

Price Dynamics and Monetary Policy Challenges —Lessons Learned and Going Forward— Summary of the 2024 BOJ-IMES Conference by Wataru Hagio, Daisuke Ikeda, Satoshi Kobayashi, and Nao Sudo

I. Introduction

The Institute for Monetary and Economic Studies (IMES) of the Bank of Japan (BOJ) held the 2024 BOJ-IMES Conference, entitled “Price Dynamics and Monetary Policy Challenges—Lessons Learned and Going Forward,” on May 27–28, 2024.¹ This was the 29th conference since its start in 1983 and was held as part of events for the BOJ’s “Broad Perspective Review” of monetary policy. Participants engaged in lively discussions on price dynamics and conventional and unconventional monetary policy.

The conference began with the opening remarks delivered by Kazuo Ueda, Governor of the BOJ. Next, John B. Taylor (Stanford University) gave the Mayekawa Lecture on inflation and monetary policy in the U.S. and other countries. Shinichi Uchida (BOJ) gave a keynote speech on price dynamics in Japan over the past 25 years. Markus Brunnermeier (Princeton University), honorary adviser to the IMES, delivered another keynote speech on resilience-based monetary policy. In the paper presentation sessions, four papers were presented on the theoretical and empirical analyses of inflation dynamics and monetary policies, by John H. Cochrane (Stanford University), Yoshihiko Hogen (BOJ), Sophocles Mavroeidis (University of Oxford), and Ricardo Reis (London School of Economics and Political Science).

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The conference organizers wish to express their sincere gratitude to the two IMES honorary advisers, Markus Brunnermeier and Athanasios Orphanides, and all other conference participants for the 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 are the authors’ responsibility.

1. See Appendix 1 for the program. See Appendix 2 for a list of participants; their affiliations are as of May 27–28, 2024.

The first policy panel discussion was moderated by Athanasios Orphanides (Massachusetts Institute of Technology), honorary adviser to the IMES, and the five panelists, Charles L. Evans (formerly of Federal Reserve Bank of Chicago), Pierre-Olivier Gourinchas (International Monetary Fund: IMF), Olli Rehn (Bank of Finland), Eli M. Remolona, Jr. (Bangko Sentral ng Pilipinas), and Boštjan Vasle (Banka Slovenije), discussed price dynamics. The second policy panel discussion was moderated by Brunnermeier, and the five panelists, Michelle W. Bowman (Board of Governors of the Federal Reserve System), Thomas J. Jordan (Swiss National Bank), Loretta J. Mester (Federal Reserve Bank of Cleveland), Isabel Schnabel (European Central Bank: ECB), and Ryozi Himino (BOJ), discussed the effects of conventional and unconventional policy instruments.

II. Opening Remarks

To set the stage for the conference, Ueda started his remarks with the changes in the BOJ's monetary policy framework in March, followed by his reflections on the past 25 years.² He posed the perennial question of Japan's struggle to escape a long period of zero-to-low inflation, also known as the zero-inflation trap, despite extensive unconventional monetary policy interventions by the BOJ, and he said that the primary explanation for the prolonged struggle was the zero lower bound (ZLB). He pointed out that the overnight call rate fell below 0.5% by late 1995, and by the onset of the zero-inflation trap, the BOJ had exhausted its leverage over short-term interest rates as a means of stimulating the economy.

On the other hand, he pointed out that during the initial years of the zero-inflation trap, there had been no explicit inflation target, and that there had been no significant increase in the BOJ's holdings of Japanese government bonds (JGBs) until 2013, and its active acquisition of long-term JGBs had happened relatively late. Thus, he noted that some might argue that the evolving policy framework adopted by the BOJ had not been at certain points optimal.

He also pointed out that a second possible explanation for the BOJ's difficulties was that the entrenched nature of low inflation expectations had led to changes in economic agents' behavior, especially the strategic pricing behavior of firms, and, in turn, prolonged the period of the zero-inflation trap. He added that there was evidence of changes after 2014, however: first, wages had started to rise modestly and then rose sharply in 2023–2024, probably in response to the recent global inflation and the continuation of the easing framework put in effect from the pre-inflation period.

Lastly, he said that the BOJ had made progress in moving inflation expectations away from 0%. He concluded his opening remarks by noting that the BOJ must now re-anchor expectations, this time at the 2% target, and would proceed cautiously.

2. For details, see Ueda (2024).

III. The Mayekawa Lecture: The Way to Stability and Growth in the World Economy

Taylor reflected on the first Mayekawa Lecture,³ which he gave at the 2008 BOJ-IMES Conference.⁴ He mentioned that one of the major concerns at that time had been high inflation, which was also a recent major issue. He added that many current economic issues, including inflation, had been strongly interconnected given today's economic, political, and geopolitical conjuncture. Furthermore, when considering economic difficulties such as global high inflation seen in the recent years, he emphasized the importance of a comprehensive "Mayekawan" approach, in which policy is formulated from comprehensive and international perspectives while recognizing the important interactions of economic problems instead of approaching them separately.

He then discussed inflation and monetary policy in the U.S. and other countries. He pointed out that the timing of the policy rate hikes in the U.S. and other countries in recent years had been late, relative to that implied by the Taylor rule, and that interest rates had been kept low for too long. He noted that, as a consequence, central banks had fallen behind the curve, causing high inflation. Furthermore, he pointed out that (1) the Federal Reserve (Fed) had subsequently raised the federal funds rate to a level above 5%, which was well above the level of about 4% implied by a simple version of the Taylor Rule, and (2) Latin American countries had also fallen behind the curve. He added that this phenomenon was observed globally, and high inflation had become a global issue.

He posed the question of whether we were entering a new era of high inflation. He said that the answer would definitely be "yes," unless central banks continued to adjust their policies appropriately. He concluded by arguing that rule-based monetary policy would help central banks avoid falling behind the curve and making unnecessary rapid rate hikes that could cause significant damage to the economy.

From the floor, **Peter Kažimír** (Národná banka Slovenska), the chair of this session, first asked about the importance of central banks coordinating their policies in an increasingly interconnected global economy and about preemptive policy responses to mitigate the effects of future economic shocks. **Taylor** replied that, as the world was getting more integrated, it was more important to have some notion of policy coordination. He also said that it would be possible to become ready to make right policy responses by continuously discussing various and broad themes such as inflation targets, the state of the economy, exchange rate considerations, and the coefficient on the inflation rate in a policy reaction function.

Several questions and comments were made about how to use a rule-based strategy for monetary policy in practice. **Orphanides** noted that in the U.S., the public had perceived high inflation from 2021 onward as an exceptional circumstance and that their inflation expectations had been incredibly well anchored. On top of that, he asked about the view that the Fed fell behind the curve by not rushing to raise interest rates due to the anchoring inflation expectations and later continued raising the policy rate above the level implied by the Taylor Rule. **Jordan** said that, given economic uncertainties,

3. For details, see Taylor (2008).

4. For details, see Taylor (2024).

there is a view that it is better for central banks to make discretionary policy decisions in some circumstances, rather than always making rule-based policy decisions, and asked for Taylor's view on that. **Mester** commented that it would be hard for central banks to give up their discretion and stick to rules because of many conflicting things. **Kosuke Aoki** (The University of Tokyo) pointed out that the optimal monetary policy under the ZLB was to allow inflation to overshoot and asked whether, in the light of recent discussions about being behind the curve, we had overstated the benefits of such a history-dependent monetary policy before the global inflation. **Taylor** responded that in his experience, rule-based policy management worked well, but it did not mean that policy rules were perfect, and that there was room to discuss discretionary policy decisions in terms of which variables and factors should be considered in the policy rules. He also argued against stressing only the benefits of the overshooting policies and that it would be important to evaluate policy using various models rather than sticking to a single perspective.

