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Bank of Japan

## **The Future of Money**

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(English translation based on the Japanese original)

## **I. Introduction**

It is a great honor to have this opportunity to deliver a speech at the Japan Society of Monetary Economics.

Today's topic is "The Future of Money." Indeed, this topic is now gaining great attention and being lively discussed among various entities, due to on-going IT innovation, global developments of various cashless payment means including mobile payments, the emergence of crypto-assets and the idea of central bank digital currency.

Money is the core of financial services and economic society, and central banks were born to play a key role in the fundamental infrastructure regarding money. Accordingly, thinking about the future of money inevitably makes us reconsider the future of financial services, the economy and central banks. Moreover, as we can see with the global "data revolution" behind the recent developments of cashless payments, the future of money is closely linked to how information and data will be used in economic society in the coming era.

In this speech, please allow me to use the word "money" as a general term covering various payment and settlement means, and which is not limited to central bank money and bank deposits.

## **II. The Function of Money**

### **Money and Credit**

Before going into the issues regarding the future of money, I would like to touch upon the origin and fundamental function of money.

Money is undoubtedly one of the greatest inventions of humans, comparable to "language" or "fire." Money enabled people to exchange goods and services across space and over time, and to build an economic society. Indeed, it would have been extremely difficult for humans to barter goods or services without using money, since such direct exchanges can only be implemented by a "double coincidence of wants."

Economics textbooks describe the three functions of money as "a measure of value," "a

store of value," and "a medium of exchange," and credit is the foundation of all of them. Money can perform these functions because people believe that all other people will accept money in the future. Humans became able to share such intangible credit with unknown others by building a "chain of trust," and with that built an economic society.

Until now various materials such as sea-shells and pieces of metals had been used. The core value of money, however, does not lie in the utility of its materials. If the material of money itself has use value, it would be consumed without being circulated, and would not function as money. Yap Island's famous stone money, known as Rai or Fei, was difficult to find any value in its use. Moreover, it was difficult to even carry around huge stone money. Indeed, Yap Island's people found value in the stone money not in the utility of its materials, but in the "information" or "story" embedded in the stone money. By looking at the stone money, Yap people imagined how hard it had been to carve out and transport it. Yap people even found value in stone money which had sunk to the bottom of the sea as the ship transporting it was shipwrecked. They trusted the story of the hard work and the tragic shipwreck, and traded using the stone money which they had never seen but believed to be lying at the bottom of the sea. This case vividly illustrates that the functions of money lie in credit.

### **Money and Information Processing**

From the perspective of information processing, money has transformed the value of various goods and services with "prices" by its common units, and enabled price mechanisms to function effectively.

Indeed, money is indispensable to the concept of "general prices" and "inflation." The measure of value in a barter transaction remains to be a relative value between individual goods and services, such as "1 kg of meat for 10 kg of rice." The invention of money made it possible to denominate all the goods and services by a single unit of value, and aggregate the measured value of them in a standardized methodology.

As such, money has made information processing regarding various economic activities significantly more efficient. The creation of money was definitely one of the main drivers that enabled humanity to build an economic society. The cases of hyperinflation in recent history always led to extreme malfunctioning of the economies, because

hyperinflation destroyed people's "chain of trust" and price mechanisms, and thereby made information processing through money extremely inefficient.

However, if many different types and units of money circulate in the economy, people would need to assess the credibility of each issuer, determine whether they could accept it or not, and agree with each other on the exchange rates between multiple numbers of units at each transaction, accordingly the efficiency of information processing would be substantially impaired. Central banks, being assigned the duty of issuing banknotes as the single issuer, were established to overcome such turmoil.

### **The Establishment of Central Banks and "a Two-Tiered System"**

In order for central banks to obtain sufficient credibility to function as a single issuer of banknotes, many conditions must be fulfilled, such as establishing an institutional framework to make them sufficiently credible. Central banks therefore, were born after modern national states were established which is where these conditions were likely to be met. Indeed, the history of many central banks is less than 200 years old. Some central banks, such as the Riksbank in Sweden and the Bank of England in the United Kingdom, were born in late 17th century. These central banks, nevertheless, originally performed the functions that were close to those of commercial banks, and they were only gradually transformed into modern central banks. For example, the Bank of England, which was born in 1694, was exclusively assigned the role of issuing banknotes by the Bank Charter Act in 1844, 174 years ago, and it became the model of modern central banks.

