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Central Bank Design under a Continued Low Inflation
and Interest Rate Environment

Summary of the 2019 BOJ-IMES Conference

Shigenori Shiratsuka, Nao Sudo, and Shingo Watanabe

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INSTITUTE FOR MONETARY AND ECONOMIC STUDIES

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Central Bank Design under a Continued Low Inflation and Interest Rate Environment

Summary of the 2019 BOJ-IMES Conference

Shigenori Shiratsuka∗, Nao Sudo∗∗, and Shingo Watanabe∗∗∗

I. Introduction

The Institute for Monetary and Economic Studies (IMES) of the Bank of Japan (BOJ) held the 2019 BOJ-IMES Conference, entitled "Central Bank Design under a Continued Low Inflation and Interest Rate Environment," on May 29–30, 2019, at the BOJ head office in Tokyo.[1] The conference attracted about one hundred participants from academia, central banks, and international organizations. The conference covered a wide range of issue related to the implementation and the effects of central bank policies under a continued low inflation and interest rate environment.

The conference began with the opening remarks delivered by Haruhiko Kuroda, Governor of the BOJ. The Mayekawa Lecture, presented by Jean-Claude Trichet, the former President of the European Central Bank (ECB), followed. The keynote speech was given by Carl E. Walsh (University of California, Santa Cruz), honorary adviser to the IMES. The paper presentation sessions discussed four papers, presented by Giancarlo Corsetti (University of Cambridge), Markus K. Brunnermeier (Princeton University), Enrique G. Mendoza (University of Pennsylvania), and Nao Sudo (BOJ). The policy panel discussion, moderated by Athanasios Orphanides (Massachusetts Institute of Technology), honorary adviser to the

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[1] See Appendix 1 for the program. See Appendix 2 for a list of participants; their affiliations are as of May 29–30, 2019.

IMES, was comprised of three panelists: Christian Hawkesby (Reserve Bank of New Zealand: RBNZ), Klaus Masuch (ECB), and Masazumi Wakatabe (BOJ).

II. Opening Remarks

In his opening remarks, **Kuroda** pointed out that both inflation and nominal interest rates remained low after the Global Financial Crisis compared with the pre-crisis period.[2] He also reviewed the current major research agenda for central banks, which were to be covered by this year's conference.

First, **Kuroda** discussed challenges to the monetary policy framework in textbook New Keynesian models. Specifically, he stressed the reliability of the natural rate of interest as a policy benchmark, as well as the stability of long-term inflation expectations. Second, regarding monetary policy instruments, he pointed out that the effectiveness of unconventional monetary policy tools would possibly be state dependent. He also added that an important question seemed to be whether such unconventional tools would be employed as standard policy tools in normal times. Third, he discussed the relationship between price stability and financial stability. He noted that continued low interest rates could affect financial stability by changing the risk-taking behavior of financial institutions. He also highlighted the importance of the choice of monetary and macroprudential policy instruments to achieve policy goals. Finally, he touched on the spillovers to emerging and developing economies and pointed out the growing concern over associated potential adverse effects to the global economy.

Thereafter, **Kuroda** expressed his hope that this year's conference would contribute to deepening our understanding of central bank design under a continued low inflation and interest rate environment.

III. The Mayekawa Lecture: The Euro Area Economic, Fiscal and Financial Governance: Difficulties and Successes in the Past – Present Challenges – Future steps

Trichet began by taking up the issue that the performance of the euro since its inception in 1999 had been underestimated.[3] He stressed that the euro had been successful in terms of international credibility, domestic price stability in the euro area, and resilience in turbulent times. He added that the euro area's per capita real income growth had been comparable to that of the United States. He also mentioned survey results that showed solid popular support among European citizens for the euro and the euro area and argued that this explained the remarkable resilience of the euro and of the euro area.

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[2] For details, see Kuroda (2019).
[3] For details, see Trichet (2019).

Turning to the issues for further promotion of macroeconomic convergence among euro area member countries, he made six proposals for strengthening economic, fiscal, and financial governance: (i) completing the ongoing process of establishing the Banking Union, (ii) applying the Stability and Growth Pact and the Macroeconomic Imbalance Procedure in a rigorous manner, (iii) improving the decision making inside the European Stability Mechanism, (iv) establishing the euro area's Minister of Economy, (v) providing the European Parliament with the last word on conflicts between national governments and the European Union institutions, and (vi) setting up a euro area budget to stabilize business cycles and to facilitate structural reforms in an area-wide fashion.