There were diverse discussions about the specification and application of a policy rule. **Rehn** mentioned that the ECB had changed its inflation target from "below, but close to, two percent" to "symmetric two percent" after concluding its strategy review and that this change had contributed to stabilizing inflation. **Kazumasa Iwata** (Japan Center for Economic Research) asked for Taylor's opinion on the U.S. neutral rate. **Masazumi Wakatabe** (Waseda University) asked for opinions on whether the Taylor rule should be strictly applied and interest rates raised even if, as in Japan, inflation expectations were not yet anchored at the 2% level but were on their way to being so. **Remolona** mentioned that forward guidance could be interpreted as a discretion for a smoothing parameter in terms of how much the rule-based policy rate should be reflected in the actual interest rate at each particular time, and that such discretion would increase the possibility of falling behind the curve. **Naoyuki Yoshino** (Keio University) asked whether a policy rule could change depending on the source of inflation such as a demand factor or a supply factor. **Evans** argued that it was important to consider some alternative scenarios rather than to get caught up on a single precise rule as the baseline. **Taylor** replied that estimating potential growth and identifying the level of the neutral interest rate and internationally interrelated supply factors was not easy, making monetary policy management more difficult, and therefore he recognized that it was important to have constant discussions between academics and policymakers about those issues. He continued that, as can be seen from the issues presented so far, there was no need to define a single policy rule, and that it was important for policymakers to model various policy rules and evaluate them while deepening the discussion toward better rule-based policy management.

IV. Keynote Speech I: Price Dynamics in Japan over the Past 25 Years

Uchida reflected on price dynamics in Japan over the past 25 years and stated that the BOJ's monetary policy during the period had been a battle against persistent de-

flation and a battle with the ZLB.⁵ He then discussed whether the current change in Japan's inflation picture means an irreversible structural change from deflation, or just a temporary phenomenon.

He first pointed out two things as background to Japan's deflation: a decline in the growth trend, and chronic shortages of demand. He added that the potential growth rate had declined, decreasing the natural rate of interest over time. He mentioned that the bursting of the asset bubble in the early 1990s appeared to be an important factor, which had triggered financial system turmoil and painful balance sheet adjustments in the corporate sector. In addition, he said that companies had had to address excess capacity, excess labor, and debt-overhang, and against this backdrop, they had become more and more reluctant to take risks and had been slow to adjust their operations to the globalization trend brought about by the rise of emerging economies. As a result, he added that the natural rate of interest in Japan had declined earlier and to a greater extent than in other countries.

Uchida also noted that BOJ's monetary policy did not have enough power to lift the actual and expected inflation under the ZLB constraint in the 1990s and 2000s. He explained that there had been a strong consensus in society that employment should be maintained, which had generated excess labor and excess numbers of companies. He continued that, as a consequence, on the price front, companies had continued to face harsh competition, as their rivals were still there, and as for wages, employees had started to accept reduced wages in exchange for job security. He said that in Japan, the price-setting behavior based on the belief that there would be no change in prices and wages had spread widely among companies, giving rise to a kind of social norm. He argued that under this norm, inflation expectations had appeared to be anchored at 0%.

Then, he said that from 2013 onward, the BOJ had continued to provide high pressure to the economy by Quantitative and Qualitative Monetary Easing (QQE) and Yield Curve Control (YCC) and, together with various government measures, this pressure had resolved the original causes of deflation, namely demand shortages and consequent excess labor supply. As to the prospect of overcoming the deflationary norm, he noted that the answer was not so clear, but added that it was set to be dissolved by the final pressure exerted by the recent global inflation and continued labor shortages.

Lastly, he concluded his speech by saying that while the BOJ still had a challenge to anchor inflation expectations to 2%, the end of the battle was in sight.

From the floor, **Takatoshi Ito** (Columbia University) pointed out the difference in price dynamics between goods and services and questioned whether the norm had been dissolved for service prices, including utility bills. **Brunnermeier** mentioned that in Japan, many companies had survived the financial crisis, employment levels had been maintained, and workers had remained in low-productivity firms, which had resulted in a decline in the potential growth rate and the natural rate of interest, and he asked what the optimal growth rate of real wages and the optimal bankruptcy rate would have been. **Iwata** pointed out that given, developments in the real interest rate and the real economy, the natural rate of interest in Japan could have been much lower than everyone expected. In response to these comments and questions, **Uchida** agreed with

5. For details, see Uchida (2024).

the view that it is not clear whether the norm in service pricing has been resolved yet. He then replied that although uncertainties remained, if the change in the labor market was an irreversible structural change, then the norm in service prices would be likely set to be dissolved. He added that, if labor shortages continued to drive changes in firms' wage-setting and price-setting behavior, then eventually, labor shortages would possibly result in an increase in the natural rate of interest. He stressed the difficulty of estimating the natural rate of interest and agreed with Iwata's comment that the level could have been significantly low.

Reis mentioned the gap between the BOJ's inflation target rate of 2% and the actual inflation rate and asked whether the gap had damaged the BOJ's credibility as a central bank. He also noted that it might not have been problematic to have less than 1% average inflation over the past 25 years in light of the existence of menu costs. **Kažimír** asked about the consequences of the interaction between monetary policy and fiscal policy under the low interest rate environment over the last 25 years. **Uchida** replied that there were several views on why the BOJ had been unable to achieve the 2% target in the past, and that it was not so clear how these views had affected the BOJ's credibility. He continued that average inflation had risen slowly but steadily for the 10 years after the BOJ introduced the price stability target, and stated that the BOJ had succeeded in achieving a situation without deflation. Furthermore, he noted that during those 10 years, the BOJ had implemented monetary policies to make careful considerations in achieving a balance between the effects of the policy and negative side-effects. He also expressed the view that central banks should adopt policies to pursue their own price stability target, and they would not leave policy rates at low levels for the purpose of fiscal support after achieving the price stability target.

Jordan asked if there were any risks that the wages could rise sharply and inflation suddenly spike under the continued highly accommodative monetary policy. **Åsa Olli Segendorf** (Sveriges Riksbank) referred to a paper arguing that wage negotiations tended to be backward-looking in Japan, which was one of the causes of prolonged low inflation in Japan. She then asked how changes in wage negotiations could affect Japan's price dynamics in the future. **Uchida** replied that the BOJ was not so worried about upside risks such as wages and prices spiraling out of control at this moment because nominal wage growth had not yet caught up with past inflation. He also said that he would continue to pay close attention to the effect on price dynamics of the big changes in spring wage negotiations in the past two years.

V. Keynote Speech II: (Un)conventional Monetary Policy and Resilience

Brunnermeier discussed the conduct of conventional and unconventional monetary policy, focusing on resilience, or the ability of the economy to bounce back from a trough (a "resilience approach"). First, he explained the resilience approach by comparing it with two other well-known approaches: the risk management approach, which minimizes risk by taking into account economic forecasts and correlations among its variables; and the robustness approach, which aims at minimizing the damage when

a risk is materialized. He said that the resilience approach emphasized adaptability, which is the ability to adapt to new environments, and agility, which takes effective countermeasures promptly when a shock actually occurs. He argued that the resilience approach could achieve higher economic growth in the long run than the other approaches.

To further explain the resilience approach, he first added that macro-level resilience did not necessarily imply micro-level resilience. He pointed out that, for example, it had been important during the Japanese financial crisis in the late 1990s to encourage exit and entry of firms by allowing unproductive firms to go bankrupt. Secondly, he stressed that the nature of risk, rather than its magnitude, should be considered, and in order to maintain resilience it was essential to identify “traps” that prevent the economy from bouncing back and “tipping points” that could lead to a negative feedback loop. He mentioned financial crisis as an example of a trap that weakened resilience, adding that after a financial crisis GDP tended not to bounce back to the previous growth trend.

Next, he shifted his focus to monetary policy. He first argued that forward guidance faced a trade-off between commitment and resilience: when commitment is weak, the effect of forward guidance is limited, but when commitment is strong, the inability to adapt to changes in the external environment can undermine resilience, which may result in falling into a trap. He next discussed quantitative easing (QE), arguing that a large central bank balance sheet resulting from QE might invite fiscal dominance under which the government restricts the central bank’s actions, such as rate hikes, because of the negative impact on the revenue of the central bank. Moreover, he noted that these considerations might give rise to “implicit forward guidance” by facilitating market participants to form specific expectations that the central bank would not raise interest rates rapidly.

In view of these possibilities, to enhance resilience, he proposed the idea of preparatory QE, in preparation for an interest rate hike. He argued that when financial institutions were exposed to large interest rate risk, a rate hike could undermine financial stability, and therefore QE that absorbs financial institutions’ interest rate risk in advance could enhance resilience by providing room for the central bank to raise interest rates without ramifications. Moreover, he continued, if central banks had losses or negative equity, they could fall into the trap of credibility loss, depending on how this was perceived by the public. He then argued that it might be an option for central banks to consider changing the allocation of legally required reserves and excess reserves in order to bring down interest paid on excess reserves. He concluded his speech by mentioning a floating exchange rate system as an international mechanism to strengthen resilience.

