

Market Bulletin

February 5, 2019

Fed Policy: Late-cycle and beyond

Assessing the impact and possible evolution of Fed policy

In brief

- Most interest rate rules suggest the Federal Reserve (the Fed) funds rate should be higher than its current level. However, these rules are not well adapted to the current monetary policy environment. Going forward, economists must re-think their views of interest rates and watch for increasingly complex policy.
- Expanding the balance sheet was equivalent to cutting the Fed funds rate by 500bps. We believe it is ultimately the flow of assets, not the size of the balance sheet, which matters for monetary policy. Financial markets have also been affected, particularly in the fixed income space. We estimate that Fed purchases have held the 10- year term premium down by 130bps.
- While we expect the Fed balance sheet to continue to shrink, the terminal level is likely close to USD3.5 trillion far above pre-financial crisis levels.
- Initially the Fed wanted to shrink the balance sheet regardless of the Fed funds rate. However, it now looks likely the Fed would cut rates and pause the balance sheet at the same time. Fed appears unlikely to use more unorthodox policies such as negative rates.

The U.S. economic expansion is in its 10 year, and is not far from becoming the longest in U.S history. While the economic backdrop remains healthy, all eyes are on the Federal Reserve (the Fed) to see how it navigates the later stages of this economic cycle and what its action might be when the next recession does hit.

When assessing the current state and next steps of monetary policy, investors need to take stock of current policy tools and look ahead to see how they might evolve. In order to do this, this paper is comprised of three parts: an analysis of interest rate policy; an analysis of the balance sheet; and an outlook for Fed policy when the next downturn arrives.

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Part I: Where are interest rates going?

Since the Fed began its rate hiking cycle in December 2015, investors have slowly but surely adjusted to the changing interest rate environment. Today, many investors do not question the direction of travel for interest rates, but do ponder where rates will settle and whether they are currently too low considering our position in this expansion.

Attempting to forecast where interest rates should be and where they are going is challenging. To help provide some guidance, economic theory has generated a number of models, or “interest rate rules,” to help economists forecast where interest rate policy should be and how it might evolve going forward. The most commonly used rules are:

- **Taylor rule¹:** The Taylor rule is one of the more prominent interest rate forecasting models. It attempts to project the nominal federal funds rate as a function of where the economy is relative to its long-run equilibria for inflation and unemployment.
- **Balanced-approach rule¹:** Similar to the Taylor rule, the balanced-approach rule looks at both the unemployment gap and the inflation gap. However, the unemployment gap coefficient is twice as large as in the Taylor rule.
- **Change rule¹:** The change rule uses the actual federal funds rate from the previous quarter and adds that to the difference between current and long-run inflation and unemployment, and increases both of their coefficients.
- **First-difference rule¹:** The first-difference rule uses a forward-looking inflation gap and the change in the unemployment rate in the prior quarter. The rule is unique as it omits the unobservable variable, non-accelerating inflation rate of unemployment (NAIRU) from the unemployment gap calculations.

¹ All policy rules are sourced from the U.S Federal Reserve, Monetary Policy Principles and Practise, March 8, 2018.

So what do these rules tell us about interest rate policy and where it should be? As shown in **Exhibit 1**, current rate policy looks overly accommodative, but future rate policy is more unclear. In the appendix, we outline each of the rules in further detail and provide additional color to our analysis.

EXHIBIT 1: CURRENT INVESTMENT MODELS AND LONG-TERM FORECASTS²

Rule	Implied current rate	2021 forecast
Fed dot plots	2.50%	3.13%
Taylor rule	3.58%	5.06%
Balanced approach	4.19%	5.98%
Change	2.90%	5.07%
First-difference	2.25%	2.98%

Source: Congressional Budget Office, FactSet, U.S Federal Reserve, J.P. Morgan Asset Management. Historically, across all policy rules, inflation targets have been held at 2% while full employment levels have been sourced from the Congressional Budget Office (CBO). For long-term forecasts, inflation forecasts have been used from the U.S. Federal Reserve and NAIRU estimates have been held at the latest CBO estimate.

