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Bank of Japan

The Post-Crisis World:
Evolution of the Economy, Economics, and Central Banks

Keynote Speech at "Nippon no Kakushin-ryoku" (Japan's Innovation) Symposium
Co-hosted by the Faculty of Economics, Keio University and Nikkei Inc.

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(English translation based on the Japanese original)

Introduction

It is my pleasure to speak here today at Keio University. As an alumnus and former professor at Waseda University, an opportunity like this, given the longstanding fruitful relationship between the two schools, is a great honor. Yukichi Fukuzawa, founder of Keio University, Shigenobu Okuma, founder of Waseda University, and the Bank of Japan share a long and intimate history together. The fact that Fukuzawa and Okuma were close friends is a famous story. During the Meiji Restoration, Okuma sought to lead reforms with the support of Keio's alumni but failed, only to be expelled from the government -- an incident later known as the failed Meiji-14 coup of 1881. In the following year, Okuma, emulating his friend Fukuzawa, built a school, which served as the predecessor of Waseda University. The Bank of Japan was established that very same year. Truth be told, Okuma, back when he was still a member of the government, proposed a plan for building Japan's first central bank (Bank of Japan [1982], pp.77-79). Although his plan was rejected, it is not far-fetched to consider part of his proposal as having been reflected in the Bank of Japan's charter in the form of liquidity provision.

This year marks about 20 years since Japan's financial crisis and the 10th anniversary of the Global Financial Crisis triggered by the collapse of Lehman Brothers. Milestones provide us with ample opportunity to look back on the past.

In my speech today, I will begin with an overview of significant changes observed in economic society today. I will then discuss the evolution of economics and the role of central banks. My message to you is threefold: first, change holds the key; second, it is important that we update our knowledge in response to change; and third, understanding the basics is essential regardless of -- or because of -- changes.

I. Progress for Humankind and Challenges Ahead

Before reflecting on Japan's financial crisis of about two decades ago and the Global Financial Crisis one decade ago, let me provide the even longer-term perspective of centuries ago. As the saying goes, "no news is good news" -- people tend to focus on unfavorable news including controversial incidents and natural disasters. In the long run, however, humankind has been making steady progress. The 17th century philosopher

Thomas Hobbes once wrote, in his renowned work *Leviathan*, that "the natural condition of mankind" was "solitary, poore [*sic*], nasty, brutish, and short" (Hobbes [1651], Chart 1). The situation has changed drastically since then. There has been a dramatic reduction in wars, violence, famine, and diseases, and people live longer so that it is now considered reasonable to expect to live for 100 years. Poverty, although persistent, is on a declining trend from a long-term perspective (Norberg [2017]; Pinker [2011, 2018], Chart 2).

What is the driving force behind these changes? First on the list are the effects of Enlightenment-based thought since the time of Hobbes as well as the development, accumulation, and spread of scientific knowledge. Economists in the 18th century such as David Hume and Adam Smith made notable contributions in these areas.

Second, the market economy plays a considerable role in the development, accumulation, and spread of such Enlightenment-based thought and scientific knowledge. The so-called globalization has encouraged not only the exchange of goods and money but also the interaction between people and the sharing of knowledge. We tend to assume that, in a market economy, human relationships become cold and impersonal, based solely on profit-seeking motives, and people become overly dependent on the market. In reality, however, human motivation is complicated and diverse. The market economy in fact allows for the coexistence of various motives as long as a certain level of profit is raised. Moreover, mutual trust among people is indispensable for markets to function properly (Seabright [2010]), and further, individuals become capable of supporting themselves through market participation (Matsui [2018]). These insights are the very line of thinking that had been held by distinguished economists in previous times, such as Hume and Smith.[1] Globalization too

[1] In his "Of Refinement in the Arts," Hume [1987] argues that industry and refinements in mechanical arts would sophisticate the arts and science and humanity, stating "*industry*, *knowledge*, and *humanity*, are linked together by an indissoluble chain" (p.271): "The more these refined arts advance, the more sociable men become…They flock into cities; love to receive and communicate knowledge; to show their wit or their breeding; their taste in conversation or living, in clothes or furniture…and the tempers of men, as well as their behaviour, refine apace."

In his "History of Astronomy," Smith [1980] traces the origins of philosophical and scientific thinking to the stability of social life: "Mankind, in the first ages of society, before the establishment of law, order, and security, have little curiosity to find out those hidden chains of events which bind together the seemingly disjointed appearances of nature…But when law has established order and

often is associated only with the cross-border flow of goods and money, but it is the cross-border exchange of knowledge among countless people all over the world that enables us to create new knowledge atop what already has been built and to enjoy the benefits of our lives today.

Having said this, we must not presume that the future is nothing more than simply something that lies in front of us. In the short run, there is an extensive list of issues on our agenda waiting to be tackled. Progress is in fact the by-product of unwavering efforts made by humankind in order to address challenges confronted at each point in time. Put differently, failing to keep up with these efforts will result in stagnation, or even worse, retreat. Indeed, a wide range of issues, such as macroeconomic policy, stagnating productivity growth, the impact of robotics and machine learning on employment, environmental problems including climate change, income and wealth inequality, and the rise of protectionism and the so-called populism, appear to have piled up. Although Japan's economy is no longer in deflation, many people faced economic difficulties during the period of prolonged deflation up until several years ago.