During the Q&A session with the floor, **Schnabel** asked about the relationship between resilience and the anchoring of inflation expectations. She commented that if central banks were to change reserve requirement ratios, it should be discussed as part of monetary policy. She continued that financial institutions might avoid holding excess reserves in expectation of changes in reserve requirement ratios, which could weaken the effects of QE and generate redistributive effects. **Brunnermeier** replied that the anchoring of inflation expectations was paramount to resilience, and that changing reserve requirement ratios essentially changed the average interest rate faced by financial

institutions and thus could be viewed as a monetary policy tool. He agreed with Schnabel and added that changing reserve requirement ratios could generate redistributive effects, not only among banks but also from banks to non-banks and the government.

While agreeing that a floating exchange rate system increased resilience, **Uchida** mentioned that in response to the Fed's QE after the global financial crisis, it seemed that other central banks had had no choice but to follow suit. He argued that monetary policy approaches that increase global resilience should also be discussed within the central bank community. **Brunnermeier** responded that the current international monetary system allowed for some mitigation of negative shocks that occur in one country through the depreciation of home currency as an informal agreement, but he argued that it must not be allowed to go beyond that as a "beggar-thy-neighbor policy" and that policy coordination among central banks was important to build consensus.

Jordan commented that in response to preparatory QE, the banking sector could build up central bank reserves, but it would be subject to stress if there were an increase in legally required reserves that pay a zero interest rate. **Brunnermeier** responded that it was not necessary to absorb all the interest rate risk held by banks, but only to manage it to the extent that the impact of a rate hike does not undermine the stability of the financial system, and that in this case banks would be able to absorb the impact of an increase in the legally required reserve ratio. He stressed that QE should be seen as a policy to strengthen resilience to crises. **Gourinchas** asked whether QE as a preparatory tool would offer put options to banks, by promising to buy government bonds at a high price. **Brunnermeier** pointed out the importance of recognizing the possibility that interest rate risk in the banking sector could limit the pace of future rate hikes, adding that central banks did not necessarily have to purchase government bonds at a high price.

Ueda mentioned that the BOJ allocated some of its profits to provisions and asked whether this could be regarded as a measure to increase the adaptability for a future policy exit. He also asked how to think of the BOJ's purchases of risky assets such as ETFs in light of resilience. **Brunnermeier** responded that increasing the net asset value in the balance sheet was a prudent decision in terms of preparing for future losses. He added that the purchases of risky assets could be seen as a tool to increase the overall resilience of the economy in the sense that these purchases would ease the balance sheet constraint of financial institutions.

Evans asked about the consistency between the long-run neutrality of monetary policy and the assertion that the monetary policy in the resilience approach can achieve a better outcome in the long run than the other approaches. **Brunnermeier** replied that while monetary policy was neutral in the long run in a simple New Keynesian model, monetary policy could have long-term effects in a more complex model, such as a model in which monetary policy affects private investment.

Cochrane acknowledged the importance of the resilience approach, but asked whether it was really possible to know which state we were in and where the tipping point was. He also pointed out that if the reserve requirement ratio were raised but no interest paid on legally required reserves, financial institutions would find it difficult to pay interest to private depositors, as in the case of financial repression in the past. He also questioned the appropriateness of central banks taking on interest rate risk from

the market through QE, noting that the management of interest rate risk should be supervised by regulators and that such interest rate risk should essentially be absorbed by private bank capital. **Brunnermeier** replied that we should not give up identifying tipping points, etc. just because it was difficult, and that continued efforts would lead to some solutions. He continued that zero interest on legally required reserves could be seen as financial repression, but if the banking sector, due to its oligopolistic power in the deposit market, did not sufficiently pass on the interest rate on reserves to the interest rate on private deposits in the first place, it would act as a corrective force on banks to reduce the gap between the interest rate on reserves and the interest rate on deposits.

VI. Paper Presentation Sessions

A. Inflation, Monetary and Fiscal Policy, and Japan

Cochrane reviewed economic and price developments in Japan over the last 30 years and discussed the role of fiscal policy in explaining inflation.⁶ First, he provided a novel view that during the last 30 years, Japan had seen the best monetary policy outcome, namely a steady price level, the zero interest rate that comes together with no opportunity cost of holding money, and satiation of liquidity demand. He then argued that because monetary policy was neutral to the real economy in the long run, 30 years of stagnation was not the consequence of monetary policy but was due to other problems. He continued that, in the past, Japan had had a rapid period of catch-up growth and reached close to the technological frontier, represented for example by the U.S., and since then the economy has been growing roughly parallel to the technological frontier in terms of GDP per working-age population. He further noted that the bursting of the asset bubble could also be interpreted as part of the transition process to the frontier.

Next, he introduced the Fiscal Theory of the Price Level (FTPL) and pointed out that expectations on long-term fiscal sustainability played a key role in determining inflation. He explained that under the FTPL, inflation did not occur in response to an increase in outstanding government debt if people expected that the government bonds issued would be repaid by raising taxes or offset by cutting government spending in the future. On the other hand, he continued, inflation occurred when people believed that a part of the increased debt would not be repaid. He then pointed out that Japan's experience had provided decisive tests to tell which inflation theories are correct, and he emphasized that during the zero interest rate period, Japan's economy had experienced neither a deflation spiral nor price fluctuations due to multiple-equilibria. He argued that these observations were therefore more consistent with the FTPL than with the standard New Keynesian model. He also argued that the monetarism argument did not necessarily hold because inflation had not picked up even though a large amount of debt had been exchanged for money under QE.

Finally, regarding the post-pandemic inflation, he referred to the cross-country study by Barro and Bianchi (2023), pointing out that inflation was correlated with the ratio of fiscal deficit to public debt, which was consistent with the implications of the

6. For details, see Cochrane (2024).

FTPL. He added that the fact that the inflation rate had declined without a recession was also consistent with the FTPL's prediction. Turning to Japan, he argued that the reasons why Japan's inflation had been lower than other countries were threefold: an already high level of existing debt, a smaller relative size of fiscal expenditure, and a greater trust in the Japanese government.

As a discussant, **Nao Sudo** (BOJ) began by pointing out that the output gap in Japan had tended to be negative over many years since the early 1990s, and that observation suggested that the persistent demand shortage had kept inflation low. Regarding the FTPL, he noted that it was important for policymakers to identify the prevailing policy regime, i.e., whether the current regime was a combination of active monetary policy and passive fiscal policy or other combinations, because the policy implications differed greatly depending on the regime. Referring to Sunakawa (2024), he argued that the expectations of Japanese households on future government debt management and fiscal policy stance could be different from those of U.S. households, which possibly accounted for the difference in the inflation rate across two countries. **Cochrane** said that it was difficult to identify the regime, but insights into the regime would be obtained by examining what had happened during the zero interest rate environment that had continued for almost 30 years.

From the floor, **Schnabel** asked whether the effects of QE on broad money and inflation depended on economic circumstances such as the strength of the banking sector's balance sheet. **Cochrane** agreed and replied that central banks could not control the quantity of broad money such as M2. **Remolona** asked how international holdings of the U.S. dollar and U.S. Treasury securities would affect the FTPL discussions. **Cochrane** commented that demand for the U.S. dollar from foreign entities would lower the yield on the U.S. Treasury securities, but it did not affect the implications of the FTPL.

Ueda pointed out that in the late-1990s Japan's fiscal deficit had been growing, but the inflation rate had been negative, and asked, given that the FTPL holds, whether the observation could be evidence that people had viewed the increase in fiscal deficit as funded deficits. **Cochrane** argued that it was difficult to test the FTPL statistically, and that the credibility of the government should be tested from an economic history perspective rather than an econometric perspective.

Referring to high inflation in 2022, **Evans** said that it was natural to think of the cause of the high inflation as supply shocks at that time, such as disruptions in supply chains. He then asked how fiscal policy had contributed to rises in inflation. **Cochrane** replied that supply shocks themselves had caused only relative price changes, and that for the whole price level to rise, it was important to have some accommodative responses of monetary policy and/or fiscal policy. **Etsuro Shioji** (Chuo University) asked whether, contrary to the original intention of the policy, the BOJ's YCC had helped alleviate inflationary pressure through the mechanism of the FTPL by compressing the term premiums of JGB yields. **Jordan** asked what the results would have been if Japanese monetary policy had been more restrictive, and what policies would have made it possible to achieve 2% inflation earlier. **Mavroeidis** mentioned that the relationship between public debt and the inflation rate was just a correlation and not a causality. **Cochrane** admitted that it was a correlation but stressed that it was an inter-

esting observation. **Iwata** asked if persistent deflation should arise under Friedman’s rule. **Cochrane** explained that inflation rate had not become negative in Japan because both nominal and real interest rates had been close to zero.