From the perspective of the supply of money, the establishment of modern central banks has led to a two-tiered system, which consists of the central bank and commercial banks. In this system, the central bank exclusively supplies the public the central bank money or base money (i.e. banknotes and central bank deposits), and commercial banks provide deposits through credit creation based on the base money.

This two-tiered system has various advantages regarding information processing and resource allocation. This is why almost all countries in the world have adopted this system, although it has only been 200 years since modern central banks were established. As the central bank exclusively issues base money using a single sovereign

unit, people no longer carry the burden of evaluating and converting multiple units of currency. At the same time, commercial banks contribute to efficient allocation of financial resources to the economy through their financial intermediation by private-led initiatives. Furthermore, as credit creation by commercial banks reflects funding needs and economic conditions, the supply of broad money can be flexibly adjusted to some extent.

Commercial banks' credit creation and maturity transformation could sometimes become a risk to financial stability. Indeed, deposit insurance and central banks' lender of last resort (LLR) functions are needed because of commercial banks' maturity transformation. Some in academia proposed the idea of "narrow banking," which virtually prohibits commercial banks' credit creation and maturity transformation. Despite these arguments, almost all countries in the world have so far maintained the above-mentioned two-tiered system. This fact seems to prove that the advantages of the two-tiered system are still greater than its disadvantages.

### **III. IT Innovation and Digitization of Payment Instruments**

#### **Digitized Payment Instruments**

Under the two-tiered system, private entities, including banks, have developed a range of innovative payment instruments, incorporating the available technologies of the time.

For example, credit cards and debit cards allow their users to make and settle payments by submitting instructions to transfer deposits held in banks. Card users therefore do not have to carry around large amounts of cash. Another example is electronic money. People can charge a certain amount in mediums of electronic money such as IC cards, and thereby avoid making small cash payments every day. Electronic money has particularly developed in Japan.

Furthermore, digitized payment instruments based on the liabilities of non-banks have developed along with the popularization of e-commerce. A typical example is PayPal developed in the United States.

## **The Global Expansion of Cashless Payments**

Today with rapid IT innovation, cashless payments, especially mobile payments, are growing on a global scale. I would like to point out two big changes behind this.

First, the number of people using mobile phones or smartphones has sky-rocketed recently. Since the birth of the iPhone in 2007, smartphones have rapidly spread across the globe in just a decade. According to an estimate by the World Bank Group, around two-thirds of the 1.7 billion unbanked adults in the world have access to mobile phones or smartphones. This change has promoted the rapid growth of mobile payments, especially in emerging and developing economies. In some countries such as China, the share of mobile payments is greater than that of traditional means of retail settlements. A mobile payment does not require bricks and mortar branches or ATMs to provide financial services. Instead it uses digital information technology to reach out to emerging and developing economies and provide financial services globally through leapfrogging physical infrastructure. As such, digital technologies are also gathering much attention as a great instrument to promote "financial inclusion."

The other change is the global "data revolution." Indeed "fintech" can be understood as a financial aspect of the on-going data revolution. People around the world are creating a gigantic amount of data every second by using smartphones for SNS posting, browsing websites and issuing location data through playing games in their daily lives. Some estimate that over 90 percent of the data produced in the history of humanity have been created in the last two years alone. Data processing capabilities have also improved substantially. The importance of data is increasing in a wide range of economic activities and businesses, and it is becoming a new asset which can create added value. In such an environment, cashless payments are gathering great attention as platforms to collect and utilize a variety of data associated with economic transactions. Many data-giant companies known as BigTechs, which have grown rapidly in recent years, are starting to provide cashless payment services with a view to collecting and utilizing big-data.

## **Crypto-Assets and Central Bank Digital Currencies**

Meanwhile, we have also witnessed the emergence of new mediums, that is, "virtual

currencies" or "crypto-assets."

After the birth of the first crypto-asset, "bitcoin" in 2009, there has been a torrent of newly issued crypto-assets. Nowadays there seems to be around 2,000 types of crypto-assets. Crypto-assets have the following common characteristics: they use "distributed" types technologies such as blockchain and distributed ledger technology (DLT), they do not have a specific issuer, and they are not denominated in sovereign currency units such as yen, dollar and euro.

