

SPEECH

## Lessons at the Zero Bound: The Japanese and U.S. Experience

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It is a pleasure to have the opportunity to speak today at the Japan Society.<sup>1</sup> Our countries have very close relations and this is particularly true at the central banker level. I just got back from the BIS last week where I had a chance to spend some time with Governor Kuroda.

Today, I will discuss the challenge that we both have been working to solve—how best to conduct monetary policy when short-term interest rates are already pinned close to zero, but the economy is still operating well below its potential. This has required considerable learning. After all, until Japan's experience began in the 1990s, no major country had actually faced this problem since the Great Depression of the 1930s.

As the first nation to experience the zero bound in modern times, Japan was an early pioneer in developing unconventional tools and strategies. Its experiences, both good and bad, along with lessons from other periods such as the Great Depression, have helped to inform the policies adopted by the United States (U.S.) and other nations in recent years. The evolution of policy in Japan, in turn, has been informed, in part, by the experience of the U.S. and other nations.

So what have we learned to date? Let me highlight six key points.

First, and most importantly, managing expectations is critical in the execution of monetary policy at the zero bound. This includes expectations about the central bank's objectives for inflation and the economy, and expectations about how the central bank will use its tools in the future to achieve these goals.

Second, in managing expectations, good communication is essential. Expectations will not be well anchored when communications are muddled or inconsistent, or when a central bank acts in ways that are not consistent with its guidance.

Third, actions speak louder than words alone. Thus, there is an important role for asset purchases that ease financial conditions to support growth and keep inflation expectations well anchored.

Fourth, the policy instruments interact so that policy as a whole exceeds the sum of its parts.

Fifth, at the zero lower bound, risk management becomes extremely important. In particular, because the costs of getting stuck in a liquidity trap with chronic deflation are high, a central bank should put substantial weight on avoiding this outcome.

Sixth, the constraints imposed by the zero bound limit what monetary policy can accomplish by itself. This increases the importance of complementary fiscal, financial, and structural policy actions. Credible fiscal policies, actions to ensure a healthy financial system, and structural reforms that lift the potential for growth are very important.

As always, what I will say here today represents my own views and not necessarily those of the Federal Open Market Committee (FOMC, Committee) or the Federal Reserve System.

### ***Review of the experience in Japan and the United States***

Let me start by briefly reviewing the experience of Japan and the United States. As you all know, Japan's rapid economic ascent and investment boom came to an abrupt halt in the early 1990s with the bursting of a gigantic bubble in equities and real estate.

Asset price deflation resulted in a huge decline in wealth. This led to a sharp fall in demand, a balance sheet squeeze for both businesses and households, and a large increase in problem loans for Japanese financial intermediaries. By some measures—such as the loss of wealth relative to the size of the economy—this was a bigger shock than the U.S. experienced in 2008. Growth slowed sharply and inflation fell.

The Bank of Japan (BoJ) responded by reducing overnight interest rates from a peak of more than 8 percent in early 1991 to ½ a percent by the fall of 1995.<sup>2</sup> Most studies of this period suggest that policy was generally appropriate given economic forecasts at the time, but too tight relative to the actual outcomes.<sup>3</sup> Economic forecasts for Japan—both by the official community and by private sector agents—were consistently more optimistic than the actual outturns. It is noteworthy that as late as January 1995—on the eve of deflation—10-year Japanese Government Bond (JGB) yields were still at 4.7 percent.

With the benefit of hindsight, we now understand that the disinflationary consequences of the asset price bust and financial stress were vastly more powerful than was widely realized at the time. As we later saw in the U.S., the forces of contraction and disinflation operated through many different channels—not just directly on household wealth, for example, but also through the impact of the asset price bust on the health of financial intermediaries and the supply of credit to households and businesses.

Over time, the Japanese banking system came under mounting stress. This was a slow-motion crisis, as the assets were mainly loans that were not marked-to-market. Accounting practices and regulatory forbearance allowed banks to delay charging off bad loans and recapitalizing at the cost of impairing the availability of credit to new potential borrowers. A full-blown banking crisis finally materialized in 1997. Although some banks were recapitalized in 1999, the full regulatory response took several more years.