B. On the Zero-Inflation Norm of Japanese Firms

Hogen presented an analysis on the “zero-inflation norm” of Japanese firms, i.e., the observation that firms kept their prices unchanged for a prolonged period.⁷ He first explained empirical observations on retail prices such as the frequency of price changes from the 1990s using the item-level and municipality-level microdata of Japan’s official Retail Price Survey, which is the base statistics for the Consumer Price Index (CPI). In particular, dividing the sample period into three phases, Phase I, the high inflation period from 1990 to 1994, Phase II, the low inflation and deflation period from 1995 to 2020, and Phase III, the recent high inflation period from 2021 to 2023, he pointed out that the zero-inflation norm had been more prevalent during Phase II and more pronounced in the services sector than in the goods sector. He also pointed out that, from Phase I to II, in the services sector the frequency of price increases had declined noticeably while that of price decreases had risen modestly, giving rise to a zero-inflation norm in Phase II.

He then introduced a simple menu cost model and discussed how the zero-inflation norm was formed. Based on the simulation analysis using the model, he argued that at most roughly half of the emergence of the norm was explained by a decline in the actual inflation rate from Phase I to II, and that in order for the model to fully account for the emergence of the norm, there must have been additional changes from Phase I to II, such as increases in menu costs and increases in the degree of strategic complementarity in price setting. He stressed that in Phase II, firms had become less active and more cautious regarding price changes than the model suggests.

As a discussant, **Paolo Pesenti** (Federal Reserve Bank of New York) raised three questions: Was the emergence of the zero-inflation norm specific to Japan?; What were the relevant narratives that explain the timing and persistence of the zero-inflation norm?; Was the norm over by now, or could it be repeated? **Hogen** replied that the zero-inflation norm was not necessarily specific to Japan because it was observed in the past in other countries, and the standard menu cost model at least partly explained the emergence of the norm. Regarding the narratives, he argued that under a secular decline in the neutral rate and the binding ZLB constraint since the early 1990s, firms had faced harsh price competition, and thus they had become less active and more cautious regarding price changes. Finally, he commented that thus far, the norm was set to be dissolved, but whether or not the norm would emerge again was uncertain, since the observations about changes in the menu cost and the degree of strategic complementarities in the past implied that they could change in the future.

From the floor, **Cochrane** asked if the model exercise tried to explain the zero-inflation norm or tried to show the limitations of a menu cost model. He also asked how the paper dealt with seasonality and temporary sales in the price data analysis. **Hogen** replied that the emergence of the zero-inflation norm could be attributable to

7. For details, see Furukawa *et al.* (2024).

various factors, such as increases in menu costs and increases in the degree of strategic complementarity, so that it was difficult to fully explain it with a single factor. He added that the price data analysis focused on regular prices. **Orphanides** asked if households' perceptions about unfairness in price changes were captured in the model. **Hogen** replied that though the model did not capture perceptions regarding unfairness in price changes explicitly, some aspects of unfairness could be implicitly reflected in changes in the strategic complementarity. **Olli Segendorf** asked how sectoral differences in wage setting and corporate profits had affected the zero-inflation norm. **Hogen** replied that the wage setting mattered significantly and pointed out that since the early 2000s many firms had been trying to secure profits under the pressure of declining price markups by reducing their labor costs through the hiring of part-time workers, especially in the non-manufacturing sector. **Iwata** asked how the aging in society had affected the zero-inflation norm. **Hogen** replied that aging could have indirectly affected the zero-inflation norm; for example, firms might have shifted their economic activities such as investment from Japan to abroad due to the decline in domestic demand.

C. Testing the Effectiveness of Unconventional Monetary Policy in Japan and the United States

Mavroeidis discussed the effectiveness of unconventional monetary policy, and presented empirical analyses for Japan and the U.S.⁸ First, he introduced two opposing views about the effective lower bound (ELB) on the short-term interest rate—a conventional monetary policy instrument: one view is that the ELB limits the effectiveness of monetary policy, and another is that the ELB does not constrain the effectiveness if unconventional monetary policy is powerful enough. He added that the latter view is called the “irrelevance hypothesis,” in the sense that the ELB is irrelevant to the effectiveness of monetary policy. He explained that a dynamic stochastic general equilibrium (DSGE) model was developed to explain the hypothesis, and that the statistical tests of the hypothesis were derived from the micro-founded DSGE model.

He said that the irrelevance hypothesis was firmly rejected by the tests that use data for Japan and the U.S. He stressed that the economic dynamics depended on whether the ELB constraint was binding or not, and that the hypothesis that the ELB is irrelevant to the conduct of monetary policy was strongly rejected by the data. He then raised the question of to what extent unconventional monetary policy has been effective under the ELB, and he explained the estimation results of the structural VAR that accounts for the ELB. He explained that, as suggested by the rejection of the irrelevance hypothesis, the effects of an unconventional monetary policy shock were smaller than those of a conventional monetary policy shock on the impact of the shocks. However, he added that the effects of unconventional monetary policy were greater with a lag in some cases. He pointed out that, for Japan especially, an unconventional monetary policy shock had a stronger positive effect on inflation and output gap with one-and two-year lags than a conventional monetary policy shock. He concluded that in evaluating the effectiveness of unconventional monetary policy it was essential to take into account

8. For details, see Ikeda *et al.* (2024).

the ELB and the time horizon of its effects.

As a discussant, **Olli Seğendorf** said that the paper had valuable policy implications for monetary policy in practice. Regarding the state-dependent effects of unconventional monetary policy, she asked whether the effects could be different during a financial crisis and in normal times as well as in the ELB and non-ELB regimes. She also asked whether the effects of QE could be different depending on the maturity of the bonds purchased. **Mavroeidis** agreed with the view that the policy effects are state-dependent, and that it was possible to analyze differences in the effects of monetary policy in various states by extending the model.

From the floor, **Reis** asked whether the results of the paper remained unchanged if a two-year interest rate is used instead of the ten-year interest rate as the long-term interest rate. He also pointed out that changing inflation expectations was important for policy implementation under the ELB, and asked if the paper's framework could include such a mechanism. **Mavroeidis** replied that the results of the paper remained unchanged even if a two-year interest rate is used, and agreed with the importance of the analysis focusing on inflation expectations. **Orphanides** questioned whether the analytical framework of this paper could capture changes in the central bank's policy reaction function. He also asked how the authors had dealt with measurement errors for output gaps used in the estimation. **Mavroeidis** replied that the analytical framework of the paper could capture changes in the central bank's policy reaction function by using a regime-switching model, and that measurement errors might affect the estimation results, but this problem could be addressed by estimating the model where the output gap is included in the model as an unobservable variable. **Uchida** asked about the mechanism behind the empirical results that show unconventional monetary policy has had small effects at short horizons but large effects with a lag. **Mavroeidis** replied that the results were based solely on empirical analyses, and it was an important research agenda for theory to explain the mechanism behind the empirical results.

Shioji and **Mototsugu Shintani** (The University of Tokyo) asked whether it is possible to empirically analyze the effects of different unconventional monetary policies separately, considering that Japan's unconventional monetary policy framework had changed several times in the past, such as the introduction of QQE and YCC, and so on. **Mavroeidis** answered that when calculating the impulse response functions, the effects of unconventional monetary policy were captured basically by the shadow rate in the current model, and it was possible to analyze the specific effects of different policies by extending the model. **Hibiki Ichiue** (Keio University) asked how the authors determined the specific level of the ELB, and how much a change in the level of the ELB would affect the estimation results. **Mavroeidis** replied that the level of the ELB was determined in line with previous studies, and the robustness of the estimation results had been checked regarding the level of the ELB.

D. Conventional and Unconventional Monetary Policies - Inflation and Resources

Reis systematically reviewed conventional and unconventional monetary policy tools, and the interest rate paid on reserves, using a simple model that consists of an arbitrage

condition regarding safe assets.⁹ He then discussed the effectiveness of each policy tool in achieving the target rate of inflation.

