Economics Discussion Series 1996-42*, Board of Governors of the Federal Reserve System, October 1996.

Clarida, Richard, Jordi Galì, and Mark Gertler (1999), "The Science of Monetary Policy: A New Keynesian Perspective," *Journal of Economic Literature*, 37, December 1999.

Coenen, Gunter, and Juan-Luis Vega (1999), "The Demand for Euro Area M3," *ECB Working Paper* No. 6, September 1999.

European Central Bank (1999), "The Stability-Oriented Monetary Policy Strategy of the Eurosystem," *ECB Monthly Bulletin*, January 1999.

—— (2000a), "The Two Pillars of the ECB's Monetary Policy Strategy," *ECB Monthly Bulletin*, November 2000.

—— (2000b), "Seminar on Monetary Analysis: Tools and Applications," *Conference Proceedings*, November 20–21, 2000.

—— (2001a), "Monetary Policy-Making under Uncertainty," *ECB Monthly Bulletin*, January 2001.

—— (2001b), "The Monetary Policy of the ECB," August 2001.

Fagan, Gabriel, Jerome Henry, and Ricardo Mestre (2001), "An Area-Wide Model (AWM) for the Euro Area," *ECB Working Paper* No. 42, January 2001.

Greenspan, Alan (2001), "Testimony at the House Financial Services Committee," February 2001.

Hansen, Lars Peter, and Thomas J. Sargent (2001), "Acknowledging Misspecification in Macroeconomic Theory," *Monetary and Economic Studies*, 19 (S-1), February 2001, pp. 213–227.

Hauser, Andrew, and Andrew Brigden (2002), "Money and Credit in an Inflation-Targeting Regime," *Bank of England Quarterly Bulletin*, Autumn 2002.

King, Mervin (2002), "No Money, No Inflation—The Role of Money in the Economy," *Bank of England Quarterly Bulletin*, Summer 2002.

Laidler, David (1999), "Passive Money, Active Money, and Monetary Policy," *Bank of Canada Review*, Summer 1999.

Meyer, Laurence (2001), "Does Money Matter?" *Review*, 83 (5), Federal Reserve Bank of St. Louis, September/October 2001.

Onatski, Alexei, and James H. Stock (2000), "Robust Monetary Policy under Model Uncertainty in a Small Model of the U.S. Economy," *NBER Working Paper* No. 7490, National Bureau of Economic Research, January 2000.

Romer, David (2000), "Keynesian Macroeconomics without the LM Curve," *Journal of Economic Perspectives*, 14 (2), Spring 2000.

Sriram, Subramanian S. (1999), "Survey of Literature on Demand for Money: Theoretical and Empirical Work with Special Reference to Error-Correction Models," *International Monetary Fund Research Paper* WP/99/64, May 1999.

*Tachi, Ryuichiro (2002), *Denshi Mane, Denshi Shotorihiki to Kinyu Seisaku* (The Impact of Advances in Information Technology on Monetary Stock), Supervising Editor Ryuichiro Tachi, edited by the Institute for Monetary and Economic Studies, Bank of Japan, University of Tokyo Press, 2002.


35. Asterisks indicate documents that are available in Japanese only.

Taylor, John (1993), "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, 39, Autumn 1993.

**Further Information about the Money Stock**

The following statistical data and guides of money stock are available on the Bank's homepage.

- Monthly published statistics (http://www.boj.or.jp/en/stat/stat_f.htm).
- Time-series data (http://www.boj.or.jp/en/stat/stat_f.htm).
- "Guide to Japan's Money Stock Statistics" (http://www.boj.or.jp/en/stat/exp/data/exms01.pdf).
- "Mane Sapurai no FAQ (FAQ of Money Stock Statistics)," (available in Japanese only at http://www.boj.or.jp/stat/exp/faqms.htm).
- "Explanation of the Monetary Survey and Changes in Money Stock ($M_2$+CDs) and Credit Statistics" (http://www.boj.or.jp/en/stat/exp/data/exdatams.pdf).

Symbols and Abbreviations Used in This Article

| | | | |
|---|---|---|---|
| FY | Fiscal year | s.a. | Seasonally adjusted |
| Q | Calendar quarter | % chg. | Percentage changes |
| % | Percent | y/y % chg. | Percentage changes from the previous year |
| % points | Percentage points | | |
| bil. | Billions | | |
| tril. | Trillions | avg. | Average |