The interest rate rules prescribe a diverse range of outcomes. However, investors should be cautious in interpreting these results. Traditional monetary policy rules, like the Taylor rule, are reliant on unobservable variables including full employment and a long-run equilibrium interest rate, commonly referred to as r^* . In addition, many of these rules are not well suited for the current low interest rate environment, with rules such as the balanced rule or the change rule suggesting that interest rates should have entered deeply negative territory for much of this cycle. Furthermore, many do not take into account the impact that balance sheet expansion has had on financial conditions.

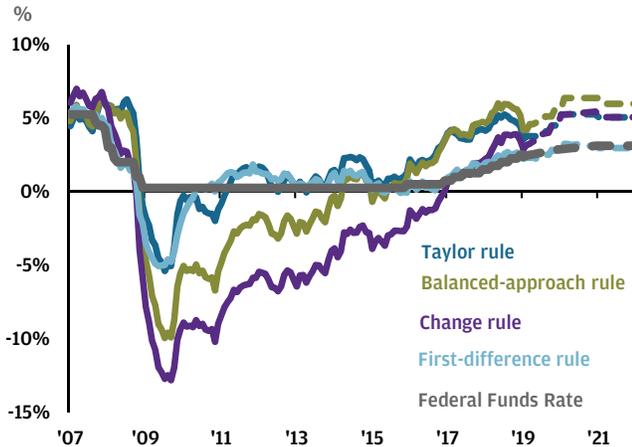
So which rule is most appropriate? Ideally, the best rule is one that is well-adapted to current economic conditions and aligns with what Fed officials are thinking.

² Individual policy rules may differ from the Federal Reserve calculations due to differences in approach. One notable variation on the Taylor Rule is substituting GDP for the unemployment rate using Okun’s Law, which states that for a 1% increase in unemployment, a country’s GDP will be 2% lower than its potential. In this analysis, we have used unemployment, as it part of the Fed’s dual mandate and data availability.

Fed Chair Powell has been skeptical of using interest rate models that rely on unobservable economic variables. This stance therefore rules out the Taylor rule and the balanced approach rule.

Instead, a viable candidate could be the first-difference rule. The first-difference rule uses an unobservable metric for full employment but does not include an r^* estimate, making it a slightly more practical guide for today's economic conditions. As we highlight in **Exhibit 2**, the first-difference rule also closely aligns with the Fed dot plots, suggesting that it may be used by the Fed going forward as it moves away from relying on unobservable economic variables.

EXHIBIT 2: INTEREST RATE MODELS VERSUS FED FUNDS RATES



Source: FactSet, Federal Reserve Board, J.P. Morgan Asset Management. Data are as of February 5, 2019.

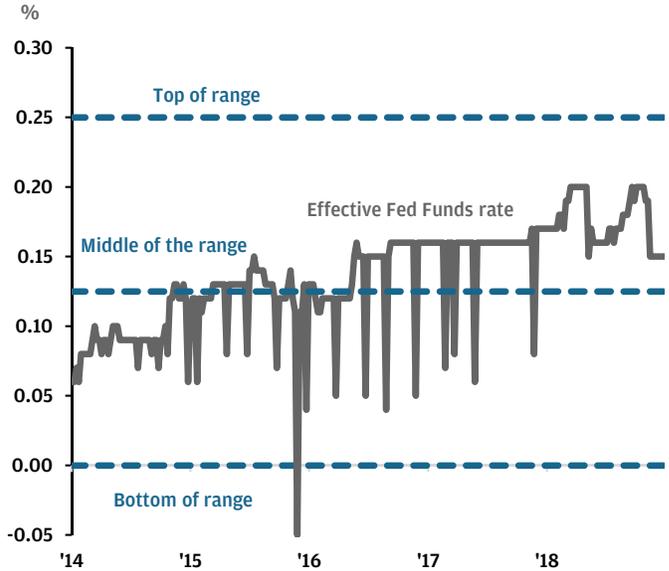
Overall, investors must re-think the approach to interest rates in this new monetary policy regime, relying less on unobservable economic metrics and leaning more heavily on less traditional models, like the first-difference rule.