First, he explained the control of the short-term nominal interest rate (policy rate)—a conventional monetary policy tool. He said that the real interest rate was equal to the policy rate minus inflation expectations in the absence of non-interest benefits of holding safe assets (i.e., convenience yields). He explained that, in this case, the inflation rate was determined by a feedback rule, widely known as the Taylor rule, where the policy rate was adjusted more than changes in the inflation rate. He pointed out that the effectiveness of conventional monetary policy also depended on private sector expectations, and thus the conduct of monetary policy called for transparency and clear communication, in addition to grasping the state of the economy, including the natural rate of interest.

He then mentioned that the economy could fall into a deflationary equilibrium due to the ELB on the policy rate when hit by large negative shocks, and that unconventional monetary policy had been deployed to avoid such a situation. He said, however, that forward guidance would not work if the commitment of central banks is not trusted by economic agents. He mentioned that QE worked by influencing convenience yields in a simple model, but, in practice, the problem was that QE could not affect the inflation rate without purchasing a huge amount of bonds. He argued that, for these reasons, unconventional monetary policy was less effective than conventional monetary policy, except for some special circumstances where the economy falls into the deflationary equilibrium, and he stressed that unconventional monetary policy could not be a substitute for conventional monetary policy.

Finally, in addition to achieving the inflation target, he discussed reserve policy from the perspective of liquidity provision and seigniorage. He argued that by paying interest on reserves, central banks could manipulate both the policy rate and the reserve volume separately, allowing them both to achieve the inflation target by manipulating the policy rate and to provide liquidity by controlling the reserve volume. In addition, he mentioned that introducing a tiered structure in reserves could solve issues regarding the heterogeneity of banks, including oligopoly, and a decrease in central bank profits due to interest paid on reserves.

As a discussant, **Masazumi Hattori** (Hitotsubashi University) provided an overview of the change of the BOJ's policy tools from conventional to unconventional monetary policy. He then explained that the unconventional monetary policy had been supposed to be transmitted to the economy by lowering the cost of financing, by lifting up inflation expectations, and by the resulting decline in the real interest rate. He also pointed out that the banking sector played an essential role in these transmission mechanisms. **Reis** agreed with the importance of the banking sector, and he replied that monetary policy transmission mechanisms called for proportional changes in private banks' lending rates and deposit rates in response to changes in the interest rate on reserves.

From the floor, **Brunnermeier** asked how the model's assumption on the timing of exogenous shocks affected the results, and whether there might be other benefits

9. For details, see Castillo-Martinez and Reis (2024).

to liquidity in addition to convenience yields. **Reis** replied that the assumption itself does not significantly affect the results, and that liquidity benefits in the form of convenience yield were sufficient when it came to controlling inflation. **Jordan** pointed out that policy effects of interest paid on reserves could be different in the case of an increase in the reserve demand, for instance, when private financial institutions run into funding difficulties. **Reis** replied that the problem could be avoided by controlling the amount of reserves and the interest rate on reserves separately. **Evans** commented that Reis's presentation suggested that there would be no benefit in implementing QE unless the policy rate was constrained by the ELB, and **Reis** agreed with his comments. **Gourinchas** pointed out that controlling seigniorage as a policy tool may be better understood as fiscal policy rather than monetary policy, given that central banks take into account the transfer to the government. He also asked what the primary role of commercial banks would be if central banks were to begin to provide reserves directly to individuals, such as the retail Central Bank Digital Currency (CBDC). **Reis** replied that controlling seigniorage could be understood as fiscal policy, but added that it was not appropriate to call it fiscal policy in the context of this research because of its focus on the efficient provision of liquidity as opposed to the maximization of central bank profits. In addition, he said that it would be possible for central banks to set different interest rates on central bank liabilities such as those provided directly to individuals, e.g., the retail CBDC, and those held by private banks.

Carlos Garriga (Federal Reserve Bank of St. Louis) asked about the implications of this research for the easing effect of QE on financial conditions. **Reis** pointed out that QE was inferior to conventional monetary policy in achieving an inflation goal because QE could have different effects on the real economy, including the easing effect on financial conditions, but central banks cannot precisely control the magnitude of those effects. **Rehn** pointed out that the reason why there had been only a limited effect in raising inflation despite the implementations of various types of unconventional monetary policy in Japan might be that economic agents had not recognized newly introduced unconventional policy measures as a "meaningful change." **Reis** replied that it was always hard to steer expectations too finely, but that in relative terms it was less hard to anchor them with conventional monetary policy than it was with unconventional monetary policy.

VII. Policy Panel Discussion I

In the Policy Panel Discussion I, moderated by Orphanides, five panelists, Evans, Gourinchas, Rehn, Remolona and Vasle, discussed price dynamics.

A. Remarks by Moderator and Panelists

Orphanides kicked off the discussion by raising two issues: the dynamics of inflation had yet to be fully understood; and the Phillips curve, which plays a central role in the standard inflation forecasting model used by many central banks, had not worked well. He then asked the panelists what direction central banks should take going forward.

Evans reviewed the inflation performance during his tenure as the president of the Chicago Fed (from September 2007 to January 2023), showing that, while inflation had been below the 2% price stability target for most of the pre-pandemic period, the surge in inflation since the pandemic had pushed up the average inflation rate since 2007 to around 2%. He noted, however, that “bygones were bygones” under inflation targeting policy, meaning that inflation undershooting the target was something that did not need to be compensated for, and that we had learned the lesson that households and firms were extremely disgruntled with high inflation and large changes in relative prices. Next, he mentioned that central banks had been slow in switching to a tightening policy stance during the period of high inflation, and then presented a former Fed researcher’s analysis on counterfactual simulations. He continued and explained that if the Fed had started raising rates in 2021 instead of 2022, inflation would have fallen to 2% somewhat faster, however, the peak inflation rate would have remained the same.

Rehn assessed that the main causes of high inflation in the euro area were the supply shocks caused by the pandemic and the surge in energy prices after the Russian invasion of Ukraine, and that wage inflation had been moderate during this period, contributing to a reduction in inflationary pressure. He noted that recently the principal driver of inflation had shifted from rising energy prices to wage inflation, reflecting the high inflation of recent years and the strong demand for labor, but added that inflation expectations had been anchored. He called for deeper analyses of structural changes in the labor market, such as immigration trends, to understand the ongoing dynamics of inflation. Finally, he stated that while inflation was approaching the ECB’s medium-term objective, the ECB would not pre-commit to any interest rate path and would continue to conduct monetary policy by assessing the incoming data at each meeting.

Remolona reviewed inflation developments in the Philippines since the pandemic and acknowledged that the policy response had been behind the curve. He then noted that supply shocks had been judged to be disregarded during the initial phase, but subsequent analysis showed that supply shocks had a second-round effect from inflation expectations. In particular, he presented survey evidence indicating that recent increases in the price of rice, which is an important commodity in the Philippines, had had a significant impact not only on actual inflation but also on households’ inflation expectations. He also presented the results of an analysis regarding the response of inflation expectations to rice and oil price shocks, showing that inflation expectations were more responsive to positive shocks than to negative ones. He then explained that this asymmetric response might explain why the second-round effect was persistent.

Vasle noted that the inflation rate in the euro area had begun to decline due to the significant interest rate hikes by the ECB during the period when supply shocks had receded. Turning to differences between the euro area and the U.S., he pointed out that on the supply side, the euro area had been affected more by the rise in energy prices because of its geographic proximity to Russia and high energy dependence on Russia, and on the demand side, the pace of post-pandemic demand recovery had been relatively slower in the euro area than in the U.S. He also laid out concerns in grasping future inflation dynamics as follows: (1) labor market developments and wage formation mechanisms across the 20 euro area countries are quite heterogeneous; (2) there is great uncertainty about the relationship between services price developments, wages,

and corporate profit margins; (3) fiscal tightening in individual countries has been lagging behind the ECB's monetary tightening; and (4) the monetary policy stance in the U.S. and in the euro area started to diverge.

