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## **Monetary Policy: Lessons Learned and Challenges Ahead**

**Summary of the 2017 BOJ-IMES Conference Organized by the  
Institute for Monetary and Economic Studies of the Bank of Japan**

Ko Nakayama and Shigenori Shiratsuka

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# IMES

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**Monetary Policy: Lessons Learned and Challenges Ahead**  
**Summary of the 2017 BOJ-IMES Conference Organized by the**  
**Institute for Monetary and Economic Studies of the Bank of Japan**

**Ko Nakayama\* and Shigenori Shiratsuka\*\***

**I. Introduction**

The Institute for Monetary and Economic Studies (IMES) of the Bank of Japan (BOJ) held the 2017 BOJ-IMES Conference, entitled “Monetary Policy: Lessons Learned and Challenges Ahead,” on May 24–25, 2017, at the BOJ head office in Tokyo.<sup>1</sup> The conference attracted about ninety participants from academia, central banks, and international organizations. The participants discussed lessons learned from past experience with unconventional monetary policies and clarified challenges in the future.

The conference began with the opening remarks delivered by Haruhiko Kuroda, the Governor of the BOJ. Ben S. Bernanke (The Brookings Institution), the former Chair of the Board of Governors of the Federal Reserve System, presented the Mayekawa Lecture. Mark Gertler (New York University), the honorary adviser of the IMES, gave the keynote speech. In the paper presentation sessions, four papers were presented by Jeffrey C. Fuhrer (Federal Reserve Bank of Boston), Benjamin Moll (Princeton University), Kenneth D. West (University of Wisconsin-Madison), and Ryo Kato (BOJ), and discussed by the participants. The policy panel discussion moderated by Marvin Goodfriend (Carnegie Mellon University),

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\* Associate Director-General, Head of Economic and Financial Studies Division, Institute for Monetary and Economic Studies, Bank of Japan (E-mail: kou.nakayama@boj.or.jp).

\*\* Director-General, Institute for Monetary and Economic Studies, Bank of Japan (E-mail: shigenori.shiratsuka@boj.or.jp).

The conference organizers would like to express their sincere gratitude to the IMES’s two honorary advisers, Mark Gertler (New York University) and Marvin Goodfriend (Carnegie Mellon University), the IMES’s chief councillor Kazuo Ueda (Kyoritsu Women’s University and University of Tokyo), and all other conference participants for thought-provoking presentations and discussions. The views expressed throughout this summary are those of the attendants and do not necessarily reflect those of their respective institutions. All remaining errors belong to the authors.

<sup>1</sup> See Appendix 1 for the program. See Appendix 2 for the list of participants; their affiliation is as of May 24–25, 2017.

the honorary adviser of the IMES, was comprised of three panelists: Charles L. Evans (Federal Reserve Bank of Chicago), Hiroshi Nakaso (BOJ), and Frank Smets (European Central Bank).

## II. Opening Remarks<sup>2</sup>

In his opening remarks, **Kuroda** presented three major research topics at the frontier of monetary economics and monetary policy making which the subsequent keynote speech and the four presented papers addressed.

First, **Kuroda** focused on inflation and its expectations dynamics. He pointed out that more research was needed on the micro-foundations of persistence in inflation expectations dynamics such as the role of information rigidity. Second, he mentioned the declining trend of the natural rate of interest. He stated that because of the declining trend of the natural rate of interest combined with the effective lower bound on nominal interest rates, many central banks in advanced economies developed new unconventional monetary policy tools. Third, he touched on heterogeneous agent macroeconomics and the distributional effects of monetary policy. He mentioned that monetary policy was not a tool well suited for dealing with inequality, but central banks were not allowed to ignore the distributional effects of monetary policy, especially if the distributional effects had an aggregate impact.

Thereafter, referring to the words of Maurice Obstfeld that “[the BOJ-IMES Conference is] a venue in which abstract monetary theory and practical policy questions can comfortably be discussed in full depth and side by side,” **Kuroda** expressed his hope that this year’s conference would produce further insights into more effective central bank policymaking.<sup>3</sup>

## III. The Mayekawa Lecture: Some Reflections on Japanese Monetary Policy<sup>4</sup>

**Bernanke** reviewed his past advice on the BOJ’s monetary policy management to see how it had stood the test of time. Given that the 2 percent inflation target had not been achieved despite the recent favorable performance of the economy, he reaffirmed the importance of the continued pursuit of the inflation target to promote greater economic stability in the future by restoring the ability of monetary policy to respond to recessionary shocks. In a related context, he suggested the very low equilibrium real interest rate and the legacies of past policies were interacting to prevent faster progress toward the inflation target in Japan.