Interest rate policy is getting complicated

While the big picture of interest rate policy is certainly an area of focus, investors should not overlook some of the more nuanced issues of setting policy. The Fed is currently grappling with one such issue, related to control of the effective Fed funds rate (EFFR).

The EFFR is the actual market interest rate that banks charge each other for overnight loans. The Fed sets a target Fed funds band, typically of 25bps, and the EFFR typically trades very close to the middle of the range. As shown in **Exhibit 3**, the EFFR sat close to the middle of the Fed's target range for most of this economic cycle. However, over the course of 2018 the EFFR has moved away from the middle of this band.

EXHIBIT 3: INTEREST RATE MODELS VERSUS FED FUNDS RATES



Source: FactSet, Federal Reserve Board, J.P. Morgan Asset Management. Data are as of February 5, 2019.

Why is the EFFR rising towards the top of the range? Most likely, the large amounts of Treasury issuance is playing a part. In 2018, the U.S. Treasury issued USD7.8 trillion in short-dated bonds, 19% more than in 2017. This has flooded the short-end of the fixed income markets, and as supply of short-dated debt instruments has increased, prices have fallen and yields have risen. This includes the EFFR. This issue is further compounded by balance sheet reduction, which is adding selling pressure to bond prices.

While this may not seem like a large issue, the EFFR slipping away from target challenges the credibility of the Fed. If the EFFR starts testing the Fed's target range, investors may begin to lose confidence in the

Fed to implement policy at this crucial juncture, where rates are rising and the balance sheet is declining.

In order to address this issue, the Fed is leaning on a tool called the “interest on excess reserves” (IOER). The IOER is the interest rate paid to banks for the deposits they hold with the Federal Reserve above those required by banking regulation. The tool was created for the Fed in December 2008 and it has become its principal means for enforcing its monetary policy decisions within financial markets³.

From December 2008 to June 2018, the IOER has been set at the same level as the top of the Fed funds band. If the Fed increased its Fed funds rate target by 25bps, the IOER rate would increase by the same amount. However, the Fed departed from this convention at its June and December meetings, increasing the target Fed funds rate by 25bps but only increasing the IOER rate by 20bps. This divergence was designed to push the EFR back towards the middle of the range, and it has worked. However, if the EFR rate gets too close to the top of the band again the Fed may have to increase this divergence throughout 2019.

With the Fed moving towards a dual-rate methodology to control financial conditions, investors are witnessing an adoption of a more complicated monetary policy framework. This should not come as a surprise, and investors would be wise to remember that central bankers are in uncharted waters: never before have we seen central banks attempt to unwind such aggressive monetary policy easing. As we move through this cycle, unforeseen issues and unintended consequences of earlier decisions may begin to come into view. Ultimately, the next generation of monetary policy is likely to be more complicated than it has been in the past, and economists will need to change the tools they use to assess it.

³ Prior to the introduction of the IOER, the Fed used purchases of government securities to influence bank reserves and control financial conditions. However, the expansion of the balance sheet made it increasingly difficult for the Fed to use its old methods, making the introduction of the IOER rate necessary.

Part II: What is the future for the balance sheet?

Taking stock of U.S. monetary policy used to involve focusing solely on the direction of interest rates. However, when interest rates were cut to zero in the wake of the financial crisis, the Fed was forced to reach for a more unorthodox monetary policy tool – the balance sheet.

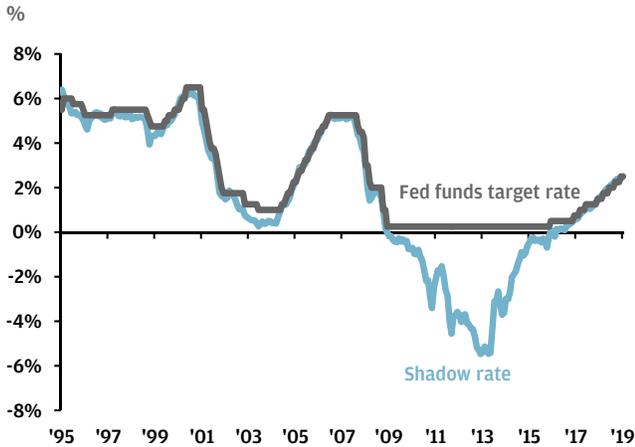
As discussed, it seems likely that the Fed will not manage to get interest rates back to a level that would allow it enough dry powder with which to adequately fight the next recession. As a result, the Fed will likely utilize the balance sheet to fight the next slow down. However, in order to better understand the balance sheet, investors need to consider three factors: what was the aim of balance sheet expansion, did it work and what impact does it have on financial markets?

