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Fed's policy review: Refining rather than reinventing the wheel

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- Next week the Fed will hold a highly anticipated conference to review its "monetary policy strategy, tools, and communications practices" used to achieve its dual mandate. This review is wide ranging, touching on topics such as the concept of maximum employment, tools for providing stimulus if the fed funds rate falls back to zero, and what changes, if any, they should make to their current 2% inflation targeting framework. As such, it has the potential to re-orient elements of how the Fed conducts monetary policy with knock-on effects to markets and the real economy. However, as Chair Powell and his colleagues have cautioned, the result of this review is more likely to produce “evolution rather than revolution”.
- Over the past year and a half we have written extensively on the various elements of this review, especially the options for a new inflation targeting framework (see: “ Fed policy framework: Is the price (level) right? ” (November 21, 2017), " The case against price level targeting " (April 23, 2018), " Changing the Fed’s inflation target: Is average best? " (February 13, 2019), " Scope for policy stimulus when a global recession hits " (April 16, 2019)). This note synthesizes the conclusions from our work in these areas and updates our views on the implications for Fed policy.

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Introduction

Next week the Fed will hold a highly anticipated conference to review its "monetary policy strategy, tools, and communications practices" used to achieve its dual mandate.[1] This review is wide ranging, touching on topics such as the concept of maximum employment, tools for providing stimulus if the fed funds rate falls back to zero, and what changes, if any, they should make to their current 2% inflation targeting framework. As such, it has the potential to re-orient elements of how the Fed conducts monetary policy with knock-on effects to markets and the real economy. However, as Chair Powell and his colleagues have cautioned, the results of this review are more likely to produce "evolution rather than revolution".

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Summary of conclusions

In our past research we have argued that while alternatives to the Fed's current framework have some attractive features and moreover that the Committee perceives some advantages of achieving higher inflation in a low-r-star world, they also carry significant complications and none clearly dominate the current 2% inflation targeting framework. For example, all variations of "make up" strategies, in which the Fed must commit to compensate for past below-target inflation by engineering an inflation overshoot, face considerable communications challenges.

As NY Fed President Williams – a strong advocate for make up strategies – wrote in a recent report, "for any of these [make up] frameworks to work as well in practice as they do in theory requires clear communication and consistent execution of the policy and a belief by the public that the policy is credible."[2] The success of these alternatives would also rely on central bankers pre-committing to actions that in the future they may have incentive to deviate from – often referred to as the "time inconsistency" problem – and further for consumers, businesses and investors to believe monetary policy will be set in this way and to act accordingly. What works well in theory and in computer simulations may therefore be less effective when applied in the real world. This was always the difficulty of extrapolating some officials' enthusiasm for these strategies in theory to a conclusion that the Fed would materially change its official objectives.

We remain of the view that experimentation such as this by one of the world's most important central banks is a risky endeavor with unknowable costs and benefits. For these reasons, we remain skeptical that the Fed will adopt a materially different policy framework than the current one. Specifically, we expect the following three outcomes from this review:

1 The conference agenda can be found here: https://www.federalreserve.gov/conferences/conference-monetary-policy-strategy-tools-communications-20190605.htm

2 See Mertens, Thomas M. and John C. Williams (January 2019), "Monetary policy frameworks and the effective lower bound on interest rates." Federal Reserve Bank of New York Staff Reports, No. 877.