Recently, there are proposals in academic and international forums that central banks should also utilize new technology and issue digital currencies which could be used as alternatives to banknotes. Some central banks are now seriously considering whether they should issue such digital currencies. For example Sweden, where the use of banknotes is rapidly decreasing, and some emerging and developing countries, where the infrastructure supporting banknotes has not yet fully developed, are now making extensive studies about the issuance of central bank digital currencies.

#### **IV. The Future of Money**

Now, the question arises as to how money will evolve in the future. In view of the rapid pace of technological progress and the drastic change in the environment surrounding payments, settlements, financial services and the economy, it would be difficult for anyone to predict how money will evolve in the future. Bearing such constraints in mind, I dare to present my own views on the future of money for discussion, and I will be touching upon the fundamental nature and functions of money discussed in the previous sections. I would like to summarize my remarks into five key messages.

##### **Credit in Money and Crypto-Assets**

First, it seems unlikely that crypto-assets, without a particular issuer and not being denominated in sovereign currency units, will be widely used for payments and settlements, as long as sovereign currencies maintain their credibility and utility.

Whatever the forms future money takes, money continues to depend on people's credit,

as in the case of Yap stone money. Building such credit will incur certain costs. In the case of Yap stone money, the costs were the efforts to carve out the stones and transport them across the ocean (sometimes in a storm). As for sovereign currencies, the institutional framework to ensure central bank independence, as well as the track record of credible policy conduct and operations, play key roles in maintaining the credibility of central banks and sovereign currencies. Once people lose trust in the central bank, even sovereign currencies are not acceptable, as evidenced in the cases of hyperinflation. As long as people's trust in the central bank is firmly maintained, the central bank is able to issue sovereign currencies for its liabilities at low marginal costs.

To make crypto-assets more acceptable for payments and settlements than sovereign currencies, they need to compete with the trust that exists in central banks. However, to build trust from scratch, crypto-assets need to bear substantial costs associated with mining, which requires a huge amount of calculation and electricity. It would not be easy for crypto-assets with such constraints to be widely used for daily payments and settlements. Indeed, crypto-assets are now mainly purchased as speculative investments and are rarely used for daily payments and settlements.

However, the background technologies behind crypto-assets, such as blockchain and DLT, may have great potential. If these technologies are successfully combined with the existing trust and credit of sovereign currencies, they could contribute to enhancing the efficiency of economic transactions and payments. In this regard, many central banks have embarked on research and experiments of these new technologies. The Bank of Japan has also engaged in the joint DLT-related research "Project Stella" with the European Central Bank.

### **Further Progress Toward a Cashless Society**

Second, unlike crypto-assets, digital payment instruments denominated in sovereign currency units will continue to expand, leading to the further promotion of "cashless" payments.

As any payment instrument, including cash, has strong "network externalities," it is difficult to argue that new digital payment instruments will become widely used instead of cash in the very near future. Especially in countries where cash is already widely



used, it would take time for digital payment tools to overwhelm cash and to be widely used instead. Moreover, especially in countries with low interest rates, strong demand for cash for the storing of value could persist, and consequently the outstanding amount of cash in circulation would not decrease despite the growth of cashless and digitized payment instruments at the transaction level.

While the pace of progress varies across countries and regions, the general trend of the growth of cashless and digitized payment instruments is expected to continue, due to the following reasons.

First, as the core value of money rests with credit and not with its materials, money does not have to take the form of physical metal or paper. In the Yap Islands, even the invisible stone money deep down in the ocean functioned as money. It is therefore not surprising to find that digitalized data without physical form can function as money. Paper, which has been widely used as the material of money, is undoubtedly one of the greatest inventions of humanity, in a sense that it can "record," "convey," and "display" information and data (hence paper has been widely used as a medium of money and securities). These days however, information and data can now be recorded and conveyed through digital technologies, and displayed on smartphones and PC screens more easily.

Second, along with technological innovation and the developments of digital trade, cashless payments have already improved people's daily lives in many aspects. For example, the spread of e-money train cards and ETC cards has substantially eased congestion at ticket vending machines and toll gates in Japan. There are various hurdles in the process of transitioning from cash to digital payment instruments. Nonetheless, once people come to realize the benefits of digital payment instruments, such as eliminating the need to queue for payments, people will never come back to cash, and the movement from cash toward digital payments can be accelerated.

