Hiroshi Nakaso: Big data – its impacts on economies, finance and central banking

Speech by Mr Hiroshi Nakaso, Deputy Governor of the Bank of Japan, at the Fourth FinTech Forum, Tokyo, 1 November 2017.

* * *

Introduction: Data and Power

It is a great pleasure to welcome you all today to the fourth meeting of the FinTech Forum. Today I would like to talk about big data and its utilization.

The importance of data itself is not new to all of us. History tells us that many kings, lords, and governments, put their first priority on collecting data to understand their lands' geographies, populations, and taxable capacities. Furthermore, they made efforts to utilize the collected data. It has been the source of their political and economic power to collect high quality data and utilize it efficiently.

Today, in light of the development of the Internet, smartphones, and SNS, the amount of data flowing into our society has been rapidly increasing. On the other hand, new technologies such as artificial intelligence (AI) enable us to process large volumes of data in a swift manner. Against the background of these rapid increases in the volume of data, and significant improvements in processing capacity, big data draws significant attention as a potential game-changer in our economy and society.

To describe how data utilization has evolved over years, I would like to use the example of maps. Over the years, many people have attempted to make maps as accurate as possible, which have provided us with remarkable benefits. Even today we enjoy the benefits of using geographical data, such as "Google Maps." However, what is different from the past is that we are no longer users of data only. Our access logs to these services themselves constitute a new set of big data, and potentially have their own value to be utilized. In today's society, data is a kind of resource, and power belongs to those who are able to collect and efficiently utilize such big data. It is analogous to the economic power of countries with large amounts of petroleum resources, which was increased after they enhanced their processing capacity and sales channels.

I. Economic and Financial Developments and Data Utilization

History of data utilization

The world economy has also developed along with the evolution of data utilization. In this sense, one of the largest breakthroughs in economic history was the birth of money.

When people exchanged goods, or bartered, the values of these goods were measured only in relative terms on a bilateral basis. However, the birth of money enabled them to use a common measure of value, and turned the value of each good into a datum, called a "price." Such price data also served as a foundation for the pricing mechanism to adjust the demand and supply of goods.

Moreover, money made it much easier for people to trade with each other. Under the bartering system, each participant had to find a counterpart with a mutual demand for trading. However, money's intrinsic function of representing value, i.e. its price, has enabled people to trade without necessarily finding such a coincidence. Since money contains data about prices, it also made it easier to store wealth by keeping it in the form of money. This feature has also enabled us to do "inter-temporal trading", such as obtaining money by selling a fish yesterday and using it for the

purchase of fruits tomorrow.

Data Utilization Today

As those episodes suggest, data utilization and the development of the economy have been strongly connected with each other. Today it is not an exaggeration to say that every economic activity is inseparable from collecting and processing data. For instance, demand forecasts, and production planning and inventory management by firms, consist of large amounts of data processing.

Above all, the financial industry is one of the most data-oriented businesses. For example, the operations taking place on the back of our daily payments and settlements via credit cards, debit cards, or deposit accounts, can be regarded as data processing. Banks provide financial intermediation services through making complicated decisions and assessments on borrowers, interest rates, and assets for investments, by collecting and analyzing various types of data. Insurance companies design insurance policies and set their fees at appropriate levels by also collecting and analyzing data. These insurance schemes allow society to efficiently redistribute risks among various entities, and enhance its resiliency against future uncertainty. As such, the financial and insurance industries have indeed promoted economic growth in modern and post-modern society.

II. IT Revolution and the Potential of Big Data

The emergence of big data

Unlike tangible assets, information and data never depreciate. Data also has an interesting feature; that is, the marginal benefit of data may even increase as more data is collected and accumulated. In the past, collecting, storing, and processing, large amounts of data had been difficult in many cases due to technological constraints. Today however, the IT revolution has been changing the situation unprecedentedly and enabling efficient collection, storage, and processing, of gigantic amounts of data.

This drastic change can be easily seen in the quantity of data. As the Internet, smartphones, and SNS, are expanding, the amount of data flowing in our economy is also increasing very rapidly. This is the emergence of big data.

Moreover, in accordance with the IT revolution, more tactical and sophisticated methodologies for collecting data have become available. For example, unlike the past when doing paper-based surveys was the main instrument to collect customer data, firms have become able to obtain data without direct contacts with customers or individuals. For example, they can collect data that people disclose on the internet via SNS voluntarily, or that their customers input when conducting searches, or from e-commerce websites.

Firms can also collect data even without their customers' explicit intention to provide data. For example, they can collect customers' data related to their purchasing activities by offering new digitized payment instruments, or obtain customer information by offering economic incentives such as special discounts to customers that provide their data through loyalty cards.

Another remarkable change has been seen in the capacity to process data. Today we are becoming able to process big data very rapidly by utilizing innovative information technologies such as AI. Furthermore, a large amount of graphical or sound data, which was difficult to use in the past, is becoming easier to be efficiently utilized through technologies such as "deep learning," in which AI automatically learns by itself through digesting such data.

Potential of big data on the economy

As such, rapid increases in the volume of data, and significant improvements in its processing capacity, are exerting a big influence on the economy and financial services.