Financial crises are one such issue. While the market economy is built upon mutual human trust, money -- the foundation of economic transactions therein -- is also dependent on trust. Intrinsically, circulation of money requires social trust; individuals must have the confidence that money will be accepted by a third party. A free and abundant flow of money leads to economic growth through active exchanges and transactions. For example, economic growth in emerging economies has been supported by global capital inflows. At times, however, such flow of money triggers problems. When capital inflows tie in with overly optimistic growth expectations, this may cause asset prices such as land prices and stock prices to rise excessively and, ultimately, the asset price bubble to burst. In a time of an abrupt reversal in global capital flows, countries experiencing capital outflows may be forced to undergo large-scale economic adjustments. Furthermore, while developments in

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security, and subsistence ceases to be precarious, the curiosity of mankind is increased, and their fears are diminished. The leisure which they then enjoy renders them more attentive to the appearances of nature, more observant of her smallest irregularities, and more desirous to know what is the chain which links them all together. That some such chain subsists betwixt all her seemingly disjointed phaenomena [*sic*], they are necessarily led to conceive" (pp.48, 51).

financial products brought the benefits of providing greater options for asset management, they also catalyzed the contagion of financial crises worldwide, as seen during the Global Financial Crisis of 2008. The prolonged economic stagnation that followed amplified people's doubts about globalization and the market economy itself.[2]

In addition, the data revolution, while significantly enhancing information sharing and utilization, has led to the rise of a small number of big tech companies making full use of data. This has caused voiced concerns about the increasing market power of such firms, their effects on income and wealth inequality, and protection of privacy.[3] What is more, digitalization is increasing the perceived threat of cyber-attacks so significantly that some claim that the next potential financial crisis could well be triggered by cyber-attacks on global financial institutions.

II. Evolution of Economics

I would now like to talk about how an ever-changing economy leads to the evolution of economics.

Let me introduce a satirical article about economists published in 1973. The article entitled "Life among the Econ" was written in the style of an anthropologist's study on a tribe of economists called the "Econ" (Leijonhufvud [1973]).[4] In this article, the Econ live in the far north and the status of the members is determined by their skill in making elaborated "modls" (taken from "model" used in economics) of their "field" of study. But "most of these 'modls' seem to be of little or no practical use." As for the "field" of study, the "Math-Econ" is considered as ranking higher than the "Devlops," where Math-Econ and Devlops respectively refer to scholars of mathematical economics and development economics. The Devlops are ranked lower because they interact with other tribes such as the

[2] Eichengreen [2018] traces the historical relationship between economic distress -- the rise of machines, depressions, and financial crises -- and political reactions.

[3] At this year's Jackson Hole Economic Policy Symposium hosted by the Federal Reserve Bank of Kansas City, discussion was centered on the rise of big tech companies and the effects of intangible assets on the macroeconomy.
https://www.kansascityfed.org/publications/research/escp/symposiums/escp-2018

[4] In Japan, Sawa [1982] popularized this through his short book.

Polscis (political scientists) and Sociogs (sociologists), and are suspected of having given up modl-making. The article concludes, "The prospect for the Econ is bleak. Their social structure and culture should be studied now before it is gone forever." It warns of the situation of economics at the time, where economists were too focused on making unrealistic "modls" and reluctant to collaborate with those outside the field of economics.

Notwithstanding whether such satire was on point at that time, the days in which it can be applied are over. Nowadays, economic research has become increasingly founded on empirical work and data science, along with the increase in computing power, spread of the Internet, accumulation of and increase in data, and development of econometric techniques (Hamermesh [2013]; Angrist et al. [2017], Chart 3). Data science methodology has been adopted actively not only in economics, but also in social sciences in general and in some fields of humanities. Through the sharing of methodologies, interaction of economics with other fields of study is being accelerated.

This is not to say that economic theory has become extinct, however. In fact, there is now greater variety to economic theory, as seen in the rise and establishment of game theory and behavioral economics. We should say that the share of purely theoretical papers in economics has decreased. What came of this was the rise in popularity of so-called applied work (Backhouse and Cherrier [2017]).

With the development of economics acquiring a new character of data science and applied science, the areas to which economics is applied have been expanding.

The first is applications to policy making. The term "evidence-based policy making," or EBPM, has finally started to prevail in Japan, and the government is promoting EBPM as part of its administrative reform. This is a movement that requires appropriate empirical evidence in policy making. "The cost-benefit revolution" (Sunstein [2018]) is under way, in which a balancing of costs and benefits based on empirical evidence is made use of in policy making. Specifically, economics has been applied in the context of deregulation and market designs such as spectrum auction and medical resident matching programs, for

example, which have started to prove successful (McMillan [2002]; Backhouse [2010]; Siegfried [2010]; Litan [2014]).

Second, economics has become a common language among policymakers. Without an understanding of economics at the very least, you will have difficulty in communication, especially at meetings of the Group of 20 (G-20), central banks, and international organizations such as the World Bank and the International Monetary Fund (IMF).[5]

Third, economists are now working more in collaboration with other disciplines, and engaging in research and education outside economics departments, especially in business schools, law schools, and public policy schools. Economists also play an important role at big tech companies (Chart 4). For example, it is said that the latest auction theory is applied when online advertising space is sold (Athey and Luca [2018]).

In sum, economics has become increasingly empirical and useful in a practical manner. Economists have been tackling the aforementioned issues facing humankind. However, this does not mean that there are no issues to be addressed in economics itself.