Third, data, as the "oil of the 21st century," is increasing in its importance, as new assets which can create added value, digital payment instruments, are now gaining great attention also in this respect. Indeed, digital payment instruments are able to record and convey much more data and information than paper attached to economic transactions. In this regard, the data revolution itself may also become the driving force for

promoting cashless payments.

### **Money and Data are Getting Closer**

Third, money and data will become more interlinked and closer to each other.

Most economic transactions are accompanied by payments and settlements. Digital payment instruments, unlike cash, can carry much more detailed data such as who buys what, when and where. Now many giant IT firms, known as BigTechs, have embarked on providing cashless payment services at low cost or sometimes for free. These firms tend to use payment services as a platform to collect big data, and utilize these data for a variety of businesses. In such businesses, users provide their own data, instead of paying monetary fees, in exchange for the use of these services.

Likewise, firms which offer discounts to customers using e-commerce or loyalty cards, virtually purchase their data. Customers, who use these rewards to purchase a variety of goods and services, exchange their own data for money-like purchasing power. As the development of cashless payments accelerates the accumulation and utilization of customer data, money and data will be more and more interlinked and become closer to each other.

The advancement of digital information technologies enables digital money to serve as a medium of exchange of information and data. Indeed, digital payment instruments can store and convey various types of information and data, and which are not limited to value data. On the other hand, for the users of digital payment instruments, how to ensure privacy and anonymity is becoming a big challenge. In such an environment, money in the future will be required to strengthen its function to manage or limit the data and information attached to it, reflecting merchants' and customers' requests. For example, firms are now trying to collect useful customer information by offering discounts or rewards to customers who newly acquire loyalty cards, or provide additional information such as their age, hobbies and other characteristics in e-commerce transactions. As such, various companies will continue making efforts to collect customer information through providing economic incentives when payments or settlements are being made. On the other hand, customers will require digital payment instruments to protect their rights and privacy by separating sensitive data or limiting

the use of it.

Also, stronger links between money and data are expected to influence the economy and financial structures in various ways.

For example, global IT innovation and data revolution have enabled firms to have the opportunity to purchase customer data through offering discounts and rewards. Since these discounts and rewards are usually subtracted from the sales prices of goods and services, IT innovation and data revolution might work as downward forces to general prices measured by traditional statistics in many countries.

Also, commercial banks have so far been providing both payment services and credit intermediation services by making use of deposits as a core. On the other hand, IT firms and e-commerce firms, which have newly entered financial services, provide a variety of services including financial ones, by making use of big data and platforms for collecting data as a core. As such, stronger links between money and data are expected to alter the structure for providing financial services.

Firms and individuals, which are users of financial services, can be regarded as bundles of information and data. Firms provide their own information and data, regarding their strength and the risks and returns of their businesses, to financial institutions, and then receive financial services such as loans. As such, financial services are inherently a series of information processing. IT innovation will encourage financial service providers to function also as "information banks" or "data banks," which keep customers' data and information, protect it, and make effective use of it to provide the best possible services to satisfy customers' needs. Also in this respect, financial service providers are more required to take appropriate measures for protecting data security and privacy for customers.

Moreover, recently more and more non-bank entities have entered financial services. They often provide their own liabilities as payment instruments. Financial authorities are now asked to consider how they should monitor and deal with these non-bank entrants, and what kind of frameworks should be prepared for them. This issue is ultimately linked to the issue of how to define banks.

## **Rationales of Two-Tiered System**

Fourth, the two-tiered system consisting of the central bank and private entities such as commercial banks will be maintained.

Regarding the debates on central bank digital currencies, some in academia see their benefits also in terms of overcoming the zero lower bound of nominal interest rates, in addition to their enhancing the efficiency of economic transactions and their payments. Moreover, some argue that if central bank digital currencies completely replace demand deposits issued by commercial banks, deposit insurance and central banks' lender of the last resort functions may become unnecessary, since commercial banks will not perform the function of maturity transformation any more. They believe that the issuance of central bank digital currencies would contribute to financial stability. In this respect, such arguments are very similar to the idea of "narrow banking" proposed decades ago.

Nonetheless, there remain many issues to be assessed before evaluating whether the issuance of central bank digital currencies could contribute to enhancing the effectiveness of monetary policy and financial stability.