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<sup>2</sup> For details, see Kuroda (2017).

<sup>3</sup> Maurice Obstfeld is currently the Chief Economist of the International Monetary Fund, and is a former Honorary Adviser at the IMES.

<sup>4</sup> For details, see Bernanke (2017).

Finally, he talked about the need for contingency policy options in case a tremendous adverse shock hit the economy. He argued that renewed coordination between monetary and fiscal authorities would be desirable. Specifically, he proposed (1) a commitment by the government to a new program of spending and tax cuts, and (2) a promise by the central bank to act as needed to offset any effects of the program on the path of the government debt-to-GDP ratio.

From the floor, a number of questions related to the fiscal-monetary coordination were raised. **Kazumasa Iwata** (Japan Center for Economic Research) asked how monetary and fiscal authorities could come to a mutual understanding with regard to the fiscal costs of the large-scale asset purchase program that would likely take place in the process of monetary policy tightening. **Bernanke** replied that the inflation which should arise as a result of current aggressive monetary policy would make it possible for the BOJ to exit from the current policy and, at the same time, should reduce fiscal problems if one focused on the consolidated balance sheet of the government and the central bank. **Takatoshi Ito** (Columbia University and National Graduate Institute for Policy Studies) and **Franz Waldenberger** (German Institute for Japanese Studies) expressed concerns over fiscal discipline and, as an extreme case, the risk of hyper-inflation. **Bernanke** insisted that it was important that the terms of the agreement with regard to monetary-fiscal coordination were laid out clearly and that this would help to ensure fiscal discipline. In addition, he noted that central banks knew well how to manage inflation and, at present, inflation was not a risk but a desirable goal.

Several questions and comments related to Japanese labor market and prices were raised. **Michael Dotsey** (Federal Reserve Bank of Philadelphia) and **Masahiro Kawai** (University of Tokyo) asked Bernanke to clarify how a high price-wage inflation equilibrium could be achieved. **Bernanke** referred to government intervention in the annual wage bargaining in Japan, and the coordination of monetary and fiscal policy to stimulate aggregate demand in line with his earlier suggestion. **Koichi Hamada** (Yale University) highlighted the success of economic policies undertaken by the current administration in terms of cutting the unemployment rate and commented that issues regarding the nominal price level were exaggerated by journalists and economists in Japan.

**Kazuo Ueda** (Kyoritsu Women's University and University of Tokyo) asked about the implications of the fact that, through the introduction of yield curve control (YCC), the pace of the BOJ's purchases of Japanese government bonds (JGBs) had become endogenous, including the falling pace of JGB purchases. **Bernanke** observed that, under YCC, an endogenous slowdown of the pace was already taking place, but this was neither tapering nor tightening. He also highlighted that YCC had the advantage that it allowed the BOJ to reach the target yield without buying a large amount of JGBs.

## **IV. Keynote Speech: Rethinking the Power of Forward Guidance— Lessons from Japan<sup>5</sup>**

**Gertler** argued that the process of reflation from a liquidity trap in Japan had taken much longer than expected, even with state-of-the-art monetary policy since Governor Kuroda was appointed in March 2013. He argued that persistent low inflation and economic weakness across the globe could not be well explained by standard macroeconomic models. He mentioned the “forward guidance puzzle” as a typical example: in such models, a central bank’s commitment with regard to the future course of monetary policy, i.e., forward guidance, produces a much faster recovery and reflation from a liquidity trap than observed in practice.

Considering the disconnect between models and the actual slow recovery and reflation, **Gertler** highlighted the role of adaptive expectations, in line with the remarks by Kuroda (2016) at the 2016 Jackson Hole Symposium. He presented a new Keynesian model with a hybrid of adaptive and rational expectations. He then went on to argue that the hybrid model was good at describing the Japanese experience in 2015 when the worldwide decline in commodity prices reduced actual inflation in Japan and confounded expectations with regard to trend inflation.

**Gertler** indicated that one of the key lessons from the Japanese experience was that in the absence of a history of inflation anchored at 2 percent, individuals needed to see some inflation to believe that more was coming. He concluded the speech by stressing that the best course for the BOJ was to continue its aggressive monetary policy and hope for some luck (favorable global shocks).