First, when the large scale asset purchase program was launched in 2008, the Fed’s goal was to loosen financial conditions despite having interest rates constrained by the zero lower bound (ZLB). In theory, asset purchases would suppress yields in core fixed income, causing investors to seek alternative investments (investment grade and high yield credit as well as equities) to boost returns. The support of a healthier financial market would therefore help build confidence and support growth.

Second, investors must consider whether the Fed achieved its desired aim of loosening monetary policy conditions. **Exhibit 4** shows the Fed funds target rate and the shadow rate, an unobservable monetary policy rate that comes into effect when the FFR hovers close to zero. It is calculated by tracking the movements of various rate benchmarks to estimate monetary policy conditions. As we highlight, the shadow rate entered deeply negative territory from 2009 to 2015, providing investors with two important takeaways: first, large scale asset purchases do work; and second the rate of asset purchases rather than

overall balance is what matters for monetary policy conditions. The shadow rate reached a low of -5.46% in April 2013, yet the Fed balance sheet did not peak in size until October 2014. The shadow rate also shows that monetary policy has effectively been tightening ever since the shadow rate troughed, more than two years before the Fed's first rate hike.

EXHIBIT 4: FEDERAL FUNDS TARGET RATE AND SHADOW RATE



Source: Federal Reserve, Leo Krippner, FactSet, J.P. Morgan Asset Management. The shadow rate is an economic factor model calculated based on VAR calculations that can help measure the impact of asset purchases when rates are close to zero. Data are as of February 5, 2019.

Finally, investors need to consider the impact that balance sheet expansion has had on financial markets, particularly in fixed income. The Fed's large scale asset purchase program has represented a large source of demand for Treasuries, holding down yields.

In our view, Treasury yields are driven by three components: inflation expectations, the future path of short-term interest rates (economic growth) and the term premium. The term premium is an unobserved variable that can be estimated, and is defined as the additional compensation an investor demands for holding a longer-term bond over a shorter-term bond (taking duration risk).

For much of this expansion, the term premium has been held in negative territory. This is due to a number of factors including lower interest rate volatility, lower developed market yields, higher foreign ownership of

Treasuries and bond purchases by the Federal Reserve. By our estimates, at the peak of the Fed's balance sheet expansion program, the term premium of the U.S. 10-year was held down by 130bps. Presently, we estimate that the balance sheet is holding down the U.S. 10-year by approximately 100bps. Pressure on government yields will continue to ease as the Fed reduces its holdings of government debt. This could be reversed if the Fed is forced to expand the balance sheet again when the next slowdown occurs.

Where is the Fed balance sheet going?