Regarding the effectiveness of monetary policy, if we want to overcome the zero lower bound of nominal interest rates, we need to completely eliminate cash. Even if we lower the interest rates on central bank digital currencies below zero, the fund shift from them into cash will occur as long as cash is used. Nonetheless, if the central bank abolishes cash, which is widely used, it would make payment and settlement infrastructures inconvenient. Moreover, cash has its own resiliency as a payment instrument, since it does not rely on the electricity supply. Indeed, cash was effectively used even during the large-scale blackout on the island of Hokkaido which was caused by the earthquake in September. Since the central bank's duty is to contribute to economic society by providing efficient infrastructure for payments and settlements, abolition of cash at this stage is not an option.

Also, the central bank needs to carefully consider the possible impacts of central bank digital currencies on financial stability and financial intermediation, especially if they could substitute for not only cash but also bank deposits.

For example, if the central bank issues its own digital currencies to the general public

and makes them accessible through mobile instruments, stresses in the banking system might cause a "digital bank run," in which people move their funds from deposits to central bank digital currencies. In cases of traditional bank runs, depositors physically come to bank branches to withdraw their deposits. On the other hand, in the situation of digital bank runs, since people can easily move their funds without even go to a bank branch, liquidity problems could accelerate very rapidly.

Moreover, if central bank digital currencies replace not only cash but also bank deposits, they could squeeze banks' credit intermediation and influence the supply of credit to the economy. In other words, the issuance of central bank digital currencies could make the existing two-tiered system into a single tiered system if they replace bank deposits. Nonetheless, a single tiered system may have disadvantages, especially in terms of the allocation of financial resources to support economic growth led by private initiatives.

We may need to consider this issue also from the viewpoint of effective use of information and data. In the current two-tiered system, the central bank does not obtain the detailed data attached to people's daily transactions. In other words, the use of those data is primarily at the disposal of private entities. Meanwhile, the central bank can obtain the data necessary for maintaining overall payment and settlement stability through operating large-value payment systems.

In this regard, if the issuance of central bank digital currencies transforms the current two-tiered system into a single tiered system, it could also influence the private sector's use of information and data attached to payments and settlements. Also, from the perspective of efficient use of information and data related to payments and settlements, the current two-tiered system consisting of the central bank and private entities may have some advantages and rationales.

The Bank of Japan does not have a plan to issue its own digital currency that can be widely used for payments and settlements at this juncture. Meanwhile, there are some central banks which are seriously considering whether they should issue digital currencies. According to their official statements they see the potential value of central bank digital currencies for enhancing the efficiency of transactions or providing risk-free payment instruments to the general public. None of them aims to replace bank deposits with central bank digital currencies. Viewing also these developments, I think

that the current two-tiered system, which is based on the central bank and private entities, is likely to be maintained even with the progress of digitization, although the characteristics of private entities may change.

### **The Roles and Functions of Central Banks**

Fifth, even if digitization progresses, and cashless payments become more widely used, monetary policy and the lender of last resort functions of central banks are likely to remain effective.

First, let me elaborate on the possible impacts of cashless payments on monetary policy.

One imaginable case is that crypto-assets, which are not denominated by sovereign currency units, become widely used for daily payments and settlements instead of domestic sovereign currencies. Theoretically, this situation is similar to "dollarization," where foreign currencies are widely used instead of domestic currencies, and the effectiveness of monetary policy could be substantially impaired. Nonetheless, crypto-assets are unlikely to be widely used for daily payments and settlements, as previously discussed.

The second case is that cashless payment instruments are issued as the liabilities of banks or they issue instructions to transfer bank deposits. In this case, the effectiveness of monetary policy may not be impaired. Indeed, there have emerged many payment instruments in this category such as checks and credit cards, but the effectiveness of monetary policy has not substantially been affected by them.

The third case is that non-banks, which are different from incumbent banks, provide their liabilities denominated in sovereign currency units as payment instruments for wider use. Indeed, payment instruments in this category are growing rapidly worldwide, as shown in the cases of AliPay and WeChatPay in China and M-Pesa in Kenya. These instruments are similar to cases in which non-bank entities provide large-scale netting services.