## **V. Paper Presentation Sessions**

### **A. Japanese and U.S. Inflation Dynamics in the 21st Century<sup>6</sup>**

**Fuhrer** presented his analysis on the dynamics of inflation and inflation expectations in Japan and the U.S. over the past 20 years. He highlighted that one notable feature of the analysis was the use of survey-based expectations as a proxy for short- and long-term expectations in a new Keynesian-style semi-structural model. He began by presenting the empirical result that inflation dynamics appeared to be explained well by short-term inflation expectations. He then argued that, in contrast to previous studies, no lag of inflation was necessary to account for inflation dynamics. Further, he presented the main finding of his analysis that although short-term inflation expectations were anchored to their long-term counterparts, short-term expectations could persistently deviate from their long-term

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<sup>5</sup> For details, see Gertler (2017).

<sup>6</sup> For details, see Fuhrer (2017).

expectations due to their intrinsic persistence and expectations regarding the output gap. In this context, he pointed out that the degree of intrinsic persistence of short-term inflation expectations in Japan was more than twice as high as that in the U.S. Using the Keynesian-style semi-structural model, he lastly presented simulation results showing that the balance sheet expansion by the BOJ had raised both short-term inflation expectations and actual inflation.

As the discussant, **Mototsugu Shintani** (University of Tokyo) made three comments. First, he mentioned the differences in the specification of short-term inflation expectations dynamics between the analysis presented and that in Fuhrer (2012). He observed that the two specifications led to quite different policy implications. Second, he commented on the relationship between the model presented and trend inflation models examined in the recent literature. Finally, he asked about the source of the intrinsic persistence in short-term expectations. In response to the three comments, **Fuhrer** first answered that some results of his previous work provided support for the specification presented. He then argued that his model paid more serious attention to the link between inflation expectations and monetary policies than trend inflation models. Finally, he mentioned filtering problem as one of the sources of the persistence and also stressed the importance of examining individuals' expectations formation in order to gain a better understanding of the sources of inflation inertia.

From the floor, **Gertler** commented that the use of survey-based expectations in macroeconomic modeling was a step in the right direction. He then suggested that the next step should be to explore the mechanism of generating high serial correlation in forecast errors of survey-based expectations. In this context, **John McDermott** (Reserve Bank of New Zealand) asked how survey-based expectations responded to policy announcements or changes. In reply, **Fuhrer** expressed his concern about the Lucas critique, that is, responses in survey-based expectations could vary with changes in policy regimes. **James Bullard** (Federal Reserve Bank of St. Louis) emphasized the importance of investigating the effects of fiscal policy on inflation dynamics using survey-based expectations. **Hamada** argued that international differences in the structure of the labor market should be taken into account in analyzing differences in inflation dynamics. **Fuhrer** replied that the high persistence in Japanese expectations might be rooted in the inflation history.

## **B. Monetary Policy According to Heterogeneous Agent New Keynesian (HANK) Models<sup>7</sup>**

**Moll** compared the effects of monetary policy in a heterogeneous agent new Keynesian (HANK) model and a representative agent new Keynesian (RANK) model. He started by

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<sup>7</sup> For details, see Kaplan, Moll, and Violante (2017).

noting two notable differences regarding the transmission mechanism of monetary policy in the two models: (i) in the HANK model, the direct effect of an interest rate cut (the intertemporal substitution effect) was weaker than in the RANK model, while the indirect effect (the general equilibrium effect) was stronger; (ii) failure of Ricardian equivalence implied that, in HANK models, the fiscal reaction to monetary policy was a key determinant of the macroeconomic fluctuation. Moreover, in the context of the “forward guidance puzzle,” he pointed out that the HANK model might be able to resolve the puzzle, since in the model the aggregate impact of a monetary policy shock became smaller as persistence of the shock became smaller. He concluded that the implication for central banks was that they should recognize the importance of the indirect effect through general equilibrium outcomes such as the increase in income, employment, and investment.

As the discussant, **Boris Cournède** (Organisation for Economic Co-operation and Development) praised the paper for its methodological advances and rich policy implications, and suggested the following two directions for future research. First, he suggested assessing the effect of monetary policy on inequality with the use of this sophisticated general equilibrium model. He argued that this extension could help to check the robustness of the results obtained in previous studies using static partial equilibrium models. Second, given cross-country differences in the degree of inequality in earning and wealth, he highlighted the need for comparative studies across countries.