On monetary policy, he argued that the convergence of the key elements for policy framework proceeded in major advanced countries, as evidenced by numerical definition of price stability at a 2 percent inflation rate in the medium to long run. To achieve price stability in Japan, he stressed that not only expansionary monetary policy but also promotion of structural reforms and higher wage growth were indispensable. He added that the latter two required effective coordination among a broad set of public and private bodies.

From the floor, **Orphanides** noted that the ECB needed to take measures to support the economic convergence process and to give more precise definition of price stability. **Trichet** disagreed with those points by arguing that the delay in convergence was due mainly to differences in member countries' efforts to improve cost competitiveness rather than the effects of euro-area monetary policy, and that all taken into account, there were more negatives than positives in changing the definition of price stability. In any case, he would stress the importance of the medium and long term perspective in the concept of the ECB. **Kazumasa Iwata** (Japan Center for Economic Research) asked whether continued non-performing loan problems in some member countries were attributable to the incomplete Banking Union. **Trichet** acknowledged that this played a role and mentioned that the integration of retail banking was significantly lower than that of the wholesale banking. **Kazuo Ueda** (Kyoritsu Women's University and University of Tokyo) asked Trichet about his view on whether Japan should use fiscal policy more to stimulate the economy, considering that yields on Japanese long-term government bonds implied a zero risk premium. **Trichet** said that doing so would be a mistake for Japanese authorities, referring to the experience of the European debt crisis, when there was large, sudden increase in risk premia on the government bonds of certain member countries. He stressed, once again, the decisive role of the social partners and the importance of unit labor costs to be more dynamic.

IV. Keynote Speech: Alternatives to Inflation Targeting in Low Interest Rate Environments

In his keynote speech, **Walsh** discussed whether inflation targeting (IT), which was widely

adopted by central banks, was the best monetary policy framework in low inflation and interest rate environments, or whether it should be replaced by an alternative monetary policy framework such as price-level targeting (PLT) or average inflation targeting (AIT).[4]

  Walsh began by pointing out that IT might be inappropriate in low interest rate environments, since it was developed when the challenge was to reduce high inflation and then stabilizing it at a low level. Employing standard New Keynesian models and a goal-based approach to policy design, he computed the welfare loss arising from shocks in an economy where the central bank's objective was to stabilize the inflation rate, the average inflation rate, or the price level, in addition to the output gap. He showed that (i) when only prices were sticky and private agents had rational expectations, PLT dominated IT and AIT by automatically guiding inflation expectations in a stabilizing fashion, (ii) in the presence of wage stickiness and productivity shocks, PLT performed significantly worse than IT and AIT, and (iii) when inflation expectations were well anchored, IT and AIT worked better than PLT. He then noted that these results depended on how the weights in the central bank's objective functions were set and that the analysis ignored the costs of changing the policy regime. He ended his speech by noting that basic theoretical models of monetary policy capture the "science" of monetary policy but not the "art" required to successfully implement policy, as the analysis abstracted from such important issues as model uncertainty and policy credibility that policymakers must deal with in practice.

  From the floor, **Orphanides** highlighted the benefits of comparing performance of various simple rules particularly under model uncertainties, and asked why the analysis was conducted using the goal-based approach. **Walsh** commented that complicated rules were difficult to communicate, and in such cases the central bank would still find it necessary to communicate their objectives. **Paolo Pesenti** (Federal Reserve Bank of New York) pointed out that the poor performance of PLT in the model was mostly attributable to the large output gap volatility. He then asked whether PLT could be optimal when an alternative welfare metric, such as no weight on the output gap in the loss function, was employed. **Walsh** replied that the weight on the output gap in the central bank's objective function was very small with the standard calibration of the New Keynesian model, thus leading to the large output gap volatility.