Gourinchas presented an analysis of the evolution of headline inflation in major advanced and emerging economies since the pandemic, studying the contribution of each factor to the run-up to the peak and to the subsequent decline in the inflation rate. He explained that the analysis decomposed changes in headline inflation into (1) headline shocks caused directly by price shocks such as an energy price shock, and (2) the effects on core inflation exerted by economic slack and the pass-through. He pointed to the findings that in most major countries, a large part of inflation fluctuations can be explained by price shocks from energy and food prices and their pass-through to core inflation, and that the factor related to labor market slack had a limited contribution to pushing up the inflation rate. He then showed that the degree of pass-through to core inflation of energy price changes varied considerably across countries, and he pointed out that in addition to energy price movements, the individual factors that determine the degree of pass-through to core inflation of energy price were also important. He stressed that inflation expectations had been anchored throughout this episode, which had played an important role in inflation dynamics, and noted that synchronized tightening of monetary policy across most major economies might have contributed to a faster decline in energy prices and inflation by suppressing aggregate demand.

B. Discussion between the Moderator, Panelists and Floor Participants

Referring to Gourinchas's estimation result that slack factors had a limited impact on inflation, **Orphanides** reiterated the difficulty of forecasting inflation using the Phillips curve. He then asked what lessons had been learned about inflation dynamics from the experience of the past few years. He noted that there had been signs of a de-anchoring of inflation expectations, which could have contributed to the rapid rate hikes since 2022. He then asked for the panelists' views on the role of inflation expectations and their anchoring.

Evans argued that the explanatory power of the Phillips curve had declined as a result of a combination of different supply shocks, and that the slack factor remained important. He said that the lesson was that central banks had followed the standard approach of ignoring transitory supply shocks in spite of an atypical situation in the current episode. He added that the Fed's policy actions since the start of the rate hike had been swift, and that importantly long-term inflation expectation had remained stable. Referring to Gourinchas's analysis, **Rehn** asked whether there had been a relationship between the degree of pass-through of energy prices to core inflation and the degree of anchoring of inflation expectations. He noted that the situation in Europe in the first half of 2022 had been very uncertain following the situation surrounding Ukraine, which had led the ECB to take a wait-and-see approach. However, he assessed that subsequent rate hikes had been quick, contributing to keeping inflation expectations anchored. **Remolona** mentioned that monetary policy management during this period had been difficult due to the problem of measuring the degree of anchoring of inflation expectations, the output gap, and the neutral rate. **Vasle** said that there had been periods of high inflation in the past comparable to the current one, and that the credibility

built by the ECB over time and strong policy responses had helped to keep inflation expectations anchored this time.

Orphanides asked Gourinchas whether taking into account pass-through effects of price shocks could be a lesson for improving inflation forecasting models. **Gourinchas** replied that the standard Phillips curve framework remained sufficiently useful, and it had become clear that if central banks disregard overheating of the economy or large fluctuations in relative prices, core inflation could be significantly affected. In addition, he noted that it was an intriguing observation that the price-cap policy implemented by many countries to prevent increases in energy prices had led to a reduction in the pass-through of energy prices to core inflation, which in turn suppressed rising headline inflation. Regarding inflation dynamics, he replied that the analysis suggested that short-term inflation expectations affected actual inflation more than previously believed. He assessed that although there might have been signs of a temporary de-anchoring of inflation expectations, central banks had been able to successfully re-anchor inflation expectations during this period.

Orphanides then asked about the lessons learned for the conduct of monetary policy from the experience of the past four years. **Evans** said that it was important for central banks to take aggressive policy measures when the real economy and inflation were not on the right trajectory. **Rehn** said that one of the reasons why central banks in both advanced economies and developing economies had prevented stagflation in the current episode was that they had secured independence and built credibility about the price stability goal. **Remolona** pointed out that if the degree of anchoring of inflation expectations could be measured, the conduct of monetary policy could be implemented systematically by incorporating such information into the policy rule. He added that it was conceivable that central banks would become more aggressive in fighting inflation if the de-anchoring of inflation expectations becomes more likely. **Vasle** noted that policy instruments that had once been regarded as unconventional could now be regarded conventional. **Gourinchas** said that the current policy framework had worked to suppress high inflation without causing a major recession so far, but he argued that the effectiveness of this framework had yet to be tested in a severe environment where both persistent inflationary pressures and recessions occur simultaneously.

From the floor, **Taylor** said that more discussion and analyses would be needed to verify whether central banks had been behind the curve. **Jordan** asked about the implications of Gourinchas's analysis for central banks' appropriate policy responses to supply shocks. He also asked how the recent episode in the euro area should be understood, where the argument against quick rate hikes had been dominant in 2021 due to well-anchored inflation expectations, but large rate hikes had been required thereafter. **Schnabel** asked for views on service price inflation becoming persistent around the world. Referring to research showing that individual past inflation experience influences inflation expectations, she asked whether the experience of inflation in the current episode would make monetary policy more difficult in the future by making expectations more fragile to new shocks.

In response to Taylor's comment, **Rehn** said that one of the lessons from the ECB's monetary policy in the current episode was that forward guidance on the sequence of monetary tightening had reduced the flexibility of policy management. **Remolona** re-

sponded that central banks had indeed fallen behind the curve and pointed to evidence that they had to raise rates by 75 basis points. **Gourinchas** said that the lessons learned were two-fold: forward guidance should be reconsidered, and persistent supply shocks should not be ignored. Regarding Schnabel's first question, he replied that he was reasonably confident that services inflation would moderate in the future, as the relative prices of services and goods had returned to their pre-2019 trends. Turning to Schnabel's second question, he noted that in the current period, central banks had consumed some of the capital, i.e., credibility, that they had built up, and, therefore, their ability to respond to inflationary pressures caused by supply shocks in the future might be weaker. **Vasle** said that in retrospect, it was clear that central banks had fallen behind the curve, but he mentioned that in assessing the appropriateness of policy actions at the time, it was necessary to take into account the special circumstances in which severe shocks had occurred one after another. He then said that the destabilization of short-term inflation expectations was one of the factors that led the ECB to take its policy responses. **Evans** said that various scenario analyses of monetary policy had been conducted, and that robust conclusions had been reached regarding whether central banks had fallen behind the curve. He added that a more difficult question was whether it had been premature to stop raising rates at 5.3% (on a reverse repo rate basis), saying that he personally did not think so.

Brunnermeier expressed concern that market participants may have interpreted forecasts as more optimistic and accommodative than policymakers intended. He also asked how changes in working styles, including working from home, had affected inflation dynamics. Highlighting the fact that inflation around the world had been well above the 2% price stability target, **Cochrane** wondered why there was no systematic study of exactly what mistakes central banks had made. **Himino** asked how to interpret the simulation results in Evans's presentation, given that the results were similar despite the major differences in policy responses. In response to Himino's question, **Evans** agreed with the view that there are several interpretations of the assumptions and the results of the counterfactual simulation using models. He then commented that these sorts of counterfactual simulations were often conducted by the Fed, and the Fed might have been trying to stockpile the lessons learned from the post-pandemic episode. **Garriga** asked how central banks, in the conduct of monetary policy, took into account the fact that a rise in interest rates can have a significant effect on households with large mortgages with floating interest rates.

Remolona agreed with Cochrane's point and replied that he thought central banks should conduct more ex post policy reviews. In response to Brunnermeier's question about the formation of market participants' expectations, **Rehn** said that he thought it was important to communicate clearly and consistently about policy board decisions. Turning to changes in the labor market, he said that while he had yet to have a concrete answer, a recent characteristic was that working hours had not increased as much as the labor force participation rate. As related examples, he noted that Friday in Finland was now part of the "long weekend" because of the widespread use of working from home, and that in Germany, labor unions demanded shorter working hours rather than higher wages. He also mentioned that he was fully aware of the existence of fixed and floating rate loans as a complicating factor in the transmission of the effects of monetary pol-

icy. **Vasle** also responded that considerable resources had been devoted to analyzing structural changes in the labor market, and that large differences in mortgage contract practices across euro area countries complicated the conduct of monetary policy. **Evans** looked back on the recent episode, and he said that a recession would have been necessary to achieve the 2% inflation target in the recent situation where large changes in relative prices of goods and services had occurred. He argued that the most important thing during this period had been to limit the damage of the recession while preventing a permanent change in inflation expectations. **Gourinchas** noted that many forecasting models used by central banks, etc., were linear, which made them good at capturing responses to small shocks, and that more accurate nonlinear models would be needed for economic forecasting with large shocks, such as those in the recent episode. **Rehn** noted that even if advances in economics allow for deeper understanding of the dynamics of the macroeconomy, expert judgment by humans would continue to be necessary in times of high uncertainty.