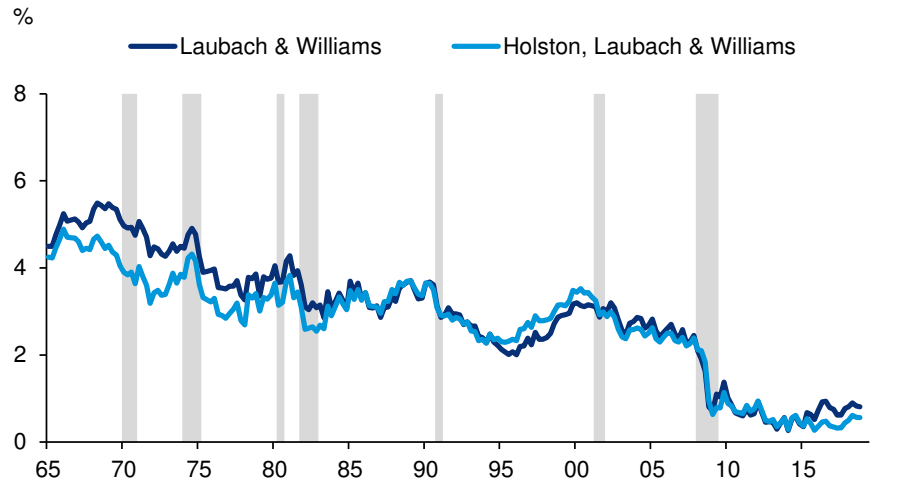
- **Inflation target**: The Fed should express a stronger commitment to the symmetry of the 2% inflation target with a willingness to accept – and indeed potentially even engineer – inflation modestly above 2% to counteract the perception that this level is a ceiling. However, we do not expect the Fed to make an explicit commitment to make up for a specific past inflation shortfall, as would typically be required by "make up" strategies. In other words, we do not believe the Fed will officially adopt some variant of price level or average inflation targeting as a permanent objective.
- **Unconventional tools**: Forward guidance and QE should remain the first defense when the policy rate gets back to the effective lower bound. QE could be implemented within a yield curve control (YCC) strategy in which the Fed sets the yield target rather than the size of the asset purchases. A commitment to easier policy at zero rates may also be enhanced by temporarily adopting a "make up" strategy for an inflation shortfall over a short historical window, as Bernanke has advocated.[3] We do not anticipate the Fed will adopt negative interest rates.
- **Communications**: The dot plot is unlikely to be eliminated and in fact may be enhanced by linking economic forecasts to interest rate projections. Forward guidance, particularly during zero lower bound episodes, should de-emphasize calendar-based elements while focusing on outcomes, such as the quantitative thresholds used by the Fed in recent years.

Why the Fed is re-considering its policy framework

At the core of the Fed's policy framework review is the recognition that the neutral fed funds rate, or r-star, has fallen to historically low levels since the financial crisis, which in turn presents considerable challenges to central banks by constraining how much accommodation they can provide through their traditional tool of short-term interest rates (Figure 1). Indeed, Fed research indicates that the zero lower bound could bind as much as 40% of the time in the future.[4]

3 See Bernanke, Ben S., Michael T. Kiley, and John M. Roberts (2019), "Monetary policy strategies for a low rate environment." FEDS 2019-009.
4 See Kiley, Michael T. and John M. Roberts (Spring 2017), "Monetary policy in a low interest rate world." Brookings Papers on Economic Activity.

Figure 1: R-star estimates near historically low levels



Source : FRBNY, Haver Analytics, Deutsche Bank

With the goal of lowering real interest rates in mind, central banks in a low r-star world have three options that are not mutually exclusive and can be used in complementary ways. First, they can cut nominal interest rates into negative territory as several major central banks have done, including the ECB and BoJ. Second, they can resort to unconventional monetary policies, such as QE and extended forward guidance, to try to replicate the easing effects of policy rate cuts once it hits the zero lower bound. Third, they can respect the zero lower bound but provide greater scope to cut real interest rates for the same reduction in nominal rates by pursuing higher inflation and inflation expectations prior to the recession.

In response to the financial crisis, the Fed eschewed negative interest rates and instead aggressively used QE and forward guidance to ease. However, uncertainty remains about the impact of these unconventional tools. Because of these uncertainties, the Fed's framework review should present a perfect opportunity to re-assess their tools. In the next two sections we first discuss the review of their inflation target and then the potential tools for providing monetary stimulus during the next downturn.