V. Paper Presentation Sessions

A. Exchange Rate Misalignment, Capital Flows and Optimal Monetary Policy Trade-offs

Corsetti presented his work on the optimal policy stance when capital flows created a trade-

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[4] For details, see Walsh (2019).

off between domestic stabilization, inflation and the external balance, based on the two-country New Keynesian framework.[5] **Corsetti** stressed that the misallocation associated to financial imperfections was well synthesized by the "wealth gap," which combined the relative deviation of domestic demand from the efficient level at home and abroad, with real exchange rate misalignment. He showed that the optimal monetary response to capital inflows that widened the deficit can be characterized analytically as a function of the wealth gap, and that, when this gap was positive, the optimal monetary stance depended on the degree of exchange rate pass through (ERPT). When inflows overappreciated the currency and boost demand, the optimal monetary stance was contractionary if ERPT was incomplete (local currency pricing, or LCP), and currency movements had limited effects on the global demand for the country's output. The central bank stabilized domestic demand, tolerating below-target inflation and overappreciation. Conversely, the optimal stance was expansionary if EPRT was complete (producer currency pricing, or PCP): the central bank contained misalignment, at the cost of above target inflation and inefficiently high demand. Relative to strict price stability, exchange rate volatility was therefore lower in PCP than in LCP economies.

As the discussant, **Pesenti** commented that the paper made an important contribution to both the theoretical and policy debate about international spillovers of monetary policy. In particular, the theoretical contribution was substantial as it explicitly addressed the implications of financial market imperfections. He asked if the wealth gap could be related to differences in the natural rate of interest between the countries. He also asked how the author's approach based on a representative agent model could be generalized. **Corsetti** replied that it was possible to express the wealth gap as a function of the natural rate of interest. He also replied that modelling heterogeneity across households might not produce drastically different implications from the current model, pointing out that the optimal policy in two-agent New Keynesian (TANK) model can be envisioned as a combination of the optimal policy under complete market and financial autarky.

From the floor, **Mendoza** commented that capital flows might have been driven by structural forces rather than business cycles, considering the gradual worsening of the net foreign position of the United States over the past two decades. **Corsetti** acknowledged the importance of structural changes since market integration may have indeed enhanced the scope for consumption smoothing via cross-border borrowing and lending. But he added that these changes may also magnify the response of capital flows to shock at business cycle frequencies. **Koichi Hamada** (Yale University) commented that the paper clearly contributed to the literature by incorporating market incompleteness in various dimensions. **Carlos Thomas** (Banco de España) asked how the wealth gap, the key metric of financial market distortion in the model, could be measured from actual data. **Corsetti** pointed out that one can

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[5] For details, see Corsetti, Dedola, and Leduc (2019).

calculate wealth gaps simply combining differences in the growth rates of (consumption) demand across countries and real depreciation (weighed by risk aversion). **Etsuro Shioji** (Hitotsubashi University) inquired about the implications of the currency denomination of the debt in the model. He also asked that actual price setting in international transaction involves both LCP and PCP, as the case in Japan. **Corsetti** replied stressing that in this model debts were zero in the steady state, so that valuation effects were zero. While this limited the scope of the analysis, an analytical advantage was that of a transparent analysis on how policy rates works via conventional transmission channels. He agreed that in practice firms may use different invoice currencies over time depending on the export destination markets, quoting recent microeconometric evidence.

B. The Reversal Interest Rate

Brunnermeier presented a theoretical framework for the reversal interest rate (RR) as a determinant of the effective lower bound (ELB), in the sense that a policy rate cut below the RR reduced lending and depressed the economy.[6] Employing a partial equilibrium model, he showed that the RR existed because the decrease of net interest income could exceed the capital gains from fixed income assets and the capital constraint could become binding. He then highlighted that the RR would creep up over time in a prolonged low interest rate environment, since capital gains faded out as fixed income assets matured. He also pointed out that quantitative easing should be employed after hitting the ELB, since quantitative easing lowered the potential capital gains of banks by reducing their bond holding and raised the RR. Incorporating the mechanism into a general equilibrium model with New Keynesian framework, he showed that the RR continued to exist in such a model. Finally, he noted that a fall in the natural rate of interest did not result in a one-to-one shift of the RR, so it made less leeway for monetary policy.