In particular, the outbreak of the Global Financial Crisis in 2008 posed significant challenges to economists. It is reported that, when Queen Elizabeth II visited the London School of Economics and Political Science (LSE) in November 2008, she asked economists regarding the turmoil in global financial markets: "Why did nobody notice it?" The economists were not ready to comment.[6]

We have to admit that the outbreak of financial crises is essentially a very difficult issue to address, and predicting it is a more difficult task. Also, as behavioral economics shows, economists may sometimes have biases or make mistakes as humans.[7] This does not mean,

[5] There is room for discussion as to the extent to which economics is actually applied to policy making. See, for example, Blinder (2018).

[6] For the response sent afterwards by U.K. economists to the Queen, see http://wwwf.imperial.ac.uk/~bin06/M3A22/queen-lse.pdf

[7] Eichengreen [2009] argues that economists could not resist various "temptations" to ignore insights obtained through information economics, organizational economics, and behavioral

however, that the insights gained in economics have become useless. Academic studies progress as we learn from past experiences, including failures. The accumulation of such processes leads to the selection of our knowledge; that is, our knowledge of economics is constantly being upgraded. What you learn from textbooks is a result of this selection process, forming the basic framework of the current economics. This holds great significance in your lives, to which I will return later when I talk about financial and economic education.

III. Changing Role of Central Banks

Central banks, operating at the intersection between the changing economy and economics, have a long history toward becoming what they are today. In fact, the concept of central banks itself has been shaped by history. Sweden's Riksbank was established in 1668, earliest among currently existing central banks, but it originally differed from central banks we are familiar with today, in that the institution's function included extending loans to the Crown to finance war (Chart 5). Central banks have changed, evolving in a process of humankind tackling economic problems that occurred thereafter, such as large price fluctuations and financial crises (Edvinsson et al. [2018]). In the course of this evolution, a number of contributions have been made by economists, from Henry Thornton, David Ricardo, Walter Bagehot, Irving Fisher, John Maynard Keynes, and Milton Friedman to those today.

Having assumed my current position at the Bank of Japan, I am now better aware of the wide-ranging roles that central banks play today (Chart 6). The Bank of Japan Act stipulates that the Bank's purpose is to achieve price stability and maintain financial system stability, thereby contributing to the sound development of the national economy. To achieve this, the Bank engages in a wide range of operations, such as issuing banknotes, conducting on-site examinations and off-site monitoring of financial institutions, operation of payment and settlement systems, and coordinating with international organizations. Needless to say, conducting research and studies through the application of economics also constitutes an important central bank operation. At this point, I will briefly explain how the Bank has responded to the two trends of the data revolution and globalization.

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economics. See also Zingales [2013].

Starting with the data revolution, electronic payments have become increasingly common in recent years. Although the so-called cryptocurrency is termed crypto-assets among central banks, partly because of its highly speculative nature, cashless payments using, for example, credit cards, electronic money, and QR codes have continued to increase. Central banks have been paying close attention to these developments, as payment and settlement systems are crucial infrastructures. Some central banks have begun research and deliberation on the issuance of a central bank digital currency.[8] In relation to the data revolution, economic statistics play a significant role. Accurate real-time data are desired since it is required that policy decisions, especially by central banks, be made swiftly based on data available at the time (Nishimura [2012]).

With regard to globalization, not only financial and economic activities, but also knowledge pertaining to policy conduct is becoming increasingly globalized through dialogue and cooperation among central banks. Japan's financial crisis from 1997 to 1998 -- preceding the Global Financial Crisis of 2008 that I mentioned earlier -- has been studied by central banks all over the world as a lesson to be learned (Chart 7). In particular, the fact that Japan, the world's second-largest economy at the time, experienced entrenched deflation and prolonged stagnation after the crisis drew the attention of policymakers and economists worldwide.

Let me sum up the lessons learned from Japan's experience. First, it has become clear that an excessive rise in asset prices above fundamentals -- the emergence of the bubble economy -- and its collapse triggering a financial crisis will exert a considerable negative impact on the economy. Second, there are still discussions, however, regarding whether to tighten monetary policy as a pre-emptive measure against a rise in asset prices. Although we should not ignore asset price fluctuations completely, taking a strong measure to burst the bubble could push the economy into a serious recession. Third, in the event of a financial crisis, ex post policy response becomes extremely important. As downward pressure is

[8] Such central banks include that of Sweden, where the amount outstanding of banknotes has been decreasing rapidly, and those of some emerging and developing economies, where infrastructure for banknotes is underdeveloped. While Bordo and Levin [2017] present research from the standpoint of advocates, Cœuré [2018] and Amamiya [2018] raise issues to be considered from a central bank's viewpoint.

exerted on the economy in the wake of the crisis, it will be necessary to respond with vigorous expansionary macroeconomic policies. If the response is inadequate or delayed, the economy will fall into deflation and face difficulty escaping from it. Fourth, regarding a financial crisis, however, there is no better way than to prevent it. In doing so, ex ante and ex post financial regulation -- monitoring excessive risk-taking behavior of financial institutions and setting up a resolution mechanism -- as well as macroprudential policy -- analyzing and assessing systemic risk in the financial system as a whole and taking policy measures based on it -- play key roles (Wakatabe [2015], pp.142-147).