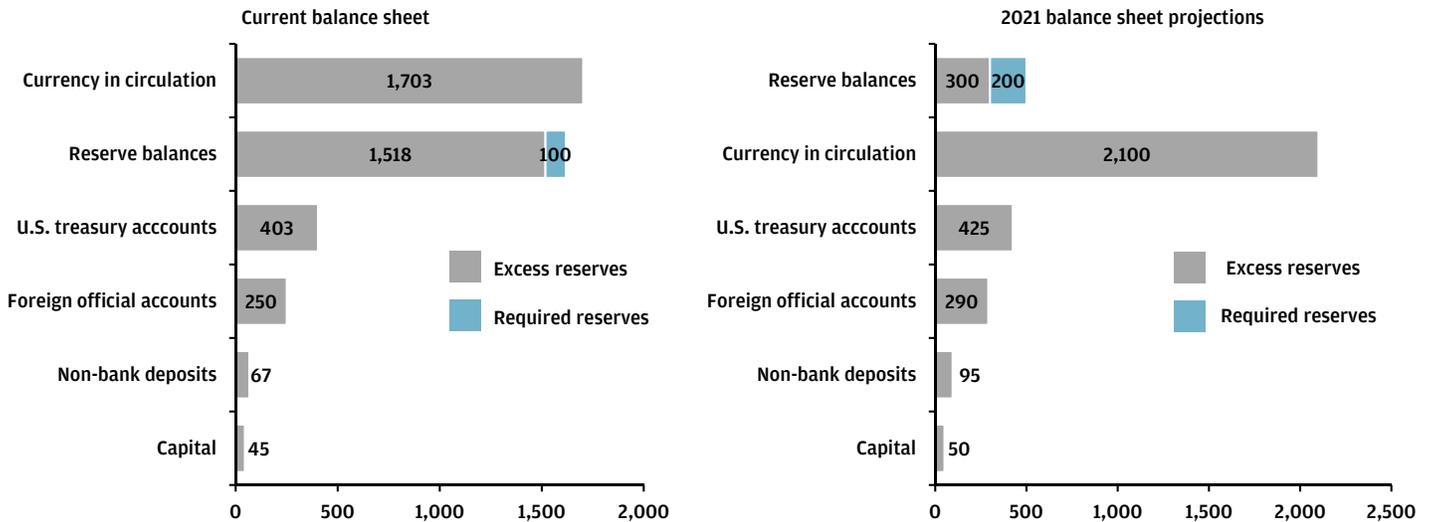
We have discussed what the Fed balance sheet has done to monetary policy and financial market conditions over the course of this cycle. Now we need to consider where the balance sheet is going. The Fed's balance sheet reduction journey began in September 2017, when the Fed introduced a cap on monthly maturing assets. This cap has been gradually increased from USD10bn per month to the maximum USD50bn as of October 2018.

While we know the start date of this balance sheet journey and the path it has taken, one crucial bit of information is missing - the destination. Most financial commentators have attempted to calculate the potential end point by focusing primarily on the asset component of the balance sheet. By looking at the profile of maturing assets on the Fed balance sheet, the balance sheet's implied level by the end of 2021 is USD2.9 trillion. This figure was further supported by projections from the Federal Reserve Bank of New York in July 2017, which estimated that the final balance sheet level would be somewhere between USD2.4 trillion and USD3.5 trillion over a four year period.

However, this approach overlooks the liability side of the Fed's balance sheet, which is likely to be a major restraint on how far the balance sheet can be rolled down. **Exhibit 5** highlights current Fed liabilities as

EXHIBIT 5: FED BALANCE SHEET LIABILITIES

USD Billions



Source: U.S. Federal Reserve, J.P. Morgan Asset Management. Reserve balance estimates are gradually reduced back to the 2008 level with additional boost for reserve bank balances due to regulatory changes. The currency in circulation is forecasted on an exponential growth function. Data are as of February 5, 2019.

well as a forecast of where they may be by 2021. In short, the Fed will likely struggle to reduce the balance sheet meaningfully below USD3.5 trillion, roughly USD600 billion higher than original estimates. One major liability restraint is the amount of currency in circulation⁴.

Despite the rise of credit cards and e-commerce, there continues to be a growing supply of physical currency. Currency in circulation is logged as a liability on the Fed’s balance sheet, and by extrapolating the current growth rate it looks set to be the biggest single liability by 2021, therefore hampering balance sheet reduction. What does a slower balance sheet reduction mean for financial assets? As discussed earlier, it is the flow of assets rather than the overall stock of the balance sheet that seems to matter for financial conditions. As a result, balance sheet reduction is unlikely to be as disruptive for financial conditions as first feared. Furthermore, it provides scope for the balance sheet to be utilized again when the next slowdown occurs.

⁴ Currency in circulation has risen by 96% over the last decade. The increase in currency in circulation has resulted in there being more USD100 bills in circulation than USD1 bills. Approximately 70% of dollars are held overseas as a store of value and circulated in the underground economy.

Part III : The Fed of the future

When fighting an economic downturn, the Fed has on average cut interest rates by 5%. With the Fed funds rate currently at 2.50% and little chance of it reaching 5%, investors are pondering what the Fed might do to fight the next recession.