As the discussant, **Meredith Beechey** (Sveriges Riksbank) praised the analysis, describing it as an excellent proof of concept of the reversal rate with a model that captured various mechanisms examined in the banking literature. She commented that loosened financial constraints and central bank policies to ease the net worth problem could increase the scope of policy rate cuts. She then conjectured that the RR might "creep down" since banks would take on more maturity mismatch and would rely more on market funding, suggesting that a cross-country estimation of the RR might be useful. She also commented that transition to cashless society might affect the RR since new technologies would erode banks' market power. **Brunnermeier** replied that the creeping down effect should be implicitly incorporated in the general equilibrium model but was not embedded explicitly in the partial equilibrium model. He then argued that the lack of data for several variables, such

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[6] For details, see Brunnermeier and Koby (2019).

depositors' behavior in response to changes of the policy rate, made it difficult to estimate the RR for many other countries.

From the floor, **Thomas** suggested that a policy rate cut might also lead to lowering the RR through a decrease in defaults on corporate debt and in banks' provisions. **Brunnermeier** replied that this might not be the case, since a negative rate could lead to raising lending rates, as happened in Switzerland. **Walsh** commented that it was important to examine the effects of other shocks than a monetary policy shock. **Brunnermeier** agreed and replied that this was future works. **Tsutomu Watanabe** (University of Tokyo) asked why the model did not contain money and argued that incorporation of money would create a zero lower bound, thereby making the RR negative. **Brunnermeier** answered that the model allowed for cash in a more general interpretation and that the RR could be positive. **Kazuhiko Ohashi** (Hitotsubashi University) asked what the result of a negative shock to loan demand would be and how it would affect the economy in the model. **Brunnermeier** replied that bank loans were endogenously determined in the model and any shocks could be shocks to bank loans.

C. Tight Money – Tight Credit: Coordination Failure in the Conduct of Monetary and Financial Policies

Mendoza presented a quantitative analysis on the interaction between monetary and financial policies using a New Keynesian model with a financial accelerator mechanism, focusing on the policy response to risk shocks that increased borrowers' external finance premium.[7] In the single policy rule regime, only monetary policy was conducted, based either on a simple Taylor rule (STR) or a Taylor rule augmented with a response to credit spreads (ATR). In the dual policy rules regime (DRR), monetary policy was conducted based on a simple Taylor rule, while financial policy was conducted based on a policy rule providing a financial subsidy to banks in response to an increase in credit spreads. He showed that economic fluctuations in response to risk shocks were much less severe and welfare costs were smaller in the DRR and highlighted that Tinbergen's rule was relevant, arguing that with the ATR the monetary policy rate rose too much when inflation increased and did not fall enough when the credit spread widened. Finally, he examined the strategic interaction between the two policies in the DRR described by the optimal choice of the elasticity of response of the monetary and financial policy rules to changes in inflation and credit spreads, respectively. He showed that the cooperative equilibria yielded welfare outcomes that were close to the first best and that welfare was lower if monetary and financial policies were not coordinated, but even without coordination the DRR dominated both the STR and the ATR.

As the discussant, **Kosuke Aoki** (University of Tokyo) began by praising the paper

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[7] For details, see Carrillo, Mendoza, Nuguer, and Roldán-Peña (2019).

for providing a quantitative analysis of the interaction between monetary and financial authorities with intuitive explanations and ample robustness checks. He then pointed out that the welfare criteria used for analyzing the benefits of the DRR and the loss function used for analyzing the coordination problem were not the same. He then suggested that the loss function should be derived from the second order approximation of utility, so that all the results in the paper were comparable. He also pointed out that a coordination problem arose in the case of markup shocks in addition to risk shocks, because markup shocks might create an additional trade-off between stabilizing inflation and stabilizing the output gap. **Mendoza** replied that no coordination problem occurred with utility-based loss functions that made common payoffs for both authorities, and generated an equivalent outcome with the cooperative equilibria.

From the floor, in line with Aoki's comments, **Thomas** argued that utility-based loss functions should be used to examine coordination problems, since such loss functions were expressed in additive form and could be assigned to each authority separately. **Masuch** argued that incorporating other policy measures aimed at reducing banks' borrowing costs, such as the ECB's Longer-Term Refinancing Operation (LTRO) and the existence of an RR as proposed by Brunnermeier and Koby (2019), into the analysis could provide more practical implications. **Ohashi** asked how the results would be affected if monetary policy became ineffective. **Mendoza** replied that it might be possible to analyze the case when an economy was in a liquidity trap by using other policy instruments such as fiscal policy to address distortions by nominal rigidities.