Regrettably, after Japan's financial crisis, policymakers across the globe could not prevent the Global Financial Crisis. They did, however, succeed in preventing another Great Depression by taking swift and bold policy responses after the crisis.[9] For example, central banks with inflation targets managed to keep their economies from falling into severe deflation even after the crisis.[10] Moreover, financial authorities including central banks have proceeded globally with the development of financial regulations, so as not to repeat a disaster like the Global Financial Crisis ever again. Through these efforts, in an ever-changing economy, central banks must be vigilant and prepared for possible future financial crises at all times.

IV. Promotion of Financial and Economic Education

Putting all this in perspective, we could gain a good sense of the most desirable qualities and skills of people working in the financial industry. Let me start with simple examples. As the data revolution proceeds, there likely will be greater demand for those educated in

[9] Kuttner, Iwaisako, and Posen [2015] point out, "Although the United States and many European countries were also hit hard by the collapse of the housing market in the late 2000s, most responded decisively, partly because policymakers in those countries were determined not to repeat Japan's experience in the 1990s" (pp.31-32).

[10] Some economists argue that, if the 2 percent inflation target had been set in Japan during the 1990s, the subsequent deflation would not have occurred (Braun and Waki [2006]). However, since the rate of growth in total factor productivity also declined during the so-called lost two decades in Japan, it is also possible to say that there were problems on the supply side as well as on the demand side. The past recession possibly had lasting negative effects on productivity growth of the economy. The Bank of Japan has great interest in the mutual relationship between business cycles and economic growth, on which research has been progressing recently. See the Bank of Japan Research and Statistics Department [2018] and Kaihatsu et al. [2018].

science, technology, engineering, and mathematics -- the so-called STEM education. On a similar note, globalization will naturally raise demand for those with a strong command of English as a communication tool. Society as a whole, including the government, should work toward better education and research in these areas. I personally believe that the biggest advantage to learning English is that it enables you to learn about the world and reminds you to not end up as a "frog in the well that knows nothing of the great ocean" -- a Japanese proverb that describes a person who measures things only within his or her own world. In relation to learning about the world, I would like to remind you that the economy and economics have been changing significantly. Given this, education about the underlying mechanism of society and the economy will only grow in importance, so as to help students develop the capability to sense and understand such changes properly.

For the financial industry to recruit qualified talents, the key lies in whether they can effectively demonstrate the advantages of working in the industry, since those with the qualities I have just mentioned are in high demand across industries.

Whether or not you work in the financial industry, financial and economic literacy is necessary for everyone. In this connection, let me introduce the Central Council for Financial Services Information (CCFSI), an organization with the two main objectives of (1) providing financial and economic information to the general public and (2) supporting financial and economic education (Chart 8).[11] Its secretariat office is located within the Bank of Japan's Head Office; as Deputy Governor of the Bank, I serve concurrently as a member of the CCFSI. The council, originally the Central Council for Savings Promotion, subsequently was reorganized as the Central Council for Savings Information and renamed as the CCFSI in 2001.

Especially today, when it is reasonable to expect to live for 100 years, asset formation is gaining more and more importance. Here is a set of questions relating to financial and economic literacy in this regard (Chart 9). I think that some of you here today are currently studying economics. For those who have taken an introductory course in economics, this should be a piece of cake -- at least, I believe so. Take question 1, for example. This

[11] For details on the activities of the CCFSI, see https://www.shiruporuto.jp/e/.

involves compound interest calculation. Compound interest calculation is a method in which interest is added to the principal sum so that interest for the following period is then earned on the principal sum plus the previously accumulated interest. With this knowledge, you may see that one would be better off starting asset building from an early stage in life and refraining from short-term transactions based on rash decisions. Let us next take question 4. This teaches you the importance of diversifying your investment portfolio. Diversifying rather than concentrating your portfolio allows you to control a certain kind of risk. By combining these two ideas, you will find an asset formation plan of investing steadily in a diversified portfolio from a long-run perspective. Basic knowledge of economics is indeed useful, but there still seems room for improvement in financial and economic literacy in Japan: The percentage of correct answers to these kinds of questions is lower than those in the United States and European countries (Chart 10). Furthermore, consumer fraud is being carried out recently in extremely artful ways, and an understanding of economics is also helpful in determining the factors behind such fraud to seek preventive measures against it (Fukuhara [2017]).[12]

Conclusion

Today, I have elaborated on the respective changes in the economy, economics, and central banks. What they have in common are structural changes of the data revolution and globalization. You cannot avoid these changes even by choosing a STEM career. According to the findings of research conducted in the United States, compensation is high at the outset of a STEM career; however, because rapid technological change leads to skill obsolescence, there are many cases where wages of STEM workers start to level off at a certain point and they switch jobs early on their career (Deming and Noray [2018]). Even if you choose a different career, the basic knowledge I have described using the financial and economic literacy questions will still be necessary, given that you may live for 100 years. Whether or not you seek a career in the financial industry, you are required to have the motivation and curiosity to regularly update your knowledge in response to change.

In concluding, let me share with you a quote from Julian Simon, an economist (Chart 11):

[12] There are various studies on the effects of financial education. See Campbell [2016] for details.

> The main fuel to speed the world's progress is our stock of knowledge; the brakes are our lack of imagination and unsound social regulations of these activities. The ultimate resource is people -- especially skilled, spirited, and hopeful young people endowed with liberty -- who will exert their wills and imaginations for their own benefits, and so inevitably they will benefit the rest of us as well (Simon [1995], p.27).

Thank you for your kind attention.