Currently, companies such as Google and Amazon, which are now at the world's top level of market capitalization, are collecting and leveraging big data through utilizing their platforms covering the world, and making it a source of their added-value and profits. In this regard, big data can be seen as a new type of "asset," in terms of a profit source, instead of traditional fixed assets such as branches. Indeed, neither Google nor Amazon has physical "branches" in a traditional manner.

Moreover, new businesses such as the sharing economy, can also be made possible by utilizing big data for connecting various idle resources and needs scattered all over the economy.

For a wide range of companies, including giant global companies or new industries, the utilization of big data and AI may improve productivity in various ways, such as accurate analysis on demand, more efficient business processing, and enhancing added value.

In emerging and developing countries with large populations, several e-commerce enterprises, backed by rapid popularization of smartphones, accumulate gigantic amounts of customer data, and the utilization of that data has facilitated the expansion of various businesses and economic activities in those countries.

Potential of big data on financial services

Big data may also extend the frontiers of financial services.

Firstly, financial services themselves can be more sophisticated through effective use of big data. By using customers' transaction data to grasp their needs and analyze risks, it becomes easier to provide customized financial services tailored to each user, and to flexibly adjust the contents of services if necessary.

For example in the field of insurance, in order to overcome "adverse selection" and "moral hazard," which have been regarded as inherent problems in the insurance industry, efforts are being made to finely adjust the insurance fees by using a new technology known as a "smart contract," and collecting a wide range of data such as how customers drive, and how they manage their health.

Moreover, new authentication technologies such as biometrics authentication through big data analysis enable customers to use various financial services in a more secure manner.

Secondly, big data may facilitate the networking of financial services with broad industries. For example, safe and efficient payment instruments are extremely important for e-commerce and the sharing economy. On the other hand, data obtained through these businesses can be useful for providing and customizing financial services. Consequently, new networks between financial services and various industries can be established, such as linking retail sales businesses with payments, loans, and insurance services.

Thirdly, big data may also enhance financial stability through facilitating refined risk management and the efficient allocation of risks. However, when a variety of entities which are different from traditional financial service providers enter financial services, central banks are required to closely monitor their impacts on financial stability and their structures.

Data security issues

Along with the enhanced utilization of big data, cyber security, data protection, and stakeholders' consent on the usage of big data, are becoming all the more important. Since "trust" has an important meaning especially in finance, these issues are becoming critical factors for

maintaining the stability of payment settlement systems as well as financial systems.

Recently, enormous amounts of non-anonymized data such as, who bought what, when, and where, are being collected. While such accumulation of non-anonymized data substantially enlarges the potential of data usage, the relevant entities are required to pay extremely careful attention to data protection and privacy.

If people were to worry about the practices of managing big data and feel uneasy about their own privacy, it would become difficult to make big data contribute to economic development and welfare. Thus, I would like to ask all the relevant entities, who collect and utilize data, to pay due attention to ensuring data security.

III. Big Data and Central Banking

Big data also has substantial implications for central banking.

All the operations and policy conduct of the central bank are closely linked with data collection and processing. Every operation including the settlement of funds and securities, and the processing of treasury funds through daily operations of the central bank's system, the core infrastructure of the economy, is made up of gigantic amounts of data processing.

In carrying out macro policies such as monetary policy, it is an important precondition that policy entities including the central bank can collect and analyze various types of economic data quickly and efficiently, and timely grasp the developments of aggregate demand, general prices, and the impacts of policy actions on the economy and financial markets. Indeed, many central banks, including the Bank of Japan, are collecting and aggregating large amounts of data such as price statistics, corporate surveys, and financial market data, by themselves. Since central banks are processing as well as utilizing large amounts of data, central banks are required to continuously examine how to utilize and leverage new technologies for collecting, processing, and analyzing various types of data.

IV. Closing Remarks

I think that big data has great potential to vitalize various economic activities, innovate financial services, and increase economic welfare, as long as data security is firmly secured.

In the well-known movie "Moneyball," open-minded and thorough analysis of data, free of prejudice and convention, leads to the finding of new and advanced strategies that drastically change traditional baseball tactics. Also in volleyball, the current offense strategy with multiple options of attack including those from backguards, which is supported by precise data analysis, has been widely adopted in recent years, which I could not imagine when I was coaching high school students decades ago. As such, analysis and utilization of data has demonstrated its potential in various areas more than ever before.

Given rapid increases in the volume of data and significant improvements in its processing capacity, I also have great expectations for the possibilities that utilizing data will increase opportunities for serendipity, that is, lucky encounters with unexpected discoveries or events, and will lead to creations that open up new frontiers. I believe that big data has huge potential to lead to new creations and value-added seeds which are free from prejudice, going beyond the psychological "wall" formed by conventional business customs. I think that such cases are already being seen.

In order to maximize the opportunities for such serendipity, positive dialogues among a wide range of stakeholders are critical and indispensable. I would be very happy if this forum could become the place where such new creations and discoveries are made.

I would like to close my remarks now by wishing that today's FinTech Forum be fruitful for all the participants.

Thank you for your attention.