The Fed may draw ideas from other central banks, some of which have explored highly unorthodox monetary policies to stimulate economic growth. However, there are three options that the Fed has not explored: negative interest rate policy, balance sheet extensions and yield curve controls.

1. Negative interest rate policy

To stimulate economic growth, a number of developed market central banks have adopted negative interest rates. Of the largest 10, six have utilized negative interest rate policy (NIRP) in this economic cycle⁵. The economic theory behind NIRP is that conservative savers and financial institutions are punished for

⁵ Countries/regions that have negative interest rates: Eurozone, Switzerland, Japan, Denmark, Norway, Sweden. Other developed countries that have not used negative rate: the UK, the U.S., Australia and Canada.

holding cash, with a negative interest rate essentially a tax on their savings. This encourages banks to lend out capital in order to avoid this charge, therefore stimulating economic growth through credit expansion.

The problem with NIRP is that while the theory may be sound, the practical application is difficult and the side-effects may be worse than the original sickness. There are a few reasons for this: first, the transmission mechanism between interest rates and the financial markets becomes less effective in the realm of negative interest rates, and banks are reluctant to pass on negative rates to customers, who would likely withdraw their funds; second, negative interest rates tend to punish long-term savers, as they receive less from savings and investments, which damages consumption; and finally, the adoption of NIRP may in fact damage business and consumer confidence in the recovery. There is nothing normal about negative interest rates, and their use may highlight how bad the economic backdrop is.

In practice, the central banks that have embraced NIRP show that there is some room below 0%. However, Fed policymakers should be wary about adopting this tool. Sweden was the first central bank to use NIRP in July 2009, and nearly a decade later its policy rate remains below zero. In fact, no central bank that has adopted NIRP has successfully transitioned back to positive interest rates. Economists therefore have not fully understood any distorting impacts NIRP might have on economic fundamentals.

2. Balance sheet v2.0

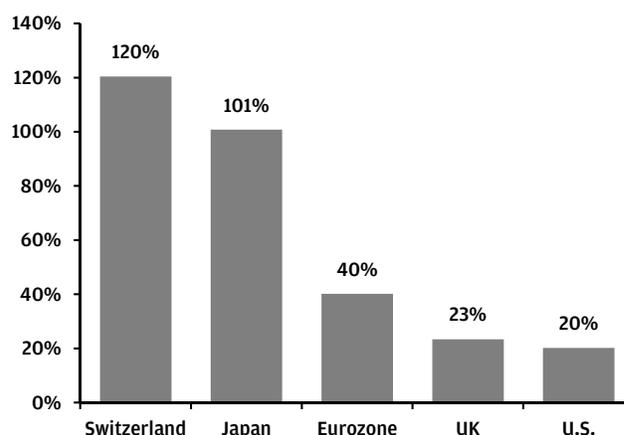
Previous Fed Chair Janet Yellen stated that she views interest rates as the “primary tool” of monetary policy, suggesting that manipulating the balance sheet plays second-fiddle to changing rate. However, should the next downturn hit sooner rather than later, and interest rate cuts are not effective, it is likely that the Fed would once again expand the balance sheet. The question for the Fed, therefore, is how large it could make the balance sheet before hitting capacity

constraints. **Exhibit 6**, which highlights the size of major central bank balance sheets as a percentage of domestic GDP, sheds some light on this issue.

By this measure, the Fed lags far behind other central banks and suggests plenty of room for balance sheet expansion should a downturn hit. Furthermore, the Fed owns approximately 15% of the U.S. Treasury market; by comparison, the ECB and BoJ own 30% and 45% of their domestic debt, respectively, again suggesting plenty of room for maneuvering.

EXHIBIT 6 : CENTRAL BANK BALANCE SHEET SIZE

Percentage of GDP



Source: Bloomberg, Bank of England, Bank of Japan, European Central Bank, Swiss National Bank, U.S Federal Reserve, J.P. Morgan Asset Management. Data are as of February 5, 2019.