References

Amamiya, Masayoshi. 2018. "The Future of Money." Speech at the 2018 Autumn Annual Meeting of the Japan Society of Monetary Economics, October 20, 2018.

Angrist, Joshua, Pierre Azoulay, Glenn Ellison, Ryan Hill, and Susan Feng Lu. 2017. "Economic Research Evolves: Fields and Styles." *American Economic Review: Papers & Proceedings*, 107 (5): 293-297.

Athey, Susan, and Michael Luca. 2018. "Economists (and Economics) in Tech Companies." *NBER Working Paper* No. 25064.

Backhouse, Roger E. 2010. *The Puzzle of Modern Economics: Science or Ideology?* Cambridge: Cambridge University Press.

Backhouse, Roger E., and Béatrice Cherrier, eds. 2017. *The Age of the Applied Economist: The Transformation of Economics since the 1970s*, Durham: Duke University Press.

Bank of Japan, ed. 1982. *Nippon Ginko Hyakunen-shi [The Centennial History of the Bank of Japan]*. Vol. 1. (in Japanese)
https://www.boj.or.jp/about/outline/history/hyakunen/hyaku1.htm/

Bank of Japan Research and Statistics Department. 2018. "[Minutes of the 7th Joint Conference Organized by the University of Tokyo Center for Advanced Research in Finance and the Bank of Japan Research and Statistics Department: 'New Developments of Macroeconomic Analysis: Interaction between Business Cycles and Economic Growth.']" *BOJ Reports and Research Papers*. (in Japanese)
https://www.boj.or.jp/research/brp/ron_2018/ron180330a.htm/

Blinder, Alan S. 2018. *Advice and Dissent: Why America Suffers When Economics and*

Politics Collide. New York: Basic Books.

Bordo, Michael D., and Andrew T. Levin. 2017. "Central Bank Digital Currency and the Future of Monetary Policy." *NBER Working Paper* No. 23711.

Braun, R. Anton, and Yuichiro Waki. 2006. "Monetary Policy during Japan's Lost Decade." *Japanese Economic Review*, 57 (2): 324-344.

Campbell, John Y. 2016. "Restoring Rational Choice: The Challenge of Consumer Financial Regulation." *American Economic Review: Papers & Proceedings*, 106 (5): 1-30.

Cœuré, Benoît. 2018. "The Future of Central Bank Money." Speech at the International Center for Monetary and Banking Studies, Geneva, 14 May 2018. https://www.ecb.europa.eu/press/key/date/2018/html/ecb.sp180514_4.en.html

Deming, David J., and Kadeem L. Noray. 2018. "STEM Careers and Technological Change." *NBER Working Paper* No. 25065.

Edvinsson, Rodney, Tor Jacobson, and Daniel Waldenström, eds. 2018. *Sveriges Riksbank and the History of Central Banking*. Cambridge: Cambridge University Press.

Eichengreen, Barry. 2009. "The Last Temptation of Risk." *The National Interest*. 101: 8-14.

———. 2018. *The Populist Temptation: Economic Grievance and Political Reaction in the Modern Era.* New York: Oxford University Press.

Fukuhara, Toshiyasu. 2017. "Kodo Keizaigaku wo Oyo-shita Shohisha Sagi Higai no Yobo ni kansuru Ichikosatsu" [A Behavioral Insight Approach to Prevent Consumer Fraud]. *Research Paper Series*. Central Council for Financial Services Information. (in Japanese) https://www.shiruporuto.jp/public/document/container/report6/

Hamermesh, Daniel S. 2013. "Six Decades of Top Economics Publishing: Who and How?" *Journal of Economic Literature,* 51 (1): 162-172.

Hobbes, Thomas. 1651. *Leviathan, or, The Matter, Forme, and Power of a Common Wealth, Ecclesiasticall and Civil*. London: Printed for Andrew Crooke.

Hume, David. 1987. *Essays, Moral, Political, and Literary*. Edited by Eugene F. Miller. Indianapolis: Liberty Fund.

Kaihatsu, Souhei, Maiko Koga, Tomoya Sakata, and Naoko Hara. 2018. "Interaction between Business Cycles and Economic Growth." *Bank of Japan Working Paper Series* 18-E-12. https://www.boj.or.jp/en/research/wps_rev/wps_2018/wp18e12.htm/

Kuttner, Kenneth, Tokuo Iwaisako, and Adam Posen. 2015. "Monetary and fiscal policies during the lost decades." In Yoichi Funabashi and Barak Kushner, eds. *Examining Japan's Lost Decad*es. London and New York: Routledge: 17-36.

Leijonhufvud, Axel. 1973. "Life among the Econ." *Western Economic Journal* 11 (3): 327-337.

Litan, Robert E. 2014. *Trillion Dollar Economists: How Economists and Their Ideas Have Transformed Business*. New York: Wiley.

Matsui, Akihiko. 2018. *Shijo-tte nan daro: Jiritsu to Izon no Keizaigaku [What is the market?: Economics of Interdependence and Dependence]*. Tokyo: Chikuma Shobo. (in Japanese)

McMillan, John. 2002. *Reinventing the Bazaar: A Natural History of Markets*. New York: W.W. Norton & Co.

Nishimura, Kiyohiko G. "Market Intelligence, Market Information and Statistics in Central Banking." Keynote Speech to the Sixth Irving Fisher Committee Conference in Basel, August 29, 2012.
https://www.boj.or.jp/en/announcements/press/koen_2012 /ko120830a.htm/

Norberg, Johan. 2017. *Progress: Ten Reasons to Look Forward to the Future*. London: Oneworld Publications.