Inflation target review

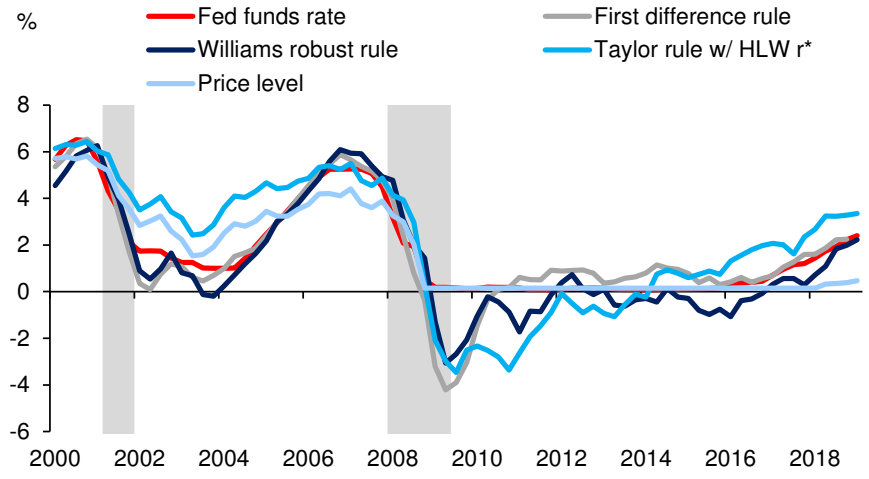
The Fed has a dual mandate of achieving full employment and price stability. The inflation side of this mandate is defined as achieving 2% inflation in a symmetric way, in other words that similar sized under- and over-shoots should be treated with the same magnitude of policy response. Importantly, this target is pursued on a forward-looking basis and does not take into account the past history of how inflation has evolved relative to 2%. That is, the Fed currently lets "bygones be bygones".

Part of the Fed's review is to assess whether this is the most appropriate definition of their inflation target. The concern is that by consistently undershooting their inflation objective, inflation expectations may become anchored at lower levels. This review will take 2% as a given inflation target, suggesting that they cannot, for example, set a higher inflation rate target. Instead, alternatives include (1) a variety of "make up" strategies in which the Fed aims to achieve 2% on average and (2) an inflation range that defines a region of acceptable inflation rather than a single target. We discuss these next.

"Make up" strategies: Attractive in theory, questionable in practice

Make up inflation strategies can come in many forms but all have the common feature that the Fed would aim to achieve 2% inflation on average over a given period. An extreme form of a make up strategy is a price level rule, in which the price level is set at some period in the past and the Fed adjusts policy to make up for the cumulative history of inflation under- and over-shoots since that time. In response to periods of persistently above or below target inflation, this framework could produce dramatically different policy outcomes than the Fed's currently defined inflation objective. Indeed, as the Fed's Monetary Policy Report has shown, a price level target, indexed to 1998, would currently call for a fed funds rate near zero (Figure 2).

Figure 2: Price level rule would prescribe considerably lower interest rates



Source : FRB, Haver Analytics, Deutsche Bank

Less extreme versions of make up strategies include Williams' average inflation target, in which the Fed aims for an inflation rate above 2% – likely on the order of 2.25% – during periods when monetary policy is not constrained by the zero lower bound to offset lower inflation during zero rates episodes. A related approach would be price level targeting with a rolling and shorter look back period in which the Fed would only endeavor to make up for deviations from 2% over, for example, the past several years. Deviations prior to the look back period would be ignored and have no effect on policy.

We have detailed the benefits and drawbacks of each of these episodes in painstaking detail in previous work, which we do not replicate here (see: " Fed policy framework: Is the price (level) right? " (November 21, 2017), " The case against price level targeting " (April 23, 2018), " Changing the Fed's inflation target: Is average best? " (February 13, 2019)). In summary, the benefits of these strategies are that, if they are credibly believed by economic agents, they should help to re-center inflation expectations at somewhat higher levels by demonstrating the Fed's credible commitment to hitting 2% inflation on average over the longer-term.