Even if the Fed did bump up against restrictions within the U.S Treasury market, it always has the option of expanding the scope of its asset purchase program, albeit only with approval from Congress. A number of other central banks have stretched into alternative asset classes: the ECB, for example, has expanded into non-financial corporate debt; the Bank of Japan (BoJ) has entered into domestic ETF markets, and owns over 60% of the ETF market (making it a top 10 shareholder in 90% of listed firms); and the Swiss National Bank (SNB) own approximately USD 100bn in equities.

Looking ahead, it seems highly likely that if interest rate cuts fail to stimulate economic growth during the

next down-turn, the Fed would pause its current balance sheet reduction program and then begin expanding it again over time.

3. Yield curve control

The case studies discussed so far are not necessarily revolutionary ideas, and while unorthodox in their application they are essentially stretching a concept that has already been applied. The adoption of yield curve control (YCC), however, is a unique and highly unorthodox strategy that has only been deployed by the BoJ so far. YCC involves pegging government bond yields to a target and directly controlling the shape of the yield curve in order to stimulate economic growth. The theory is that a steeper yield curve encourages financial activity amongst banks, as they get rewarded for taking deposits and lending them to the real economy. By doing YCC in conjunction with negative interest rate policy, the BoJ is seeking to force conservative savers to lend to the real economy while not financially punishing banks by fixing the back end of the curve in positive territory.

Like with NIRP, the jury is still out on this policy. Either way, though, the strategy is likely unattainable for the Fed. The BoJ is in a unique position in owning 45% of the domestic bond market, while highly conservative domestic savers controls a further 45%. This gives the BoJ enormous leverage to essentially bend the bond market to its will with little fear of losing control of the situation. The Fed does not have this luxury, and while it is a big owner of domestic Treasuries, it does not have the same power as the BoJ. Furthermore, the rest of the market is still actively controlled by risk-seeking investors with a very different attitude from domestic Japanese savers.

Ultimately the monetary policy response to the next recession depends on the severity of the slowdown. Assuming this recession is closer to a “normal”

recession and not like the Global Financial Crisis, it seems likely that the Fed will lean first on interest rates to stimulate growth and then pause the balance sheet reduction program to help ease financial conditions. With plenty of room to maneuver on the balance sheet, the Fed will likely not be forced to reach for unorthodox monetary policy.

Investment implications

Many of the old, more traditional economic tools for assessing interest rate policy may no longer be appropriate. Instead, the first-difference rule will become more relevant moving forward.

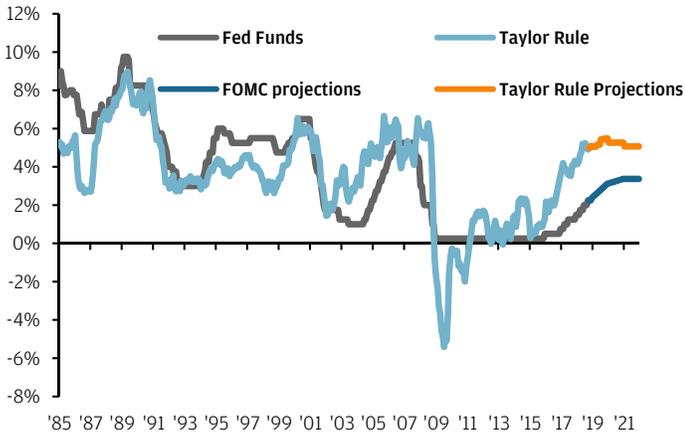
Challenges with maintaining the EFR within the target band are likely to lead to more complex interest rate policy going forward as the target Fed funds rate and IOER rate diverge from one another.

It seems that the flow, rather than the stock, of the balance sheet influences financial conditions. Furthermore, balance sheet liability restraints will constrict balance sheet reduction, meaning liquidity may not tighten as much as first feared.

Looking ahead to the next downturn, the Federal Reserve is unlikely to raise interest rates to such a level that they can be used exclusively to fight the next recession. Instead, the Fed is likely to lean on the balance sheet once again to stimulate economic growth, but more unorthodox monetary policy will not likely be necessary.