D. Prolonged Low Interest Rates and Banking Stability

Sudo theoretically argued that prolonged low nominal interest rates reduced banks' profits, thereby undermining banking stability by using a dynamic stochastic general equilibrium model with a bank run, *à la* Gertler and Kiyotaki (2015).[8] He explained that the key mechanism rested on the positive relationship between nominal interest rates and the deposit spread arising from liquidity services provided by bank deposits. Specifically, when nominal interest rates were low, households had less demand for deposits, so that the interest spread on deposits was compressed and banks' profits declined. As a result, the adverse effects of a bank run on banking sector and the real economy tended to be larger, bringing the economy closer to the state with a bank run equilibrium. However, based on simulation exercises using the model calibrated to Japan, he suggested that low nominal interest rates did not bring the economy to the state with a bank run equilibrium, except for the extreme cases that the TFP growth rate or the target inflation rate of the central bank stayed below zero. He also argued that the qualitative implications remained unchanged when the model was calibrated to

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[8] For details, see Aoki, Munakata, and Sudo (2019).

Canada, the United Kingdom, and the United States.

As the discussant, **Thomas** commented that the paper focused on the topical issue. He then argued that banking instability might not be as implausible as the paper claimed, for the two reasons. First, demographic changes going forward might exert downward pressure on nominal interest rates, bringing the economy to a state with a bank run even if the TFP growth rate or the target inflation rate was positive. Second, while the existence of non-bank lenders (NBLs) alleviated the concerns regarding a bank run in the model, in practice, some NBLs were leveraged and could be vulnerable to a run. **Sudo** agreed with these arguments. He pointed out, however, that demographic changes involved additional aspects other than downward pressure on interest rates, such as changes associated with age-specific differences in the elasticity of deposit holdings, which potentially improved banking stability. He also argued that while the model did not incorporate vulnerability of NBLs, the impact of leveraged NBLs could be captured in the model by using a broad definition of banks.

From the floor, **Corsetti** highlighted the importance of addressing the relationship between banks' default risk and deposit rate. **Sudo** replied that the model indeed captured the positive relationship between the two variables, but added that the quantitative effect of the default risk on the variables in the model was minor. **Brunnermeier** asked how the model's implications would change if the government conducted asset purchase to support asset prices in the case of a run. **Sudo** replied that banking stability would improve if it was expected that the government would successfully support asset prices. **Mendoza** encouraged him to examine the transitional dynamics of the model. **Sudo** replied that, partly for illustrative purposes, the paper exclusively focused on the steady state and that examining the transitional dynamics would be a useful extension. **Daisuke Miyakawa** (Hitotsubashi University) asked about the implications of firms' cash holdings. **Sudo** replied that such firms were considered as NBLs in the model and contributed to mitigating the fall in asset prices in the case of a run. **Shioji** pointed out that the returns from the three types of assets – bonds, money, and deposits – could not be equalized to zero when the utility gains from deposits and money were considered. **Sudo** replied that the returns from bonds and deposits were strictly above zero due to utility gains. **Hamada** proposed to introduce deposit insurance into the model. **Sudo** replied that even if deposit insurance was in place, a run could still occur if the insurance was incomplete, so that the conclusions of the paper would remain unchanged.

VI. The Policy Panel Discussion

In the policy panel discussion, moderated by Orphanides, three panelists, Hawkesby, Masuch, and Wakatabe, expressed their views on central bank credibility under a low interest rate environment.

A. Remarks by Panelists

Hawkesby explained recent reforms of the monetary policy framework at the RBNZ. First, he introduced that RBNZ shifted to a dual mandate with an employment objective in addition to a price stability objective. He explained that employment was one measure of wellbeing of the public, which was the end goal of monetary policy. Second, he noted that the RBNZ adopted a formal Monetary Policy Committee (MPC), and pointed out that diversity in its members was key for ensuring the credibility of the RBNZ. He added that the RBNZ had published the Monetary Policy Handbook as a means to enhance transparency in its decision-making process. Moreover, he noted that the RBNZ needed to prepare for a situation of less room for interest rate cuts, in order to maintain its credibility under a sustained low interest rate environment. In addition to the possibility of introducing unconventional monetary policy tools, he explored the possibility of fiscal and monetary policy coordination, stressing that operational independence of the central bank did not mean operational isolation.