A key drawback is that policy may be time-inconsistent – meaning that the Fed would have to commit ex-ante to future policy decisions that are sub-optimal in real time, such as cutting rates in a hot economy if inflation has in the past been too low. This time inconsistency problem should be worse for objectives with longer look-back periods, such as price level targeting, as they require the Fed to make up for inflation data that could have happened many years in the past. If this "commit-

ment" from the Fed is not credible, the benefits of make up strategies of higher inflation and inflation expectations are unlikely to be realized. For this reason, while these policies have been effective in theory and model-based simulations, there effectiveness in the real world remains in question. Fed officials, such as San Francisco Fed President Daly, have stressed the importance of the Fed's credibility for any change to the monetary policy framework and noted that the bar for change is high for this reason. Indeed, if the Fed is not able to meet these enhanced commitments, such a change could be counterproductive by undermining the Fed's credibility.

Another key drawback is the operational difficulty of achieving any given inflation objective with traditional monetary policy tools. In the eyes of some, the Fed has struggled to achieve its 2% inflation target even allowing bygones to be bygones. Engineering an inflation overshoot to make up for those bygones would be that much more challenging, potentially requiring low rates for a long time given the very flat Phillips curve. The flat Phillips curve would also cut the other way as unwinding such an overshoot would require much higher rates and the associated risk of triggering a recession.

At this point, the Committee appears divided on whether or not to adopt an inflation framework based on a make up strategy. On our count, six Fed officials have favored adopting this strategy, including NY Fed President Williams (Figure 3). While not saying so explicitly, we think Vice Chair Clarida also leans in this direction given his long-held concerns over a low neutral rate and more recent worries about slipping inflation expectations. Conversely, we count four officials that are firmly against make up strategies, including two Governors – Brainard and Quarles. The remainder of the Committee, including Chair Powell, appears undecided on this issue, at least based on public comments to date.

Figure 3: Fed officials' views on inflation "make up" strategies

Support	Against	Uncertain
Bullard (St Louis)	Brainard (Board)	Barkin (Richmond)
Daly (SF)	George (Kansas City)	Bostic (Atlanta)
Evans (Chicago)	Mester (Cleveland)	Bowman (Board)
Kashkari (Minneapolis)	Quarles (Board)	Clarida (Board)
Rosengren (Boston)		Harker (Philadelphia)
Williams (NY)		Kaplan (Dallas)
		Powell (Board)

Source : Deutsche Bank

Because of the credibility issues that come with adopting a make up strategy, and the fact that this approach is untested by other global central banks, we think it is very unlikely that the Fed would pivot to a framework that compensates for a significant history of inflation deviations, like a price level target. Moreover, while such a framework with a shorter and rolling look back period is more attractive, communications challenges also make this approach less likely. As a result, we do not believe the Fed will formally adopt a make up strategy with an explicit commitment to compensate for specific deviations from target.

Other options

Aside from make up strategies there are several additional options for a new inflation targeting framework that the Fed may consider. Below we detail two that have

been discussed: an inflation range rather than a specific target and temporary strategies that are only in effect around zero lower bound episodes.

***Inflation range**:* One alternative that has been advocated by Boston Fed President Rosengren and Cleveland Fed President Mester, amongst others, is for the Fed to target a range of inflation, such as say from 1.5% to 2.5%, as opposed to the current framework of targeting a single point of 2%. This would give the Fed some flexibility in deciding how to respond to shocks in the economy, particularly with respect to supply shocks whose growth and inflation implications have opposing prescriptions for monetary policy. Such a regime would also have the benefit of acknowledging reality in that even if the Fed were setting monetary policy perfectly, measured inflation would still be expected to randomly fluctuate relative to its underlying trend. Our recent work suggests that the Fed can impact about two-thirds of the core PCE basket (see "Revisiting cyclical and acyclical inflation: How much can the Fed impact core?") However, those random deviations should not be taken as an indication that monetary policy is set in a suboptimal way.