From the floor, **Goodfriend** posed the question whether it would be possible to take the natural rate of interest into account to explore the consequences of the decline in the natural rate of interest over time. **Moll** replied that while he had not worked in that direction yet, he had just developed tools that would make it possible to conduct such an analysis in future research. **R. Anton Braun** (Federal Reserve Bank of Atlanta) asked whether optimal monetary policy in the HANK model would be different from that in the RANK model. **Moll** acknowledged the importance of extending the research agenda to examining optimal policy, but pointed out the difficulties involved in computing social welfare for all the heterogeneous agents. **Jan Marc Berk** (De Nederlandsche Bank) asked to what extent the changes in wealth or income inequality could explain the puzzlingly low inflation around the world. **Moll** replied that although it was difficult to give a clear answer, the distribution of wealth and income would be relevant for the inflation rate.

### **C. Some Evidence on Secular Drivers of U.S. Safe Real Interest Rates<sup>8</sup>**

**West** presented empirical results on the long-run correlations between real interest rates and 21 variables in the U.S. He explained that the list of variables was motivated by the inter-temporal investment-saving (IS) equation, the aggregate saving and investment

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<sup>8</sup> For details, see Lunsford and West (2017).

relationship, and variables used in previous empirical studies. Employing an annual dataset from 1890 to 2015 and various methods to measure long-run correlations such as the low-pass filter technique, he showed that real interest rates were negatively correlated with the population share of 40 to 64 year olds, which implied that middle-aged workers drove down real interest rates through the accumulation of savings.<sup>9</sup> He added that although the first order condition for purchases of nominal one period bonds suggested that there should be a positive correlation between productivity and real interest rates, no such correlation was found. Finally, he made 21 different forecasts of U.S. real interest rates in 2025 by regressing interest rates on each variable and reported that the median of those forecasts was 0.55 percent.

As the discussant, **Piti Disyatat** (Bank of Thailand), based on his own research, pointed out that in a dataset covering an extremely long period of time relationships among variables may not be stable over time. He also highlighted that real rates are actually determined in financial markets as a result of the interaction among central bank policies, market expectations, risk perceptions, and preferences, rather than IS equations. **Kurt Lunsford** (Federal Reserve Bank of Cleveland), the coauthor of the paper, replied that avoiding subsample instability by dividing data into shorter periods and extracting long-run correlations represented a difficult tradeoff.

From the floor, **Gertler** asked whether the same results would be obtained for countries other than the U.S. Referring to Disyatat's research, **West** replied that demography likely had a lot to do with the dynamics of real interest rates across countries, although he had not examined this so far. **Braun** agreed with Disyatat's final comment on the importance of real rates in financial markets, citing Hall's (2013) financial wedge, which is defined as the gap between the safe short real interest rate and the rate of return to capital. **Goodfriend** suggested that the government debt recently piled up in advanced countries through fiscal stimulus measures may have led to a change in households' saving behavior in anticipation of possible tax hikes, which may have affected the relationship between the real interest rate and demographic variables.

#### **D. Market Concentration and Sectoral Inflation under Imperfect Common Knowledge<sup>10</sup>**

**Kato** discussed the determinants of sectoral inflation persistence both in the U.S. and in Japan. He first showed the empirical fact that sectoral inflation persistence was (i) starkly dispersed and (ii) negatively correlated with market concentration in each sector. Then, to explain the empirical observations, he proposed a dynamic stochastic model in which each

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<sup>9</sup> The low-pass filter is a filter that retains only long cycle (i.e., low-frequency) components of the data.

<sup>10</sup> For details, see Kato and Okuda (2017).

monopolistic competitive firm sets its price while receiving private signals about cost shocks. He highlighted the key feature of the model that a decrease in market concentration raised strategic complementarity among firms in the same sector. He pointed out that under imperfect common knowledge of the cost shocks, prices in a less concentrated sector depended more on firms' higher-order expectations with regard to the shocks. He concluded that the prices in such sectors responded only gradually to cost shocks, yielding high inflation persistence.