  Masuch discussed the relevance of structural factors and non-monetary policy issues for the conduct of monetary policy, with emphasis on the euro area economy. He first pointed out that without proper support from fiscal and structural policies, monetary policy close to the ELB may require more time to achieve the price stability objective than otherwise. He then discussed importance of creating sufficient economic buffers in normal and favorable times through (i) appropriate non-monetary policies such as banking regulations to ensure a strong capital base in banking sector and (ii) fiscal management to create sufficient fiscal space. Such policies could better support monetary policy in a major downturn. He finally stressed that appropriate EU-wide policies were important in addition to sound national economic policies, such as the European Deposit Insurance Scheme.

  Wakatabe explained Japan's experience after the late 1990s from the viewpoint of central bank credibility. He first highlighted the importance for a central bank to match deeds to words by referring to Blinder (2000). He briefly reviewed the BOJ's monetary policy before and after 2013, emphasizing that the introduction of a clear numerical definition of price stability in January 2013 and aggressive monetary easing since April 2013 contributed to boosting the CPI inflation to the level stably above 0 percent. He next explained Japan's experience after the late 1990s, including (i) the low natural rate of interest, (ii) the difficulties in re-anchoring inflation expectations, (iii) the interplay between financial stability and monetary policy, and (iv) revisions of the institutional framework such as the introduction of a formal price stability target. He added that long-term inflation expectations still remained below the 2 percent target, suggesting that the BOJ still needed to continue its effort to achieve the target. He concluded that central banks needed to deliver clear communication to the public, and to take decisive policy actions in order to achieve their objective.

B. Discussion Among Panelists

After presenting their own views, panelists commented on each other's views. **Hawkesby** made a brief review of the three presentations by showing two common issues: one was the importance of taking action rather than just declaring objectives and the other was the importance of cooperating with fiscal authorities if needed. **Masuch** added that central banks needed to deliver a high level of transparency to receive broad support. **Wakatabe** also stressed the importance of communication with the public. **Masuch** asked Wakatabe regarding the costs of inflation expectations being significantly below 2 percent. **Wakatabe** argued that sluggish nominal GDP growth during the deflationary period in Japan entrenched a deflationary mindset, making firms reluctant to invest in human and production capital.

Orphanides asked the three panelists how coordination with fiscal policy could be operationalized. **Hawkesby** emphasized that the central bank needed to build a good relationship with the government to have an open dialogue over their objectives and the current situation. **Masuch** explained that the fiscal authorities of euro area member countries were supposed to have built up fiscal buffers during normal times under the Maastricht Treaty. However, fiscal policy often turned out to be pro-cyclical in retrospect. **Wakatabe** highlighted Abenomics as an example of a policy mix of sound fiscal and monetary policies.

Orphanides next asked the panelists' views about the recent move at the RBNZ from the single mandate of price stability to a dual mandate with employment. **Hawkesby** noted that if the RBNZ faced a tradeoff between the two, it was likely to put particular emphasis on inflation expectations being anchored around the target level. **Masuch** commented that the introduction of a dual mandate in the euro area may be difficult inter alia because of the large difference in structural and cyclical unemployment rates across its member countries. **Wakatabe** pointed out that central banks with a dual mandate were faced with the challenge in practice: the estimation of the natural rate of unemployment became increasingly difficult due to structural changes in the labor market.

C. General Discussion

After the exchange among the panelists, the discussion was opened to conference participants. Regarding Masuch's question to Wakatabe on the cost of inflation expectations significantly below 2 percent, **Ueda** added that the greatest cost had been the lack of a safety margin on the interest rate against the ELB. He explained that, when other central banks cut interest rates sharply in 2008, the BOJ could not do that due to the lack of a margin, resulting in a sharp appreciation of the yen. **Masuch** commented that an implicit presumption in this argument was that the effectiveness of unconventional monetary policy tools adopted by central banks was uncertain when interest rates hit the ELB. **Beechey** explained Sweden's experience with the introduction of a negative interest rate policy. She stressed that communication with the

public about the negative interest rate had been particularly difficult, as the public viewed the negative interest rate as a signal that the economy was still in crisis. **Wakatabe** noted that the situation was similar in Japan, adding that its negative connotation seemed to have misguided the public understanding of the policy.