A target range, if that were to be the choice, could also be set asymmetrically around the Fed's current 2% target by placing the mid-point of the range above 2%, as with the 1.5% to 3% range that Rosengren put forth. In theory, this would allow the Fed to more easily accommodate positive inflation shocks and help to address concerns that inflation expectations could become unanchored to the downside. However, it is unclear that such an approach would be permitted, since a range with a mid-point above 2% could be interpreted as running afoul of their commitment to stick with a 2% target.

While there would certainly be issues during the transition to such a new way of communicating the Fed's target, other central banks, such as the Bank of Canada and Royal Bank of Australia, currently target a range, implying that market participants and the public can be conditioned to incorporate such information. The major downside to adopting this framework would be similar to that of a higher inflation target: communicating the Fed's willingness and/or actual ability to generate higher inflation. An inflation range with a mid-point set at 2% would likely be counterproductive for inflation expectations by signaling that the Fed is more willing to tolerate inflation modestly below their target, as has consistently been the case since the crisis. This would reinforce the exact narrative that the Fed is hoping to overturn that they treat 2% as a ceiling.

Another complication is that this target range induces non-linearities in the Fed's reaction function which present communication challenges. Loosely speaking, the Fed's current reaction function is to get increasingly worried about inflation the further it gets from its 2% target. Hawkish or dovish members can put more or less weight on those deviations, but a given official will be more likely to want to change policy when prices are growing by only 1.5% than when they are growing at 2%. A target range induces non-linearities in this reaction function in that it allows a range of rates that the Fed would consider acceptable and, as such, would not warrant a policy response. Anything outside of that range, presumably, would warrant a policy response. As an (admittedly hyperbolic) example, should Fed officials adopt a range with a lower bound of 1.5%, then an inflation rate of 1.51% would be copacetic but a rate of 1.49% would warrant a policy response. For that 1.49% rate, then the question becomes how much of a policy response is warranted. Should the Fed cut rates to just get inflation over that 1.5% boundary or should it get inflation back to (or even above) 2%?

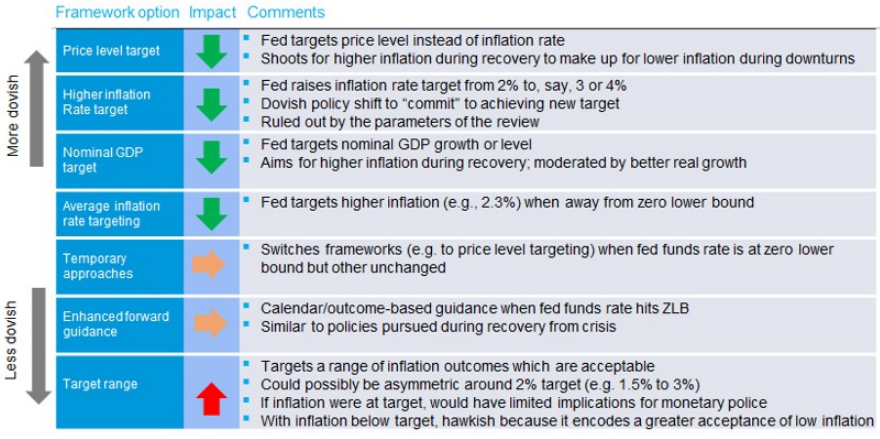
***Temporary strategies**:* A final set of alternatives are strategies where the Fed maintains its 2% inflation target as currently defined but temporarily adopts a different strategy when monetary policy is constrained by the effective lower bound on interest rates. Former Fed Chair Bernanke has advocated for such strategies in the past, in particular by arguing that the Fed should temporarily adopt a price level target that would commit the Fed to keep rates at the zero lower bound until a pre-defined inflation shortfall was made up. Another alternative would be to commit to make up the shortfall that has occurred over a rolling period of a few years in the past, rather than from a fixed point. Compared with full price level targeting, these temporary versions are very narrowly targeted to only be in effect during recoveries from zero lower bound events, obviating the implication that the Fed would have to impose a painfully severe recession to make up for a prolonged period of elevated inflation.