The monetary and fiscal stimulus that was provided helped Japan avoid a deep recession. But expectations about future nominal income growth for both households and businesses ground lower over time. With inflation expectations sinking, inflation-adjusted real interest rates rose, and Japan became mired in deflation.

While deflation is ultimately a monetary phenomenon, structural elements were also important. Long-term demographic factors added to the deflationary pressures and structural rigidities, and credit supply problems constrained the reallocation of resources to growth sectors. These structural factors made it substantially more difficult to escape the deflation trap.

The Bank of Japan was active during this period. From the late 1990s onwards, it pioneered an extremely broad array of innovative tools—many of which were later adopted, in amended form, by the Fed and other major central banks. These included forward guidance on the future path of the policy rate, quantitative easing through purchases of government securities and private assets including asset-backed securities, equities and real estate investment trusts (REITs), a more quantitative inflation objective, and funding for bank lending.

From my perspective, Japan's experience with forward guidance for the policy rate, asset purchases and a more formal inflation goal are particularly instructive, as this helped inform the later use of such tools in the United States.

In early 1999, the Bank of Japan said it would maintain its zero interest rate policy until “deflationary concerns” were “dispelled.” This commitment was lifted in August 2000, and the BoJ raised the policy rate by a quarter-point. However, the BoJ was subsequently obliged to reverse course, and reintroduced forward guidance in March 2001. This guidance was tied to the realization of a new inflation objective.

With deflation intensifying, the Bank of Japan embarked on a quantitative easing (QE) program in 2001 designed to increase the size of the monetary base. The Bank of Japan engaged in purchases of JGBs that were large in scale, but confined to short-dated maturities. This reflected a view that such purchases primarily acted through the liabilities side of the central bank's balance sheet—pushing up the amount of reserves in the banking system. Because the growth of the monetary base was deemed the goal of policy, it was logical to purchase short-dated assets, which could be allowed to run off once a sustainable recovery was in place.

The downside of this approach was that the purchases did not change the composition of the private sector's balance sheet very much because the policy essentially resulted in the exchange of one short-term risk-free asset for another. As a consequence, the purchases had only modest direct effects on financial conditions.<sup>4</sup>

Starting in 2006, when the initial wave of QE ended, the BoJ began to formalize its inflation goal in numerical terms. This was initially expressed as an “understanding of medium- to long-term price stability” based on individual policymakers' views. The inflation objective went through several iterations before being defined in 2012 as a Committee “goal” of a positive range of 2 percent or lower, with a lower interim goal of 1 percent.

Following the onset of the global financial crisis in 2007-2008, Japan resumed QE, and gradually tightened the link between its policy actions and its objectives. By January 2012, the BoJ had committed to keep rates at the zero bound and to continue purchasing assets until the 1 percent goal was “in sight.”

Several prominent Japanese experts have argued that there was a “start-stop” aspect to monetary policy during the 1990s and 2000s with reversals in policy beginning before deflationary expectations were eliminated.<sup>5</sup> Fiscal policy also reversed abruptly on several occasions before economic recovery was firmly established. While Japan did enjoy a period of respectable real per capita growth in the mid-2000s, escape from deflation proved elusive.

More than a decade after Japan's bubble burst, the U.S. housing bubble burst. This exposed extensive vulnerabilities in our financial system and triggered a global financial crisis.<sup>6</sup> Unlike Japan, we had the advantage of being able to learn from another nation's recent experience. We applied what we understood to be the lessons from Japan, though with hindsight, perhaps not in every respect as completely as we could have.

In particular, Japan's experience reinforced the lessons of the Great Depression here in the U.S. and made us sensitive to the disinflationary force of an asset price bust and financial crisis. We recognized that we had to be very aggressive to prevent deflation and deflation expectations from becoming well entrenched.

The Federal Reserve reduced short-term interest rates to nearly zero by late 2008—a little over a year and a half after the initial shock hit in August 2007. Immediately upon reaching the zero bound, we provided additional stimulus by expanding our balance sheet and deploying forward guidance on the policy rate. These actions, in the context of a strong commitment to both our inflation and employment mandates, succeeded in preventing deflation expectations from taking hold, even though real outcomes were disappointing. We also took steps to formalize our 2 percent inflation objective.<sup>7</sup>

The Fed's large-scale asset purchase programs differed from those originally undertaken in Japan both in theory and in practice. They were concentrated in longer-term securities—Treasury and agency mortgage-backed securities. This reflected a different perspective on how purchases affect financial conditions and the economy, as well as the different structure of our financial system.