As the discussant, **McDermott** raised a number of econometric issues. He stressed the importance of controlling for sectoral differences in characteristics and also expressed some concern about the low R-squared. More importantly, he expressed doubts about the negative correlation between market concentration and inflation persistence, as it looked inconsistent with earlier studies including one using data for New Zealand. He argued that some empirical studies indicated that prices tended to be stickier in more concentrated sectors, suggesting that market concentration might be positively correlated with inflation persistence. **Kato** emphasized the robustness of the empirical findings, referring to the fact that the size of the sample they used was larger than that of similar studies. He also acknowledged that some unobservable variables might be the sources of the low R-squared values. He added that empirical studies had found that stickier prices entailed lower inflation persistence, so that his findings were consistent with the existing evidence. He wrapped up by highlighting the importance of carefully distinguishing, from a theoretical as well as an empirical perspective, between the frequency of price changes and inflation persistence.

From the floor, **Gertler** noted that he agreed that (i) price stickiness could not explain inflation persistence and (ii) theoretically higher-order expectations could play an important role in generating inflation persistence. **Fuhrer** suggested extending the model to investigate the effects of other shocks such as mark-up shocks on sectoral inflation persistence. **Yukinobu Kitamura** (Hitotsubashi University) offered the view that not only concentration on the seller side but also on the buyer side had an influence on sectoral inflation persistence. **Yuzo Honda** (Kansai University) expressed his concern that several outliers might generate biases in the regression.

## **VI. The Policy Panel Discussion**

In the policy panel discussion moderated by Goodfriend, Evans, Nakaso, and Smets stated their recent experience with unconventional monetary policies and discussed lessons learned and challenges ahead.

### **A. Remarks by Panelists**

**Nakaso** discussed the three lessons learned from the BOJ's monetary policy since 2013,

starting from “Quantitative and Qualitative Monetary Easing (QQE)” to the most recent “QQE with YCC.” First, he emphasized the importance of understanding how the public formed inflation expectations. He showed that, compared to other countries, in Japan realized inflation had a much larger impact on the formation of short-term as well as long-term inflation expectations. Second, he mentioned the adverse side effects of the excessive decline and flattening of the yield curve induced by the combination of the negative interest rate policy (NIRP) and large-scale JGB purchases. He added that such excessive flattening of the yield curve posed the risk of impeding the functioning of financial intermediation. Third, he noted that the experience of daily market operations before QQE with YCC showed that the entire yield curve could be controlled by exploiting a NIRP and large-scale JGB purchases. He then stated that the new monetary policy framework, QQE with YCC, was introduced based on those lessons learned. Finally, he closed his remarks by pointing out three challenges ahead, namely, the need to deepen our understanding of (i) how to raise inflation expectations that fell once to an undesirably low level; (ii) optimal levels and shapes of the yield curve; and (iii) the influence of yield curve control on market functioning.

**Evans** discussed three lessons from the U.S. experience with the Global Financial Crisis and Great Recession. First, he noted that outcome-based policies are even more critically important than usual during crises and are indispensable in the face of the zero lower bound (ZLB). He argued that both stating goals clearly and taking actions that display a “do whatever it takes” mentality are crucial for credibility and the eventual achievement of policy goals. Second, he argued that a symmetric inflation target is a challenging objective. He reasoned that after correcting for the upward inflation bias of the seventies, conservative central bankers may now find it difficult to tolerate above-target inflation even for limited and controlled periods of time. Accordingly, they might lean towards overly restrictive financial conditions and deliver lower-than-optimal inflation. In such cases, the inflation goal would become a ceiling instead of a symmetric target. Third, he argued that, with lower equilibrium policy rates, the risk of facing the ZLB will be elevated for quite some time and, consequently, risk management will be a key element for policy decision-making in the foreseeable future.

**Smets** discussed the lessons learned from the implementation of multi-dimensional monetary policy measures by the ECB in the last three years. He mentioned that the measures were designed to deal with the impaired transmission mechanism of traditional monetary policy, in addition to the ZLB on policy rates. Providing a broad overview of the outcomes of the overall easing policy package, he argued that the various policy measures reinforced each other: the NIRP strengthened the portfolio-rebalancing channel of the asset purchase program (APP) without producing serious damage to bank profitability; the APP strengthened the forward guidance through its signaling effects; and the targeted long-term

refinancing operations (TLTRO) strengthened both the interest rate policy and the APP by mitigating the impairment of the bank lending channel.

## **B. General Discussion**

**Goodfriend** began by posing several questions to the three panelists to consider what might happen in the future under the unconventional monetary policies implemented after the Global Financial Crisis.