Pinker, Steven. 2011. *The Better Angels of Our Nature: Why Violence Has Declined*. New York: Viking.

———. 2018. *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress*. New York: Viking.

Sawa, Takamitsu. 1982. *Keizaigaku towa nan daro ka [What is economics?]*. Tokyo: Iwanami Shoten. (in Japanese)

Seabright, Paul. 2010. *The Company of Strangers: A Natural History of Economic Life*. Revised edition. Princeton: Princeton University Press.

Siegfried, John J., ed. 2010. *Better Living Through Economics*. Cambridge: Harvard University Press.

Simon, Julian L., ed. 1995. *The State of Humanity*. Oxford: Basil Blackwell.

Smith, Adam. 1980. *Essays on Philosophical Subjects.* Edited by W. P. D. Wightman and J. C. Bryce. Oxford: Clarendon Press.

Sunstein, Cass R. 2018. *The Cost-Benefit Revolution*. Cambridge: The MIT Press.

Wakatabe, Masazumi. 2015. *Japan's Great Stagnation and Abenomics: Lessons for the World*. London and New York: Palgrave Macmillan.

Zingales, Luigi. 2013. "Preventing Economists' Capture." In Daniel Carpenter and David A. Moss eds. *Preventing Regulatory Capture: Special Interest Influence and How to Limit It*. New York: Cambridge University Press: 124-151.

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(Chart 1)

Leviathan **(1651)**

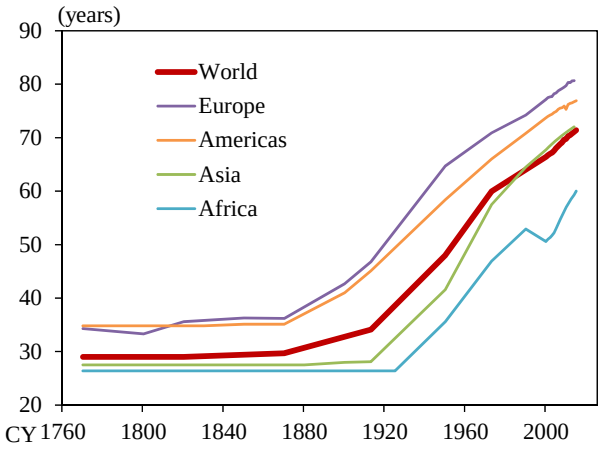
Thomas Hobbes (1588-1679)

"the life of man, solitary, poore [*sic*],
nasty, brutish, and short"

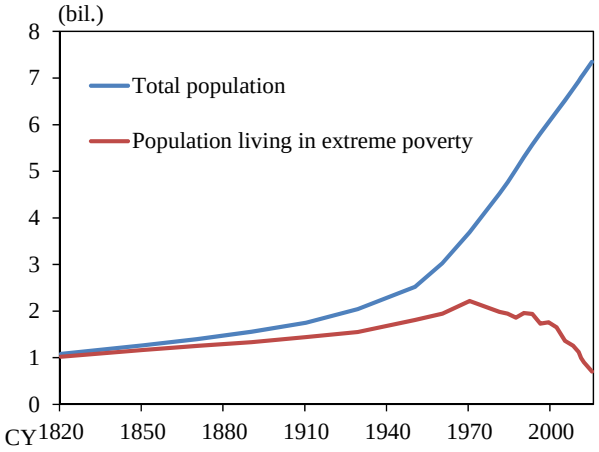
(Chart 2)

Progress for Humankind

Life Expectancy



World Population in Extreme Poverty

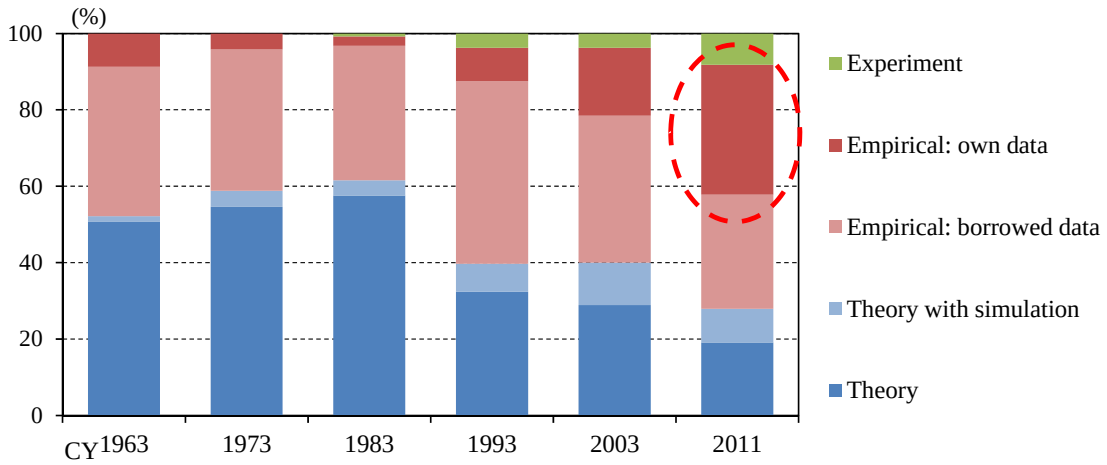


Source: Our World in Data.