Our view is that asset purchases work primarily through the asset side of the balance sheet by transferring duration risk from the private sector to the central bank's balance sheet. This pushes down risk premia, and prompts private sector investors to move into riskier assets. As a result, financial market conditions ease, supporting wealth and aggregate demand. The fact that such purchases increase the amount of reserves in the banking system and the size of the monetary base is a byproduct—not the goal—of these actions.

The U.S. also moved relatively quickly to recapitalize core financial institutions—partly as a result of good judgment, but also because the intense pressures of a capital markets-based financial system forced us to confront these issues. The Supervisory Capital Assessment Program (SCAP) in early 2009 identified and addressed the potential capital shortfalls of the major U.S. bank holding companies in a stressed scenario. The SCAP forced the banks to recapitalize either through the use of private funds or the injection of government convertible preferred equity from the TARP program.

However, our policy approach was far from perfect. Comparing actual growth to the growth projections by FOMC participants in the Summary of Economic Projections shows that we were consistently too optimistic about growth over the 2009-2012 period. As a result, with the benefit of hindsight, we did not provide enough stimulus. Perhaps, if we had paid more attention to the persistent divergence between growth forecasts and outturns in Japan in the 1990s, we might have been more skeptical about the prospects for a strong economic recovery, even with a more aggressive monetary policy regime.

Also, we could have done better in communicating our intentions and goals. We put too much emphasis, too early, on the exit. At an earlier stage, we should have put greater emphasis on our commitment to use all our tools to the fullest extent possible for as long as needed to achieve our dual mandate objectives.

Our policies also had a “start-stop” aspect to them that may have undercut their effectiveness. For example, until September 2012, our large-scale asset programs generally specified the total size of the program, with a purchase rate and an expected ending date. This created a void when the programs ended and made our policy response sporadic and hard to forecast. This limited the scope for market prices to adjust in anticipation of our future actions in ways that would help stabilize the economy.

Another shortcoming was in our use of forward guidance with respect to the path of short-term interest rates. Although calendar-based guidance worked reasonably well in influencing expectations about the future path of short-term rates and thus the shape of the yield curve, it was clumsy in a number of respects. For example, if we moved the forward date guidance out in time, did this reflect a change in our reaction function, the amount of desired policy stimulus or greater pessimism about the outlook?

Of course, as we have learned, we have acted to rectify these shortcomings. For example, our asset purchases are now outcome based, tied to the goal of substantial improvement in the labor market outlook, and our forward guidance on short-term rates is tied to unemployment and inflation thresholds rather than to a calendar date.

The Japanese authorities have also capitalized on our joint experiences and actions. Thus, we have witnessed a convergence in the monetary policy regimes of our two countries.

Today, the two regimes are quite similar in three important respects. Both the Fed and the Bank of Japan place considerable emphasis on an explicit inflation objective, commit the central bank to use all available tools to achieve its objectives, and use forward guidance on interest rates and large scale purchases of long duration assets as the main tools to achieve these objectives.

Although there are still some important distinctions in how policy is conducted, much of these relate more to differences in legal frameworks and the current starting point for economic activity and inflation rather than fundamental differences in philosophy. For example, the BoJ's asset purchases are broader than the Fed's, extending to equity ETFs (Exchange Traded Funds) and REITs. This option is not available to the Federal Reserve because the Federal Reserve Act sets tighter limits as to the types of assets that the Federal Reserve can purchase.

Similarly, current circumstances in the two countries are different, with deflationary expectations still in the process of being dislodged in Japan. The BoJ needs to push up inflation expectations, whereas in the U.S. the current level of inflation expectations is consistent with the long-term objective of the Fed. Therefore, the BoJ, relative to the respective sizes of the two economies, has adopted a purchase program that is more aggressive than the U.S. program. This is true whether measured in terms of the amount

of duration being pulled out of the market or purchases as a share of total issuance.

### ***Lessons learned***

As I mentioned earlier, there have been at least six major areas where there has been significant learning, which has influenced the evolution of policy. Let me turn to them.