First, **Goodfriend** asked Nakaso (1) whether downward pressure on bond rates through central banks' asset purchases had been offset by upward pressure through the increasing issuance of corporate bonds (CBs), (2) which factor played a larger role in the decline of JGB yields – term premiums or expected future short-term rates, and (3) why the NIRP depressed bank profits more in Japan than in the euro area. Regarding question (1), **Nakaso** answered that overall demand and supply conditions in the bond market in Japan remained quite tight and that little change had been observed in the spread between yields on CBs and JGBs. In reply to question (2), he mentioned that while term premiums contributed relatively more to lowering long-term interest rates, the NIRP played the role of a game changer, referring to the analyses in the BOJ's "Comprehensive Assessment" published in September 2016 showing that the effect of an additional unit of JGB purchases on the yield curve became much stronger after the introduction of the NIRP. Finally, with respect to question (3), he pointed out that the NIRP squeezed banks' lending margins more severely in Japan mainly due to the structure of the banking sector: given that retail depositors made up a large part of their customer base, commercial banks were very reluctant to introduce negative deposit rates.

Next, **Goodfriend** asked Evans (1) under what circumstances the U.S. would consider a NIRP, and (2) what caused the "Taper Tantrum" in May 2013. With respect to question (1), **Evans** replied that the BOJ's case provided a good example of the circumstances under which the U.S. would consider a NIRP, but the U.S. economy had not reached this situation. Regarding question (2), he pointed to a change in marginal investors' behavior: before May 2013, they had expected the Federal Reserve to change its asset purchase program only in the very distant future and therefore had taken on excessive risk; however, in May 2013, they realized the potential risks involved in the positions they had taken and incorporated these risks into the pricing of bonds. This repositioning, in turn, led to the sharp increase in long-term interest rates.

Finally, **Goodfriend** asked Smets (1) why the ECB had introduced the NIRP in 2014, and (2) why in the euro area the NIRP had not been detrimental to banks' profits. Regarding question (1), **Smets** mentioned two aspects that formed the background to the NIRP introduction: (i) several other central banks had already introduced a NIRP; and (ii)

the medium-term outlook for inflation had worsened. In reply to question (2), he pointed out that the reason was that the degree of pass-through from the policy rate to deposit rates was quite large in Europe.

After the replies from the panelists, the discussion was opened to conference participants. Regarding Evans' presentation, **Kawai** and **Emrah Şener** (Central Bank of the Republic of Turkey) asked about the lessons from the Taper Tantrum with regard to spillover effects of U.S. monetary policy. **Evans** replied that policy coordination among central banks was a challenge, since all policy actions of a particular central bank were determined by that central bank's specific mandate and therefore might potentially be out of step with economic conditions in some other countries. With respect to Evans' reply, **Nakaso** added that an example of coordination among central banks was the exchange of views on dollar liquidity positions of firms and banks in emerging market economies.

Regarding Smets' presentation, **Cournède** asked about the reason for the difference in the effect of the NIRP on bank profitability across individual banks, and the implications for financial stability. In a similar vein, **John Simon** (Reserve Bank of Australia) posed a question for all panelists, asking to what extent central banks should care about the risk that their accommodative policies might be leading to inappropriate risk-taking that might raise concerns about financial stability. **Smets** replied to Cournède's question that the heterogeneity of banks in the euro area meant that the interbank market functioned sufficiently well even at negative interest rates, and that even banks that had a liquidity shortage could obtain funding at very low interest rates from investment banks with excess liquidity. In reply to Simon's question, **Nakaso** answered that the BOJ examined the soundness of the financial system in the *Financial System Report* published semiannually, which confirmed that there were no signs of either an overheating of economic and financial activity or a deterioration of financial intermediation. **Evans** also remarked that to manage financial stability risk, the monetary policy authority needed to collaborate with fiscal and financial regulatory authorities.