Orphanides concluded the panel discussion by saying that it was a welcome change that central banks had become more open about regular policy reviews, and that recent experience offered valuable opportunities to improve the monetary policy framework and policy management.

VIII. Policy Panel Discussion II

In the Policy Panel Discussion II, moderated by Brunnermeier, five panelists, Bowman, Jordan, Mester, Schnabel, and Himino, discussed the effects of conventional and unconventional monetary policy.

A. Remarks by Moderator and Panelists

Brunnermeier first introduced the theme of the panel discussion, “the effects of conventional and unconventional policy instruments.” He said that he expected all panelists to express their views and participants to have lively discussions from the floor especially on forward guidance, communication, asset purchases, QE, and foreign exchange interventions. He then moved on to remarks from each of the panelists.

Mester discussed forward guidance and communications. She first stated that forward guidance about the future path of the policy rate could be effective under the ELB by affecting long-term interest rates, and assessed that forward guidance was a useful policy tool. However, she pointed out that forward guidance faced two challenges. She argued that the first challenge was about communications on commitment. She continued that since the effectiveness of forward guidance depended on the strength of the commitment to the future policy path, policymakers often faced time inconsistency problems. Next, she argued that the second challenge was about communications on policy reaction functions. She acknowledged that building public understanding of forward guidance was challenging in practice because forward guidance was a policy that promises temporary deviations from normal behavior. To address these issues, she made two recommendations: “use their own words” and “connect the dot plots with economic projections.” Regarding the former recommendation, she pointed out that in-

stead of focusing on short and concise communications, policymakers should use their own words to manage narratives. With regard to the latter, she recommended that the FOMC connect the participants' dots, i.e., their projections of the federal funds rate, to their economic projections in the Summary of Economic Projections (SEP), rather than keeping them separate, so that people could more easily understand their reaction function.

Bowman focused on the use of the central bank balance sheet as an unconventional monetary policy tool.¹⁰ She first assessed that the Fed's QE (Large-Scale Asset Purchases: LSAPs) following the global financial crisis (GFC) contributed to the decline in long-term interest rates, by reducing term premia. She argued that the QE after the GFC could be considered a success, with the unemployment rate having fallen and the inflation rate having remained close to 2 percent during the period of QE. She then mentioned balance sheet policy during the COVID-19 pandemic. She stated that the FOMC had deployed large-scale asset purchases starting in March 2020 to restore the functioning of financial markets, to support financial stability, and to provide monetary policy accommodation, and that the pace of such purchases during the pandemic period had been much greater than during the previous QE episodes. However, she wondered whether the FOMC should have conducted such large purchases of agency MBS (Mortgage Backed Securities) into late 2021, given the underlying strength of the housing market relative to the GFC. Moreover, given the high level of fiscal support to household and businesses, she raised the question of whether the FOMC should have made such large purchases of Treasury securities over such a long period of time. She pointed out that because the effects of QE could depend on the economic and financial system conditions, policymakers had to balance the risk of "doing too little" against the risk of "doing too much" depending on the situation.

Schnabel argued that asset purchases could be a powerful tool when financial markets were in turmoil, but outside these periods, central banks needed to carefully assess whether the benefits of asset purchases outweigh the costs.¹¹ With respect to how asset purchases work, she said that there were three main transmission channels: (i) the signaling channel, (ii) the liquidity channel, and (iii) the portfolio rebalancing channel. She then argued that the experience after this great inflation was likely to have significantly weakened the role of the signaling channel as the response by central banks worldwide to the surge in inflation was a forceful reminder that policymakers cannot tie themselves to the mast of a ship as Odysseus did in Greek mythology. She continued that central banks can only credibly communicate about the likely future direction of monetary policy in a "Delphic" way – that is conditional on how the economy evolves. Regarding the liquidity channel, she stated that the experience of the past 15 years suggested that this channel had been effective in stabilizing the financial markets, for example, during the COVID-19 pandemic and the "dash for cash" in the U.S. Finally, she mentioned that the portfolio rebalancing channel was a primary part of the stimulus effect on aggregate demand in the vicinity of the ELB. She noted, however, that the evidence since the GFC suggested that the effects of QE on yields, activity and prices were state-dependent and have been found to be smaller outside crisis periods, when

10. For details, see Bowman (2024).

11. For details, see Schnabel (2024).

balance sheet constraints and limits to arbitrage are less binding (For details, see Schnabel (2024)). She argued that asset purchases come with side effects and these effects might be higher than those of the other conventional monetary policies.

Jordan shared the experience of the unconventional monetary policy implemented by the Swiss National Bank (SNB) to ensure price stability, namely the foreign exchange interventions and the negative interest rate policy. He stated that since the Swiss franc was regarded as a safe haven currency and the foreign interest rate cuts had compressed interest rate differentials, Switzerland had experienced a massive inflow of funds and appreciation of the Swiss franc after the GFC. He said that this overvaluation of the Swiss Franc had made financial conditions substantially tight because the Swiss economy was closely linked to the exchange rate. He explained that QE had not been considered as a viable option to deal with the situation. The SNB had instead decided to adopt foreign exchange interventions and the negative interest rate policy. He stated that while those policies had helped to protect the Swiss economy from deflation, there had been several negative side effects, such as rapid expansion of the central bank balance sheet, the impact of the negative interest rate on financial institutions, and the impact on asset prices, especially real estate prices. He emphasized that although unconventional measures were beneficial, there were also negative side effects, and he pointed out the importance of a cost-benefit analysis when making a judgment about the usefulness of unconventional measures.

Himino shared the BOJ's experience of using the widest range of unconventional instruments for the longest period of time. He stated that forward guidance had better be conducted based on the state of the economy rather than the calendar, and on outlook than on outcome. He added that QE was particularly effective when the financial markets were under stress, and that the transmission of the negative interest rate policy depended significantly on the competitive structure of the banking sector. He stated that although there was some concern that exiting the YCC might cause disruptions, the BOJ's experience suggested that it was possible to make a seamless transition from the YCC to regular QE, at least under certain circumstances. He raised the question of the appropriateness of using unconventional policy instruments for a long time in non-crisis periods while recognizing some of the unconventional policies are already in the standard toolkit of many central banks. He also mentioned that the transmission channels of unconventional monetary policies include changes in asset prices, such as real estate and stock prices, or foreign exchange rates, and he raised the question of how we should incorporate the asset price context in which unconventional instruments operate into the analysis of the roles they play.

B. Discussion between the Moderator, Panelists and Floor Participants

Brunnermeier asked the panelists about the side effects of prolonged unconventional monetary policy and whether central banks should simultaneously design an exit strategy when launching unconventional monetary policy in the future. He also asked what kind of guiding principle should be provided regarding the size of central bank balance sheets.

Mester argued that having an exit strategy when central banks start the unconventional monetary policy, or at least having an idea of the criteria and the timing for an

exit, would be helpful and a good way to discipline central banks. She also mentioned that central banks needed to consider the optimal maturity composition of their balance sheets in case QE was utilized again in the future. **Bowman** agreed with Mester and argued that it was important to reduce the balance sheet size as much as possible. She continued that, in deploying asset purchases, central banks would need to distinguish whether it is in response to a severe economic crisis or in response to an increase in volatility in particular markets. **Schnabel** agreed with the previous discussions on the necessity of an exit strategy. Regarding the persistence of QE, she stated that the ECB's Targeted Longer-Term Refinancing Operations (TLTROs) could effectively ease financial conditions, avoiding the side effect inherent in QE whereby it takes longer to reduce balance sheets, because the size shrank automatically as private banks began to repay their outstanding loans. In addition, she explained that the eventual size of the balance sheet depended on the framework of market operations. In the process of reducing balance sheet size, she noted that central banks had to choose either to maintain (i) the "supply-driven floor system" that had been adopted as a result of QE, or alternatively, to make a transition to either (ii) a "demand-driven system," where the marginal unit of reserves is provided on demand through regular refinancing operations, or (iii) the "corridor system" that was widespread before the GFC. She explained that the ECB had chosen a demand-driven system because it allowed the ECB to reduce the balance sheet size while avoiding disruptions in the money markets. She also pointed out that a cost-benefit analysis should be conducted from a long-term perspective, as most of the side effects of unconventional monetary policy may materialize only with a considerable time lag.