#### *The importance of managing expectations*

Managing expectations is always central to monetary policy. However, at the zero bound this is even more critical than usual.

There are two aspects of this. First, keeping inflation expectations anchored at levels consistent with the central bank's medium-term inflation objective—2 percent on the personal consumption expenditures deflator in our case—is vitally important. Once deflation expectations become well entrenched, it is very difficult to change them. And, because inflationary expectations are an important driver of actual inflation outcomes, deflationary expectations can be self-fulfilling in driving actual deflation outcomes. Also, if inflation expectations were allowed to fall, this would raise the level of expected real interest rates, making monetary policy less accommodative.

Conversely, a central bank does not want medium-term inflation expectations to climb above levels consistent with its inflation objective. If inflation expectations were to become unanchored to the upside, that could damage credibility and result in higher risk premia for financial assets and tighter financial market conditions. Thus, a policy that maintains medium-term inflation expectations in line with our inflation objective is most consistent with our mandate.<sup>8</sup>

Second, at the zero bound, the ability to provide credible forward guidance—both in terms of the future path of the policy rate and the future path of the balance sheet— becomes the predominant vehicle by which a central bank's actions affect financial market conditions. If this expectations channel did not work, then it would be very difficult to provide additional monetary accommodation because short-term rates cannot be reduced materially.

In the U.S., in recent months we have communicated that short-term rates are likely to stay very low for a long time; our balance sheet is likely to increase further in size and then stay large for a long time; and that we will not be overly hasty in tightening monetary policy once the recovery gets well established. By doing this, we are influencing expectations about the likely future path of short-term rates and the interest rate term premium. By utilizing the expectations channel in this way, we have been able to make policy more accommodative and generate easier financial market conditions.

#### *Good communication is essential*

To manage expectations well, both credibility and good communication is essential. This means explaining clearly the policy framework, the relationship between the use of tools and the central bank's mandated objectives at the zero bound, and how the use of these tools will evolve with changes in the outlook.

In this regard, a central bank's credibility is crucial. Only if a central bank does what it promises to do will expectations be solidly anchored. Of course, this does not mean mechanically following a set policy trajectory regardless of how the outlook changes, but it does mean that the stance of policy over time must evolve in ways consistent with the criteria established in the guidance.

It is important to communicate how policy will respond to changing economic circumstances over time. This is particularly important when the outlook changes, because expectations about how policy will respond can be an important self-stabilizing element of monetary policy. In this regard, a framework that ties the use of policy tools explicitly to economic outcomes has many advantages.

Good public communication is also important. For example, press conferences offer an opportunity to ground the policy actions and stance in a framework that is explicit about how the central bank plans to achieve its mandated objectives.

### ***Asset purchases are an effective tool***

Credibility requires taking action in the present as well as providing guidance for the future, and we are fortunate to have learned that asset purchases can indeed be an effective tool to support growth, employment and inflation expectations at the zero bound. While I believe that managing expectations is crucial, I am somewhat skeptical of the view that forward guidance on the policy rate alone is sufficient in these circumstances. This is particularly the case when guidance extends out several years in the future. Promises about future actions may be seen as not fully credible given the potential for changes in a central bank's leadership and policy committee and the degree of uncertainty about economic conditions that will prevail far out in the future.

In recent years, we have developed considerable positive experience providing accommodation through changes in the size and composition of the central bank balance sheet. Taking interest rate risk and mortgage prepayment risk out of private hands has proven to be effective in easing financial conditions, increasing wealth and lowering private sector borrowing costs.<sup>9</sup> The impact of purchases may be attenuated to some degree by deleveraging and ongoing adjustments in markets such as real estate. But it is material even in these circumstances, and builds over time as these needed adjustments proceed.

### ***The sum is greater than its parts***

Another important insight is that each of the components of policy—the current stance in terms of the policy rate and the balance sheet, expectations about the future stance, the degree of commitment to future policy, and the clarity of communications—all interact. Our tools are more powerful used in combination, and, when their use is explicitly tied to the outcomes we seek to achieve. As a result, the sum is more powerful than the component parts.