(Chart 3)

Evolution of Economics

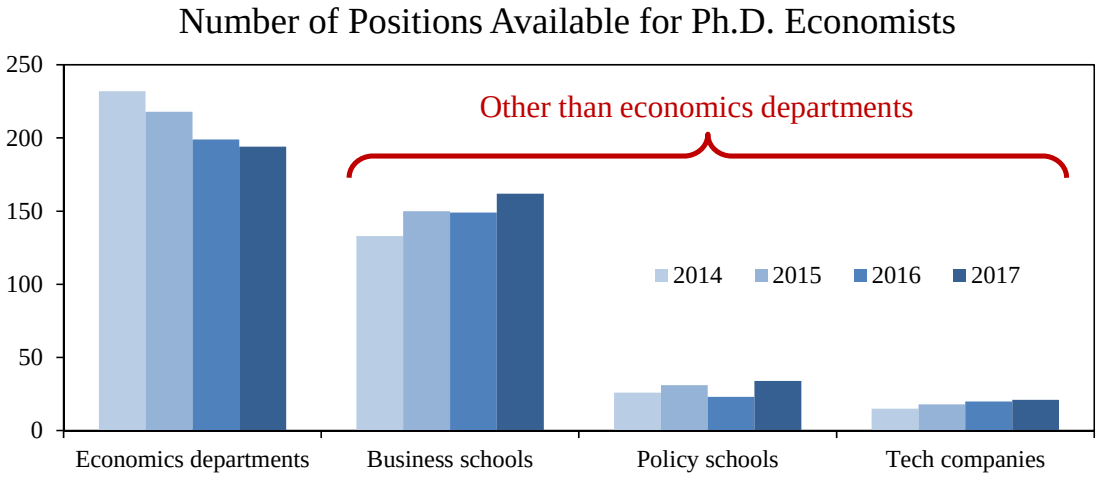
Percentage Distributions of Methodology of Published Articles in Economics



Source: Hamermesh (2013).

(Chart 4)

Increased Applications of Economics



Notes: 1. Figures are those for the period from February to the following January.
2. Figures for tech companies represent the number of firms with job postings (each firm may offer multiple positions).
Source: Athey and Luca (2018).

(Chart 5)

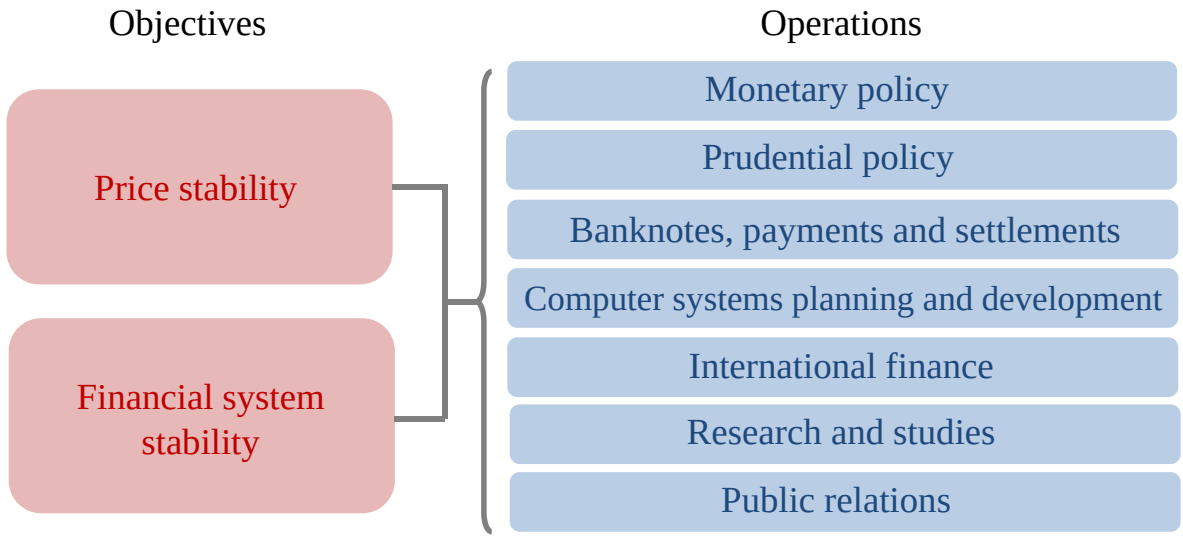
Establishment of Central Banks

	Year		Year
Riksbank (Sweden)	1668	Bank of Japan	1882
Bank of England	1694	Bank of Italy	1893
Banque de France	1800	Swiss National Bank	1907
De Nederlandsche Bank	1814	Federal Reserve System	1913
National Bank of Belgium	1850	Bank of Canada	1934
Reichsbank (Germany)	1876	European Central Bank	1998

Source: Central banks.

(Chart 6)

Objectives and Operations of the Bank of Japan

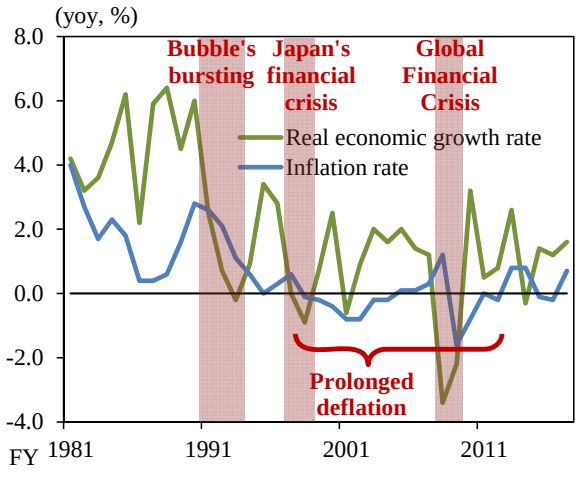


Source: Bank of Japan.