These approaches suffer from the same time inconsistency concerns noted above, though on a smaller scale given that the time horizon over which the commitment is being made is shorter. The benefits of this approach are therefore likely to be more limited, as they should be less effective in lifting inflation and inflation expectations when considered across the entire cycle. As a result, this approach should be less effective in preventing zero lower bound episodes. Instead, the primary benefit of such an approach could be to codify the lower-for-longer policy that the Fed pursued in response to the financial crisis. That is, rather than communicating a lower-for-longer policy through a series of approaches, such as calendar and quantitative guidance, temporary price-level targeting could streamline the Fed's communications around unconventional monetary policies, much as Taylor rules can streamline communication around conventional interest rate policy.

Conclusion: Material change to Fed's inflation framework unlikely

Based on the above, while we believe the Committee perceives some benefits of achieving higher inflation during expansions in a low-r-star world, we remain skeptical that the Fed will adopt a materially different policy framework than the current one.

Figure 4: Options for an alternative inflation targeting framework



Note: "Impact" column refers to the implications of the change for Fed policy, with the green arrow dovish, orange arrow neutral, and red arrow hawkish. Source : Deutsche Bank

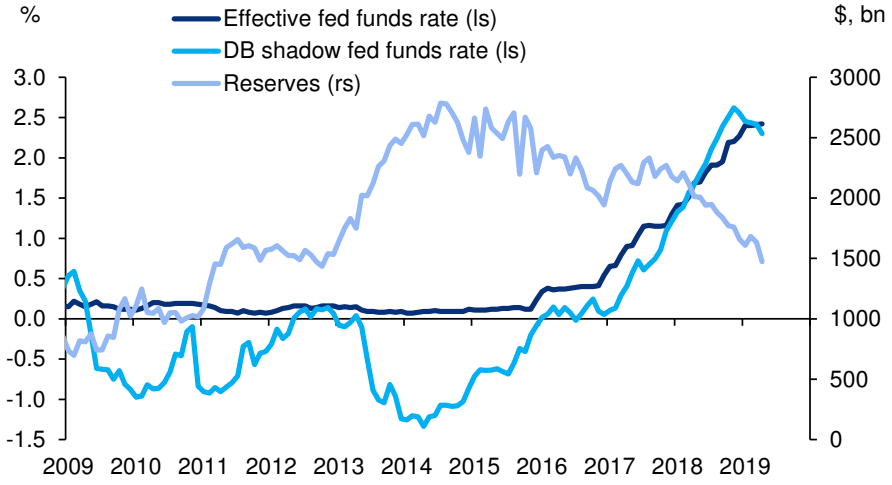
Policy tool options for the zero lower bound

A second key topic for the Fed's review is what tools they should use to provide monetary accommodation when interest rates get back to the effective lower bound. Much of the content in this section is summarized from an earlier note: Scope for policy stimulus when a global recession hits .

QE: A now conventional unconventional tool

Most assessments indicate that QE and forward guidance were able to effectively compensate for some of the lost policy stimulus due to the fed funds rate being stuck at the zero lower bound since the crisis. As the minutes to the August 2018 FOMC meeting indicate, however, Fed officials are very aware about the uncertainties surrounding these estimates. In particular, the minutes noted that, "participants acknowledged that there may be limits to the effectiveness of these [unconventional] tools in addressing an ELB [effective lower bound] episode. They also emphasized that there was considerable uncertainty about the economic effects of these tools. A number of participants indicated that there might be significant costs associated with the use of unconventional policies, and that these costs might limit, in particular, the extent to which the Committee should engage in large-scale asset purchases."[5]

Figure 5: DB shadow rate shows balance sheet provided substantial accommodation during the recovery from the financial crisis



Source : FRB, Haver Analytics, Deutsche Bank

Therefore, while unconventional tools were successful in easing financial conditions in recent years, the effectiveness of these tools remains in question. Moreover, while an already-elevated balance sheet will not preclude the use of QE during the next downturn, it may make its implementation more politically contentious, particularly if purchases were to be of assets other than Treasuries. At best, QE and forward guidance remain imperfect substitutes for rate cuts. But with few tested alternatives, we expect QE and forward guidance to be used regularly in the future in response to these episodes.