There are several new issues regarding these instruments. For example, the growth of these new instruments might cause fluctuations in velocity of monetary aggregates, which are the sum of banks' liabilities in principle, and further destabilize the

relationship between monetary indicators and economic activities. Moreover, financial authorities and central banks will be required to consider how they should monitor the activities of these non-bank entrants in payment and settlement services in order to maintain payment, settlement and financial stability. Nonetheless, these issues are manageable, at least theoretically, through the review and refinement of statistics, institutional frameworks and the way to conduct monetary policy.

In sum, the possible impacts of cashless payments on monetary policy are manageable, and monetary policy will remain effective in the era of digitization.

Also the lender of the last resort function of central banks will still be needed if the current two-tiered system is maintained, and private entities continue playing the role of maturity transformation. Moreover, as long as domestic sovereign currencies are widely used for payments and settlements, central banks' provision of sovereign currencies would continue to be effective in alleviating liquidity problems.

At the same time, due to the recent increase in new entrants, the players in payment and settlement services have become much more diversified than before. In these environments, central banks are required to consider how they should work with them and monitor their activities, in order to maintain payment, settlement and financial stability.

In addition, more data are being accumulated by financial businesses, and various new instruments, such as mobile phones and tablets, are now used to access financial services. The tactics of cyber-attacks are becoming increasingly sophisticated. In these environments, it is becoming more important to take sufficient measures in terms of data security and resiliency against cyber-attacks. Central banks are required to deal with these issues in an appropriate manner.

## **V. Closing Remarks**

This is my current "best effort" to predict the future of money. I would like to summarize my prediction as follow.

Although it is very unlikely that crypto-assets are widely used for payments and

settlements, digitized cashless payment instruments will continue to grow and be more widely used. In accordance with such a trend of digitizing payments, money will also play a greater role as a medium of information and data. The link between money and data will be strengthened further, and the closer link between them will influence the structure of financial services and the economy. Meanwhile, the two-tiered system consisting of the central bank and private entities will be maintained, and monetary policy and the lender of last resort function of central banks will remain effective.

Having said that, I have one important reservation. The views I have just shared with you will probably only last for two to 30 years at the most. There is no clear scientific basis for the maximum duration of 30 years, but some in academia argue that the "technological singularity" will occur in 2045, which is 27 years later from now. Unfortunately, I do not have sufficient knowledge to determine the adequacy of this specific figure. What I would like to emphasize here by referring to this figure is the astonishing speed of IT innovation.

In 2008, which was only a decade ago, we were in the midst of the global financial crisis. At that time neither crypto-assets nor blockchain existed. Devices like iPhone and Kindle, as well as businesses in the sharing economy, were still in their very early stages. Neither the "Like button" of Facebook nor Instagram had yet to appear.

Since then the number of smartphones has sky-rocketed. During this decade IT firms such as "GAFA" of the United States and "BATJ" of China have grown very rapidly, are now top global firms in terms of market capitalization, and are now also entering the financial business. No one in 2008 could surely have expected these developments. Now, smartphone apps, digitized books, the "Like button" of Facebook and "instagramable" photos are deeply embedded in people's daily lives, but all of them have developed very rapidly within this decade. In view of these developments, it would be safer to expect that the changes in the coming 10 years would be more rapid and drastic than those that have occurred in the last 10 years.

How will the advances of quantum computing and artificial intelligence change financial services, the economy and society in the future? To address this question, we need to continue our efforts to keep up with fast and on-going innovation and evolution. As a thought experiment, we can even imagine the case in which money will no longer



be needed in the distant future, where dramatic progress in the capacity and networks for processing information and data enable people to directly and instantly agree on the exchanges of needed goods and services, and also to secure the execution of these agreements.

Needless to say it may not be realistic to expect that money will disappear in the near future, since there remain many uncertainties in the economy. Meanwhile, in the history of humanity, money has always played a key role in information processing in the economy. Now the on-going IT innovation and data revolution are influencing money in various ways. In view of these developments, we can be sure that the future of money is closely linked with the future of finance, and the utilization of information and data in the overall economy in the future.

From an academic perspective, money, finance and monetary economics are now at a very dynamic stage. Indeed, many new phenomena are arising from complicated interactions between money, finance, information technologies and data revolution. In these environments, I am very much interested in watching how research and studies on money and finance will develop in the coming years.

The Bank of Japan, in close cooperation with academia, will continue to closely follow the development of money and finance, and take appropriate measures if necessarily.

Thank you for your attention.