Several questions regarding various topics were raised from the floor. **Paolo Pesenti** (Federal Reserve Bank of New York) asked whether the unconventional monetary policy tools introduced by central banks still had a role to play once economies had returned to normal. **Smets** replied that to what extent central banks would continue to use such tools depended on the degree of frictions or impairments in financial markets. **Oscar Arce** (Banco de España) posed the question whether the current situation in Japan's labor market was relevant for the formation of inflation expectations. **Nakaso** replied that while wage setting was quite backward-looking and was closely connected with realized inflation in the previous years, wage increases were observed despite almost zero inflation, probably reflecting the fact that the labor market was extremely tight. **Alexander Polonskiy** (Bank of Russia) asked about the effect of digital currencies on the inflation processes. **Evans** replied

that digital currencies were just another kind of asset with a lot of price volatility and their effect on the economy was still uncertain.

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## APPENDIX 1: PROGRAM

Wednesday, May 24, 2017

### Morning

#### Opening Remarks

Chairperson: **Shigenori Shiratsuka**, Bank of Japan

Speaker: **Haruhiko Kuroda**, Bank of Japan

#### Mayekawa Lecture

Chairperson: **Kazuo Ueda**, Kyoritsu Women's University and University of Tokyo

Lecturer: **Ben S. Bernanke**, The Brookings Institution

#### Session 1: Japanese and U.S. Inflation Dynamics in the 21st Century

Chairperson: **Anne Le Lorier**, Banque de France

Paper Presenter: **Jeffrey C. Fuhrer**, Federal Reserve Bank of Boston

Discussant: **Mototsugu Shintani**, University of Tokyo

### Afternoon

#### Keynote Speech

Chairperson: **Shigenori Shiratsuka**, Bank of Japan

Speaker: **Mark Gertler**, New York University

#### Session 2: Monetary Policy According to Heterogeneous Agent New Keynesian (HANK) Models

Chairperson: **Takatashi Ito**, Columbia University and National Graduate Institute for Policy Studies

Paper Presenter: **Benjamin Moll**, Princeton University

Discussant: **Boris Cournède**, Organisation for Economic Co-operation and Development

#### Session 3: Some Evidence on Secular Drivers of U.S. Safe Real Interest Rates

Chairperson: **Emrah Şener**, Central Bank of the Republic of Turkey

Paper Presenter: **Kenneth D. West**, University of Wisconsin-Madison

Discussant: **Piti Disyatat**, Bank of Thailand

**Morning**

**Session 4: Market Concentration and Sectoral Inflation under Imperfect Common Knowledge**

Chairperson: **James Bullard**, Federal Reserve Bank of St. Louis

Paper Presenter: **Ryo Kato**, Bank of Japan

Discussant: **John McDermott**, Reserve Bank of New Zealand

**Policy Panel Discussion**

Moderator: **Marvin Goodfriend**, Carnegie Mellon University

Panelists: **Charles L. Evans**, Federal Reserve Bank of Chicago

**Frank Smets**, European Central Bank

**Hiroshi Nakaso**, Bank of Japan

## APPENDIX 2: LIST OF PARTICIPANTS

<b>Fahad Ibrahim Alshathri</b>	Saudi Arabian Monetary Authority
<b>Masayoshi Amamiya</b>	Bank of Japan
<b>Kosuke Aoki</b>	University of Tokyo
<b>Oscar Arce</b>	Banco de España
<b>Jan Marc Berk</b>	De Nederlandsche Bank
<b>Ben S. Bernanke</b>	The Brookings Institution
<b>R. Anton Braun</b>	Federal Reserve Bank of Atlanta
<b>James Bullard</b>	Federal Reserve Bank of St. Louis
<b>Lillian Cheung</b>	Hong Kong Monetary Authority
<b>Angelo Alfonso Alberto Cicogna</b>	Banca d'Italia
<b>Boris Cournède</b>	Organisation for Economic Co-operation and Development
<b>Francisco Jr. Garcia Dakila</b>	Bangko Sentral ng Pilipinas
<b>Piti Disyatat</b>	Bank of Thailand
<b>Taeyoung Doh</b>	Federal Reserve Bank of Kansas City
<b>Michael Dotsey</b>	Federal Reserve Bank of Philadelphia
<b>Charles L. Evans</b>	Federal Reserve Bank of Chicago
<b>Jeffrey C. Fuhrer</b>	Federal Reserve Bank of Boston
<b>Hiroshi Fujiki</b>	Chuo University
<b>Yukitoshi Funo</b>	Bank of Japan
<b>Mark Gertler</b>	New York University
<b>Marvin Goodfriend</b>	Carnegie Mellon University
<b>Koichi Hamada</b>	Yale University
<b>Yutaka Harada</b>	Bank of Japan
<b>Hisashi Harui</b>	Japan Society of Monetary Economics
<b>Hideo Hayakawa</b>	Fujitsu Research Institute
<b>Yuzo Honda</b>	Kansai University
<b>Nobuo Inaba</b>	Ricoh Company, Ltd.
<b>Takatoshi Ito</b>	Columbia University and National Graduate Institute for Policy Studies
<b>Kazumasa Iwata</b>	Japan Center for Economic Research