5 Research supporting this uncertainty includes Chung et al. (2018), and Greenlaw et al. (2018).

Yield curve control (YCC): More bang for the buck

As an alternative to QE the Fed could pursue yield curve control in which the central bank specifies the level of yields they wish to achieve and allows the market to determine how much QE must be executed to hit that target, as the Bank of Japan has done in recent years. Such an approach would not be completely foreign to the Fed. Vice Chair Clarida recently noted that, although the Fed reviewed YCC in response to the financial crisis, they "ultimately found this tool and some others deployed by foreign central banks wanting relative to the alternatives it did pursue."

In support of YCC, then New York Fed President Dudley previously noted that it could be a more efficient way to conduct balance sheet expansions, as it is more cost-effective to set the price and allow the market to determine the size of the Fed's balance sheet rather than rely on imprecise and uncertain estimates about how QE effects the yield curve to calibrate the size of the asset purchase programs needed to achieve the desired outcome. Governor Brainard also recently highlighted a variant of this approach in which, "once the short-term interest rates we traditionally target have hit zero, we might turn to targeting slightly longer-term interest rates—initially one-year interest rates, for example, and if more stimulus is needed, perhaps moving out the curve to two-year rates."[6]

Given that YCC (and any other QE tools) work primarily through compressing the term premium, the interaction with forward guidance and the signaling channel is a particularly important aspect for which further research is warranted. One could argue that the BoJ successfully kept control of yields despite tapering purchases exactly because they have been successful at convincing market participants of their commitment (not to mention some favorable global rates developments). However, should forces converge to push US rates higher and test the Fed's resolve to defend the target, it could end up with a larger balance sheet than anticipated.

While a smooth transition out of YCC might have been a concern given the untested nature of the policy during the financial crisis, the BoJ's graceful management of the policy thus far should provide the Fed with some confidence on that front. Arguing against YCC, however, is the Fed's revealed preference for alternative policies in response to the financial crisis and the potential for YCC to reduce liquidity in the US Treasury market if the Fed is forced to become an even larger holder of Treasury securities.

Ultimately, the mostly positive BoJ experience with YCC and indications of at least tentative support for such an approach from Fed officials suggest that YCC is likely to be seriously considered in response to the next downturn. We think that YCC will, in some form, be a part of the Fed's toolkit in response to the next downturn.

Negative rates: Still unlikely

A natural alternative to balance sheet policies aimed at mitigating the effects of the zero lower bound is to ignore this constraint by cutting rates below zero. One benefit of being able to cut rates below zero would be the immediacy of the transmission to other financial conditions which could more closely replicate the prescribed rate from traditional policy rules. The Fed considered negative rates in response to the financial crisis but ultimately decided against this tool. As detailed in a technical staff note in 2010, The Fed's concerns with negative rates at the time were numer-

6 Brainard, Lael (May 8, 2019), " 'Fed Listens' in Richmond: How does monetary policy affect your community?" At the Federal Reserve Bank of Richmond.

ous.[7] First, global central banks had very limited experience with the tool at that time. Second, it was unclear if the Fed had the legal authority to implement negative rates. Third, there were practical complications, such as "the Federal Reserve computer systems used to calculate and manage interest on reserves do not currently allow for the possibility of a negative IOER rate, although these systems could be modified over time." The Treasury's systems also did not, at least at that time, accept negative interest rates at auctions.

More fundamentally, deeply negative rates, which they considered to be -35bp or lower, could incentivize banks to significantly reduce reserves in favor of currency, which would in turn present challenges for ramping up currency production, given that the demand would exceed the Fed's inventory by a significant amount. Relatedly, knowledge that the Fed was dramatically ramping up currency in circulation could have unpredictable implications for various macro variables, including inflation and inflation expectations. Finally, the possibility that even near-zero rates could induce "nearly complete revenue losses for Treasury-focused [money market funds]" would risk the "widespread closure of these funds."