### ***Risk management is particularly important***

Risk management is particularly important at the zero bound. At the zero lower bound, once you are caught in deflation, it is very hard to get out. Thus, policymakers need to put considerable weight on this risk and conduct monetary policy with sufficient aggressiveness to ensure that they avoid such an outcome.

It is also true that we have less experience with the monetary policy tools used at the zero bound. As a result, there is greater uncertainty around the efficacy and costs of these tools. This pushes in the opposite direction of being more cautious.

This means that risk management is essential—what are the costs of being wrong in either direction? Sometimes a cautious, incremental approach may not always be the right strategy.

### ***Limits to monetary policy***

At the zero bound, monetary policy encounters additional constraints. These fall into three broad buckets.

First, there are costs associated with non-conventional tools. This means they cannot simply be used without limit, though the appropriate limit will vary based on the outlook and balance of risks. The most obvious example of this is our large-scale asset purchase program. As the balance sheet increases in size, the potential costs increase in terms of market functioning, risks to financial stability, and the path of future remittances to the U.S. Treasury.

Second, there is a limit on how far the expectations channel can be exploited. As I discussed earlier, since the current FOMC cannot bind future FOMCs and the economic outlook is highly uncertain, it isn't reasonable to expect that policies that affect expectations many years in the future will have a powerful impact today. I believe that the effectiveness of the expectations channel decays as the length of the horizon extends.

Third, monetary policy is only one leg of the stool necessary to generate a vibrant and sustained economic expansion. In particular, as noted earlier, the health of the financial system is critical. For without it, the monetary transmission channels will be impaired and monetary policy will be less effective in influencing the cost and availability of credit. Similarly, it is critical that fiscal policy be set appropriately. This means the short-term impulse needs to be properly calibrated to the current set of economic circumstances (not too much restraint) and the long-run budget trajectory needs to be credible and consistent with fiscal sustainability. Finally, removing structural impediments that hinder growth and economic rebalancing are also important. In the case of the U.S., this could include changes in immigration policy, infrastructure investments that remove bottlenecks and job training programs that improve the quality of human capital.

### ***Implications for U.S. monetary policy***

Undoubtedly, we will continue to learn as we seek to implement monetary policy most effectively.

Let me give a few examples of how my own thinking may evolve. In terms of our asset purchase program, I believe we should be prepared to adjust the total amount of purchases to that needed to deliver a substantial improvement in the labor market outlook in the context of price stability. In doing this, we might adjust the pace of purchases up or down as the labor market and inflation outlook changes in a material way. For me, the base case forecast is not the sole consideration—how confident we are about that outcome is also important.

Because the outlook is uncertain, I cannot be sure which way—up or down—the next change will be. But at some point, I expect to see sufficient evidence to make me more confident about the prospect for substantial improvement in the labor market outlook. At that time, in my view, it will be appropriate to reduce the pace at which we are adding accommodation through asset purchases.

Over the coming months, how well the economy fights its way through the significant fiscal drag currently in force will be an important aspect of this judgment.

We are also learning about how best to prepare for the eventual normalization of monetary policy. For example, we may need to update our thinking with respect to the so-called exit principles that we published in June 2011 in order to bring them up to date with developments since then, and ensure they do not unnecessarily constrain our ability to conduct policy in the most effective way today.

Those exit principles stated that we would first stop reinvesting, then raise short-term interest rates, and finally sell agency mortgage backed securities over a three-to-five year period. This seems stale in several respects. In particular, how does one time the end of reinvestment given that we now have economic thresholds that govern the timing of liftoff? Also, the thresholds are

thresholds, not triggers. Thus it is hard to link the timing of the end of reinvestment to the unknown liftoff date for short-term rates.

More broadly, it may be desirable to update our thinking around the path and composition of the balance sheet over time, in light of our capacity to shape this path in a way that mitigates potential costs and risks. For example, the agency MBS portfolio is substantially larger today than it was when the original exit principles were devised. To the extent that the Committee wants to reduce the risk of disrupting market functioning during normalization, it could decide to indicate that it will avoid selling the MBS portfolio during the early stages of the normalization process. Moreover, to the extent that the Committee wants to mitigate the risk of a sharp increase in long-term rates, it could judge that it would prefer not to commit to agency MBS sales. Expectations about future MBS sales or actual sales have the potential to generate or amplify such an upward spike in long-term rates. If the Committee believes that it could be costly in terms of credibility to incur a period of no remittances to Treasury—a notion I am personally somewhat skeptical about—avoiding MBS sales would also reduce this risk. Indeed, the Committee might conclude that it was better on all three counts to allow the agency MBS securities to run off passively over time.<sup>10</sup>