Pesenti asked if engineering a transitory overshooting of the inflation rate through monetary policy would be desirable to maintain central bank credibility. **Hawkesby** replied that the RBNZ would compare which case would be more regrettable: the case that inflation remained below the target level or the case that it became too high. **Wakatabe** added that the BOJ had introduced the overshooting commitment in 2016 in an attempt to re-anchor inflation expectation at 2 percent target. **Masuch**, on the other hand, argued that the ECB had not deliberately tried to overshoot (or undershoot) the inflation aim (of close, but below 2 percent).

Beechey argued that if coordination involved an open and honest exchange between the central bank and the government, then some central bankers might feel that their independence was threatened. **Hawkesby** replied that central bankers needed to become comfortable with their operational independence, to allow open discussions, and this may come overtime as the central bank becomes more experienced operating independently. **Wakatabe** added that central banks might benefit from cooperation with experts in, for example, political science to develop desirable governance structures for policy coordination.

Thomas raised a question as to how fiscal and monetary coordination could be operationalized in the euro area, given that the ECB faced 19 fiscal authorities, each with its own national interests in mind. **Masuch** agreed that policy coordination was difficult for the euro area and emphasized the need to complete the Economic and Monetary Union (EMU) and build fiscal capacity at the EMU level. He emphasized that open communication between authorities about their reaction functions and views of the economic situation was a way to achieve informal coordination.

Shioji referred to the joint statement between the BOJ and the Japanese government in January 2013 as a clear statement of policy coordination and asked if similar examples were seen in other countries. **Masuch** replied that the Stability and Growth Pact in the euro area was intended to be such a statement, although with the benefit of hindsight it did not effectively deliver counter-cyclical fiscal policy.

Hamada commented that if the number of policy instruments was equal to the number of policy targets, the Tinbergen rule should apply, and policy coordination might not be necessary at all. **Masuch** agreed with the basic idea of the Tinbergen rule, but argued that general equilibrium models may also need to take political economy dynamics into account.

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APPENDIX 1: PROGRAM

Morning

Opening Remarks

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

Mayekawa Lecture

Chairperson:	**Kazuo Ueda**, Kyoritsu Women's University and University of Tokyo
Lecturer:	**Jean-Claude Trichet**, Former President of the European Central Bank

Session 1: Exchange Rate Misalignment, Capital Flows and Optimal Monetary Policy Trade-offs

Chairperson:	**Maria Almasara Cyd N. Tuano-Amador**, Bangko Sentral ng Pilipinas
Paper Presenter:	**Giancarlo Corsetti**, University of Cambridge
Discussant:	**Paolo Pesenti**, Federal Reserve Bank of New York

Afternoon

Keynote Speech

Chairperson:	**Adam Glapiński**, Narodowy Bank Polski
Speaker:	**Carl E. Walsh**, University of California, Santa Cruz

Session 2: The Reversal Interest Rate

Chairperson:	**Daniel G. Sullivan**, Federal Reserve Bank of Chicago
Paper Presenter:	**Markus K. Brunnermeier**, Princeton University
Discussant:	**Meredith Beechey**, Sveriges Riksbank

Session 3: Tight Money-Tight Credit: Coordination Failure in the Conduct of Monetary and Financial Policies

Chairperson:	**Jinho Huh**, Bank of Korea
Paper Presenter:	**Enrique G. Mendoza**, University of Pennsylvania
Discussant:	**Kosuke Aoki**, University of Tokyo

Morning

    Session 4: Prolonged Low Interest Rates and Banking Stability

        Chairperson: **James C. MacGee**, Bank of Canada

        Paper Presenter: **Nao Sudo**, Bank of Japan

        Discussant: **Carlos Thomas**, Banco de España

    Policy Panel Discussion

        Moderator: **Athanasios Orphanides**, Massachusetts Institute of Technology

        Panelists: **Christian Hawkesby**, Reserve Bank of New Zealand

                                  Klaus Masuch, European Central Bank

                                  Masazumi Wakatabe, Bank of Japan

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