Ten years removed from the financial crisis, global central banks now have significantly more practical experience with negative rates then when the Fed was first contemplating this policy in response to the crisis. We also now have data points with which to conduct an empirical assessment of the effectiveness of these policies. So the critical question for the Fed is have these negative rates policies worked and do they dominate other tools, such as QE.

On the former question, as our colleagues in Europe have noted (See Deutsche Bank Thematic Research (March 13, 2019), "How to fix European banking...and why it matters."), negative interest rates have not achieved the desired objective for a variety of reasons, including the adverse signaling effect about the economic outlook, with knock on deleterious effects on confidence, and a lack of loan demand, which cannot be overcome by trying to induce banks to lend more. In addition, negative rates are hindering bank profitability in an economy that is heavily reliant bank lending for credit.

On the other hand, there is some evidence that these policies have had – and could have in the US – some positive effects. For example, recent research from the ECB using bank-level data found that "banks highly exposed to the [negative rates] policy tend to grant more loans."[8] Recent research from the San Francisco Fed uses model simulations to find that cutting the fed funds rate to only -25bp would have achieved most of the necessary easing to get the economy back on track at an earlier. [9] These estimates strike us as being overly optimistic about the ability of slightly negative rates to provide ample accommodation to the economy.

Officials will hear further debate on this issue at next week's conference. A recent paper by one of the presenters, Cynthia Wu, argues that QE is a more effective policy tool than negative interest rates, which need to be "twice as large as a conventional

7 See Burke, C., S. Hilton, R. Judson, K. Lewis, and David Skeie (August 5, 2010), "Reducing the IOER rate: An analysis of options." Released on January 29, 2016.
8 Demiralp, S., J. Eisenschmidt, T. Vlassopoulos (May 2019), "Negative interest rates, excess liquidity and retail deposits: Banks' reaction to unconventional policy in the euro area." ECB Working Paper Series, No. 2283.
9 See Curdia, Vasco (February 4, 2019), "How much could negative rates have helped the recovery?" FRBSF Economic Letter.

policy shock" to achieve the same outcome.[10] However, the moderator for that panel, Ken Rogoff, has recently argued that serious steps should be taken towards eventually being able to implement more deeply negative interest rates because this policy is the most efficient.[11] Among these steps, Rogoff notes that "Implementing effective negative rate policy will require a host of legal, regulatory and tax changes" and that "electronic currency [will have to become] the unit of account" to circumvent issues with currency hoarding.

While negative rates will be considered as part of the Fed's review, the experience of other major economies that have enacted this policy since the crisis does not present a compelling case for the Fed to take that route. Moreover, the steps that would need to be taken to implement deeper negative rates, as would eventually be needed to substitute for other policies, remain non-trivial hurdles. More importantly, while a number of Fed officials have expressed concerns about negative interest rates, including Boston Fed's Rosengren and Dallas Fed's Kaplan, we are not aware of a single official that has supported this tool publicly. As such, we do not think negative rates will be part of the Fed's toolkit in response to the next zero rates episode.

Conclusion

The research at next week's Fed conference is a crucial input into the monetary policy framework review and has the potential to affect how the Fed conducts monetary policy going forward in both "normal times" as well as during periods when traditional monetary policy is constrained. The results of this review will be announced in the first half of 2020 and our base case is that they will be, in Chair Powell's words, more evolutionary than revolutionary, seeking to reinforce the symmetric nature of the Fed's 2% inflation target and perhaps provide some structure for the unconventional monetary policies the Fed may have to use in the future.

10 Sims, E. R. and J. C. Wu (May 23, 2019), "Evaluating central banks' tool kit: Past, present, and future." Working Paper.
11 Lilley, A. and K. Rogoff (April 24, 2019), "The case for implementing effective negative interest rate policy." Paper presented at the "Strategies for monetary policy: A policy conference" at the Hoover Institution, Stanford University.

Appendix 1

Important Disclosures

*Other information available upon request

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