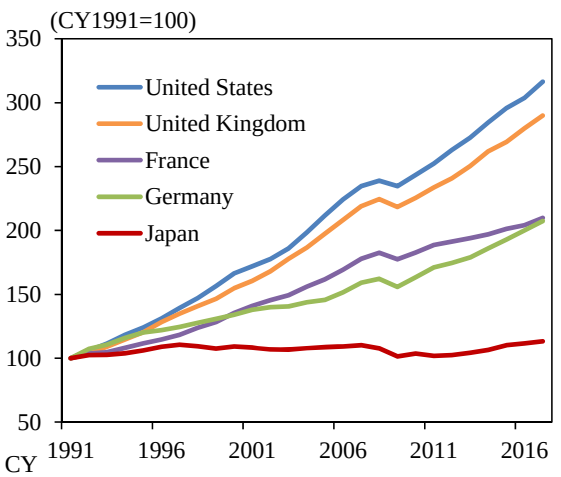
(Chart 7)

Japan's Experience

Japan's Real Economic Growth and Inflation



Nominal Economic Growth by Country



Note: Inflation rates are based on the CPI (less fresh food, adjusted for changes in the consumption tax rate).
Sources: Cabinet Office; Ministry of Internal Affairs and Communications; International Monetary Fund; Bank of Japan.

(Chart 8)

History of the CCFSI

Transition to Meet the Needs of the Times

Year	Name	Characteristics
1952-	Central Council for Savings Promotion	National movements to control inflation after WWII and to promote savings for capital accumulation
1988-	Central Council for Savings Information	Stress on disseminating information relating to savings
2001-Current	Central Council for Financial Services Information	Stress on supporting independent consumers and on promoting financial education at schools, amid financial innovations

Source: Central Council for Financial Services Information.

(Chart 9)

Financial Literacy Questions

Q1. Suppose you put 1 million yen into a savings account with a guaranteed interest rate of 2% per year. How much would be in the account after 5 years?

Q2. Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account? More than today, exactly the same, or less than today?

Q3. When compared, a 15-year mortgage typically requires higher monthly payments than a 30-year loan, but the total interest paid over the life of the loan will be less. True or false?

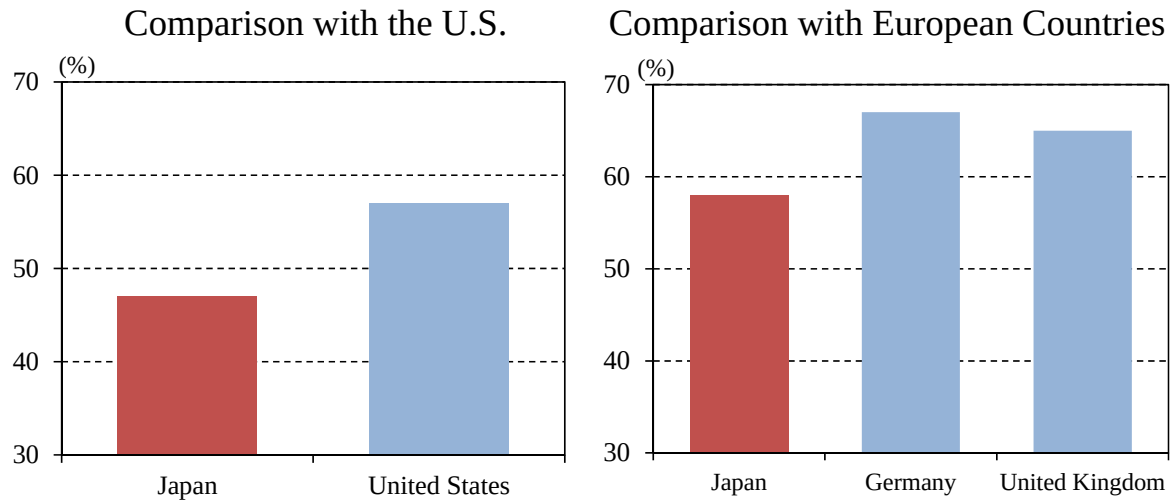
Q4. Buying a single company's stock usually provides a safer return than a stock mutual fund. True or false?

Q5. If interest rates rise, what will typically happen to bond prices? Will they rise, stay the same, or fall?

Source: Central Council for Financial Services Information, "Financial Literacy Survey: 2016 Results."

(Chart 10)

Percentage of Correct Answers to Financial Literacy Questions



Note: The average percentage of correct answers to five questions. Comparisons with the U.S. and with European countries are based on different sets of questions, respectively (For this reason, the figures for Japan differ).

Source: Central Council for Financial Services Information, "Financial Literacy Survey: 2016 Results."

(Chart 11)

Simon (1995)

The main fuel to speed the world's progress is our stock of knowledge; the brakes are our lack of imagination and unsound social regulations of these activities. The ultimate resource is people -- especially skilled, spirited, and hopeful young people endowed with liberty -- who will exert their wills and imaginations for their own benefits, and so inevitably they will benefit the rest of us as well.