<b>Kikuo Iwata</b>	Bank of Japan
<b>Alexander Kadow</b>	Deutsche Bundesbank
<b>Koichiro Kamada</b>	Bank of Japan
<b>Takashi Kano</b>	Hitotsubashi University
<b>Ryo Kato</b>	Bank of Japan
<b>Takeshi Kato</b>	Bank of Japan
<b>Masahiro Kawai</b>	University of Tokyo
<b>Mohd Nozlan Khadri</b>	Bank Negara Malaysia
<b>Yukinobu Kitamura</b>	Hitotsubashi University
<b>Takahide Kiuchi</b>	Bank of Japan
<b>Haruhiko Kuroda</b>	Bank of Japan
<b>Tetsuo Kurosaki</b>	Bank of Japan
<b>Takushi Kurozumi</b>	Bank of Japan
<b>Shigehiro Kuwabara</b>	Bank of Japan
<b>San Ling Lam</b>	Monetary Authority of Singapore
<b>Anne Le Lorier</b>	Banque de France
<b>Li Siduo</b>	People's Bank of China
<b>Kurt Lunsford</b>	Federal Reserve Bank of Cleveland
<b>Eiji Maeda</b>	Bank of Japan
<b>Takako Masai</b>	Bank of Japan
<b>John McDermott</b>	Reserve Bank of New Zealand
<b>Atsushi Miyanoya</b>	Bank of Japan
<b>Ryuzo Miyao</b>	University of Tokyo
<b>Madhusudan Mohanty</b>	Bank for International Settlements
<b>Benjamin Moll</b>	Princeton University
<b>Akihiro Nakano</b>	Bank of Japan
<b>Hiroshi Nakaso</b>	Bank of Japan
<b>Ko Nakayama</b>	Bank of Japan
<b>Marianne Nessén</b>	Sveriges Riksbank
<b>Mitsuru Nomura</b>	Bank of Japan
<b>Kazuhiko Ohashi</b>	Hitotsubashi University
<b>Yutaka Okada</b>	Bank of Japan

<b>Yoji Onozawa</b>	Bank of Japan
<b>Paolo Pesenti</b>	Federal Reserve Bank of New York
<b>Matthew Poggi</b>	U.S. Department of Treasury
<b>Alexander Polonskiy</b>	Bank of Russia
<b>Takehiro Sato</b>	Bank of Japan
<b>Yasuyuki Sawada</b>	Asian Development Bank
<b>Toshitaka Sekine</b>	Bank of Japan
<b>Emrah Şener</b>	Central Bank of the Republic of Turkey
<b>Seiichi Shimizu</b>	Bank of Japan
<b>Mototsugu Shintani</b>	University of Tokyo
<b>Shigenori Shiratsuka</b>	Bank of Japan
<b>John Simon</b>	Reserve Bank of Australia
<b>Frank Smets</b>	European Central Bank
<b>Wook Sohn</b>	The Bank of Korea
<b>Kazuya Suzuki</b>	Bank of Japan
<b>Wataru Takahashi</b>	Osaka University of Economics
<b>Seiichi Tsurumi</b>	Bank of Japan
<b>Kazuo Ueda</b>	Kyoritsu Women's University and University of Tokyo
<b>Kozo Ueda</b>	Waseda University
<b>Yoichi Ueno</b>	Bank of Japan
<b>Franz Waldenberger</b>	German Institute for Japanese Studies
<b>Dody Budi Waluyo</b>	Bank Indonesia
<b>Kenichiro Watanabe</b>	Hitotsubashi University
<b>Toshiaki Watanabe</b>	Hitotsubashi University
<b>Kenneth D. West</b>	University of Wisconsin-Madison
<b>Mark Wynne</b>	Federal Reserve Bank of Dallas
<b>Hiromi Yamaoka</b>	Bank of Japan
<b>Nobuyasu Yoshioka</b>	Bank of Japan
<b>Attilio Zanetti</b>	Swiss National Bank