Jordan first pointed out that central banks should use foreign exchange interventions only as long as needed, and negative interest rate policies should be maintained for as long as necessary. He assessed that it was difficult to clearly define exit strategies for unconventional monetary policy soon after its introduction. He also stated that when the SNB had been trying to reduce the size of its balance sheet, it also aimed at minimizing the impact on financial conditions. He agreed with Schnabel's remark on the importance of a cost-benefit analysis, but he also stated that such an analysis might be difficult to conduct during the crisis. **Himino** mentioned that the BOJ had to be more patient about the policy exit than in other jurisdictions because inflation expectations in Japan needed to be anchored at 2% in contrast to other jurisdictions where inflation expectations were well anchored. He also stated that, given the size of its current balance sheet, the BOJ still had lots of time to think about the eventual size of its balance sheet.

From the floor, **Cochrane** asked whether it was possible to argue that the benefits and costs of QE had been small, given that such a large-scale QE as that conducted in Japan, which had been larger than in other jurisdictions, had had a limited effect on inflation. He also asked, especially with respect to the U.S., whether the low interest rate environment had been prolonged by flexible average inflation targeting or whether commitment to maintaining the low interest rate environment had been violated. Regarding the cost of QE, for example, **Himino** mentioned that market price discovery functions in the government bond market had deteriorated in the sense that pricing does not fully reflect changes in the real economy and financial conditions due to the BOJ's

significant presence in the secondary market of government bonds. **Mester** replied that there was great uncertainty about making the appropriate policy decision at the appropriate time, adding that, in some circumstances, central banks might abandon forward guidance and might give up time consistency. **Schnabel** commented that forward guidance had certainly limited the central bank's policy flexibility, though the ECB did not adopt flexible average inflation targeting.

Reis asked about the role of lending facilities as an unconventional policy tool, mentioned by Schnabel, and asked about how to deal with the problem that demand of reserve is volatile when reducing the balance sheet size. **Schnabel** replied that if central banks could revive the interbank market function that absorbs daily local liquidity shocks, central banks did not have to worry very much about large fluctuations in the size of their balance sheet. **Bowman** shared the experience of when the FOMC resumed balance sheet growth in October 2019 to ensure that the level of reserves remained ample against the background of high market volatility, such as the spike in repo rates, and added that this type of policy should only be used when absolutely necessary.

Remolona mentioned that forward guidance tended to be seen as a standard policy tool, and he asked whether we needed to distinguish clearly between unconventional monetary policy and forward guidance. **Jordan** replied that it was hard to distinguish clearly between the two since forward guidance did not have an exact definition; it could, for example, include a broader meaning such as an explanation of the transmission mechanism and the policy reaction function. **Orphanides** asked why policymakers could not provide guidance on the exit strategy, while acknowledging some degree of discretion as the exit depends on actual and expected inflation. **Jordan** replied that the reason policymakers are reluctant to announce the exit from unconventional policies at an early stage is the relatively high risk of being misunderstood when the exit is in the distant future. **Bowman** agreed with Jordan's reply.

Uchida mentioned that it could be argued that the effect of QE and quantitative tightening (QT) is asymmetric and the effect of QE is greater than that of QT, due to the announcement effects associated with government bond purchases for monetary easing, and asked why the empirical results in the study mentioned by Schnabel suggest that the stock effect is almost the same during QT and during QE in the euro area. **Schnabel** responded that the stock effect during QE and during QT could be almost symmetrical since QT was also associated with the announcement effect through the central bank's communication to the public but noted that the effects may be weaker as QT is implemented more gradually.

Regarding communications on policy reaction functions mentioned by Mester, **Pe-senti** asked whether it was possible to improve communications by publishing communication tools such as a consensus forecast. **Mester** agreed that it was an option, but added that there was room for improvement in the SEP. She continued that, to improve communication, the SEP had actually started to show confidence bands around the median of projection. **Schnabel** commented that it would be better for effective communication to show several scenarios based on different assumptions than to show only one realistic scenario. In contrast, **Jordan** noted that the SNB was distinct in the sense that foreign exchange market interventions were used to fulfill its monetary policy

mandate, and therefore, unlike other central banks, the SNB had tried to have homogeneous communication because heterogeneous communications would have a negative impact on the effectiveness of foreign exchange interventions. Regarding communication, **Himino** added that speaking to various economic agents and listening to them were equally important, and that such two-way communication would help build public confidence in central banks' policies.

Taylor mentioned that monetary policy rules were sometimes shown as a table that covers various rules other than the standard Taylor rule, and he asked how the Fed would use such a table in its communication strategy. **Mester** replied that the Fed sometimes showed several monetary policy rules as a benchmark for communication, but the Fed would never use a single specific policy rule. **Bowman** stated that economic data, such as job growth and inflation rates, were eventually revised up from their initial estimates, sometimes significantly, so that it was difficult to simply apply these data in real time to monetary policy rules or economic models. She added that, nevertheless, the Fed had not completely ignored the rules, as the implications of various monetary policy rules were included as one element among the vast amount of information used to make policy decisions.

Iwata asked whether there was a more appropriate order for the introduction of QT and rate hikes. He also asked whether QT should be an autopilot based on a predetermined amount of reduction or should be flexibly adjusted while monitoring reactions in money markets. **Jordan** argued that policy priority might differ depending on the situation, and it would be difficult to come up with a general rule that was applicable to all circumstances. **Himino** stated that if central banks specified the order for the introduction of QT and rate hikes in advance, they might increase the risk of falling behind the curve as a result, as Orphanides argued in his speech last year at this conference, and that such a situation would not be favorable.

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APPENDIX 1: PROGRAM

Monday, May 27, 2024

Opening Remarks

Speaker: **Kazuo Ueda**, Bank of Japan

Mayekawa Lecture: The Way to Stability and Growth in the World Economy

Chairperson: **Peter Kažimír**, Národná banka Slovenska

Lecturer: **John B. Taylor**, Stanford University

Theme A: Price Dynamics

Keynote Speech I: Price Dynamics in Japan over the Past 25 Years

Chairperson: **Shin-ichi Fukuda**, The University of Tokyo

Speaker: **Shinichi Uchida**, Bank of Japan

Session 1: Inflation, Monetary and Fiscal Policy, and Japan

Chairperson: **Shin-ichi Fukuda**, The University of Tokyo

Paper Presenter: **John H. Cochrane**, Stanford University

Discussant: **Nao Sudo**, Bank of Japan

Session 2: On the Zero-Inflation Norm of Japanese Firms

Chairperson: **Shin-ichi Fukuda**, The University of Tokyo

Paper Presenter: **Yoshihiko Hogen**, Bank of Japan

Discussant: **Paolo Pesenti**, Federal Reserve Bank of New York

Policy Panel Discussion I

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

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

Pierre-Olivier Gourinchas, International Monetary Fund

Olli Rehn, Bank of Finland

Eli M. Remolona, Jr., Bangko Sentral ng Pilipinas

Boštjan Vasle, Banka Slovenije

Tuesday, May 28, 2024

Theme B: Effects of Conventional and Unconventional Policy Instruments

Keynote Speech II: (Un)conventional Monetary Policy and Resilience

Chairperson: **Takeo Hoshi**, The University of Tokyo

Speaker: **Markus Brunnermeier**, Princeton University

Session 3: Testing the Effectiveness of Unconventional Monetary Policy in Japan and the United States

Chairperson: **Takeo Hoshi**, The University of Tokyo

Paper Presenter: **Sophocles Mavroeidis**, University of Oxford

Discussant: **Åsa Olli Segendorf**, Sveriges Riksbank

Session 4: Conventional and Unconventional Monetary Policies - Inflation and Resources

Chairperson: **Takeo Hoshi**, The University of Tokyo

Paper Presenter: **Ricardo Reis**, London School of Economics and Political Science

Discussant: **Masazumi Hattori**, Hitotsubashi University

Policy Panel Discussion II

Moderator: **Markus Brunnermeier**, Princeton University

Panelists: **Michelle W. Bowman**, Board of Governors of the Federal Reserve System

Thomas J. Jordan, Swiss National Bank

Loretta J. Mester, Federal Reserve Bank of Cleveland

Isabel Schnabel, European Central Bank

Ryozo Himino, Bank of Japan

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Olli Rehn	Bank of Finland
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Rebecca Zarutskie	Board of Governors of the Federal Reserve System