An important challenge for us will be to think carefully about what combination of actions and communications will best ensure that when we do eventually judge that it is appropriate to begin normalizing policy, the initial tightening of financial market conditions is commensurate to what we desire. There is a risk is that market participants could overreact to any move in the process of normalization. Indeed, there is some risk that market participants could overreact even before normalization begins, when the pace of purchases is adjusted but the level of accommodation is still increasing month by month.<sup>11</sup> Not only could such responses threaten financial stability, but also they might make it harder to calibrate monetary policy appropriately to the economic situation. We will need to think long and hard about how best to develop policy in a way that enables us to respond flexibly to a changing economic outlook, but in a way that is not disruptive to the economy.<sup>12</sup>

Based on what we have learned to date at the zero bound, I believe that it will be important for us to anchor all our communication around the core principle: The path of the policy rate and the size and composition of the balance sheet over time will be driven by our unbending commitment to our dual mandate objectives of maximum sustainable employment in the context of price stability.

As you can see, there will be much more to learn as we go. Thank you for your kind attention. I would be happy to take a few questions.

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<sup>1</sup> Krishna Guha, Paolo Pesenti, Simon Potter, Jamie McAndrews, Jonathan McCarthy, Lorie Logan, John Clark, Eben Lazarus and others on my staff helped with the preparation of these remarks.

<sup>2</sup> Actual overnight rates; the Bank of Japan did not publish its rate target until 1998.

<sup>3</sup> See “Preventing Deflation: Lessons from Japan’s Experience in the 1990s,” Alan Ahearn, Joseph Gagnon, Jane Haltmaier, and Steve Kamin et. al., International Finance Discussion Papers, No 729, June 2002, Board of Governors of the Federal Reserve System.

<sup>4</sup> However, research suggests that the purchases did reinforce the forward commitment. See, for example, “Policy commitment and expectation formation: Japan’s experience under zero interest rates” Kunio Okina and Shigenori Shiratsuka North American Journal of Economics and Finance, Vol 15, No 1, pp 75-100.

<sup>5</sup> See, for example, “Deleveraging and Monetary Policy: Japan Since the 1990s and the United States Since 2007”, Kazuo Ueda, Journal of Economic Perspectives, Vol 26, No 3, Summer 2012, pp 177-202.

<sup>6</sup> Some commentators prefer the term “North Atlantic financial crisis” as the failure and near-failure of financial institutions was concentrated in the U.S. and Europe. However, the crisis was global in the sense that financial markets transmitted the shock throughout the world and this resulted in a severe global economic downturn.

<sup>7</sup> Committee members, through their submissions to the Summary of Economic Projections, had already indicated that their inflation objective was close to 2 percent as measured by the personal consumption expenditures deflator; in January 2012 the Committee formalized the inflation objective as a 2 percent “longer run goal” (see <http://www.federalreserve.gov/newsevents/press/monetary/20120125c.htm>).

<sup>8</sup> In addition to acting to manage inflation expectations, the central bank can also support expectations about the outlook for growth and job creation. This can be implemented by making it clear that, subject to medium-term price stability, it will seek to stabilize the economy and has the means to do so even at the zero bound.

<sup>9</sup> With respect to borrowing costs, this is particularly true in real terms.

<sup>10</sup> This would also provide additional stimulus at the margin, since the degree of accommodation provided by our balance sheet holdings is related to how long the public expects us to hold the assets.

<sup>11</sup> The move to economic thresholds-based guidance for the federal funds rate should help in this regard. While the thresholds are

certainly not triggers, they should help market participants adjust expectations about the likely timing of lift-off in a relatively continuous manner and guard against these expectations being pulled further forward in time than is warranted by changes in the economic outlook.

<sup>12</sup> Indeed, even when purchases of additional longer-term securities cease, the enlarged balance sheet will provide substantial ongoing stimulus. It is important to recognize that the Fed could remain in this posture with policy “on hold” for a significant period.

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