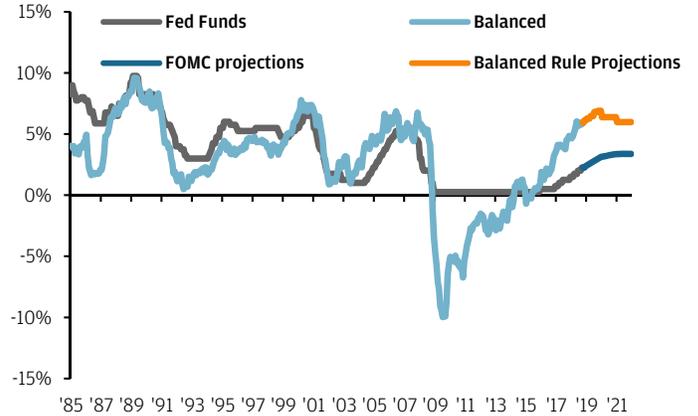
Appendix

TAYLOR RULE VERSUS FED FUNDS RATE



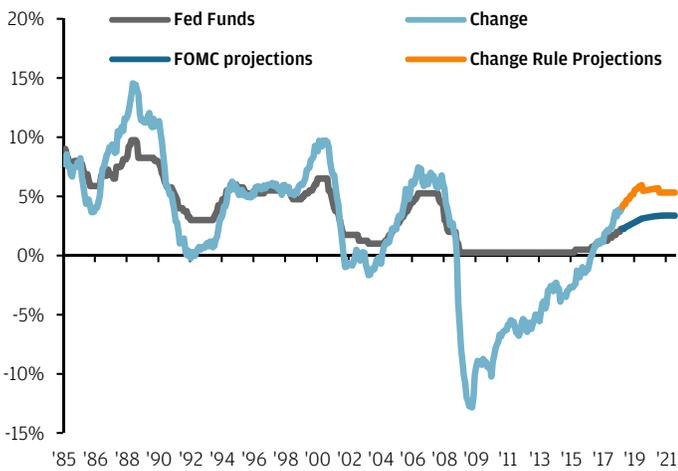
$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t)$$

BALANCED RULE VERSUS FED FUNDS RATE



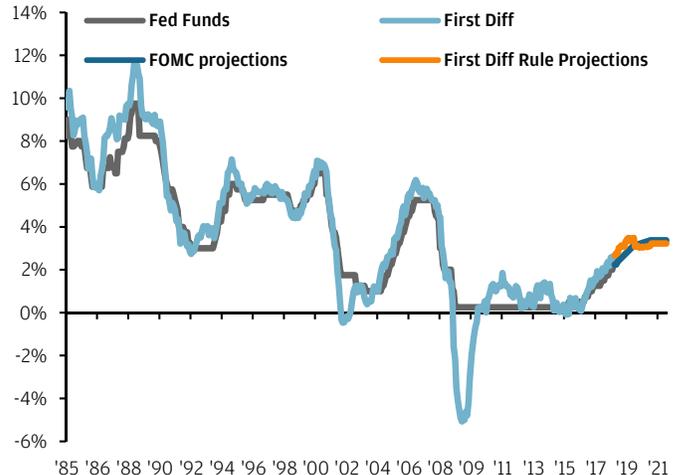
$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2(u_t^{LR} - u_t)$$

CHANGE RULE VERSUS FED FUNDS RATE



$$R_t = R_{t-1} + 1.2(\pi_t - \pi^{LR}) + 2(u_t^{LR} - u_t)$$

FIRST- DIFFERENCE RULE VERSUS FED FUNDS RATE



$$R_t = R_{t-1} + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t) - (u_{t-4}^{LR} - u_{t-4})$$

KEY

r_t^{LR} = level of the neutral real federal funds rate in the longer run

π_t = four-quarter price inflation for quarter t

π^{LR} = inflation at its 2% longer-run objective

u_t^{LR} = rate of unemployment in the longer run

u_t = unemployment rate in quarter t.

Glossary

- Interest on excess reserves (IOER): The interest rate applied to banks capital at the Federal Reserve which is deposited in addition to regulatory capital.
- Effective Fed Funds Rate (EFFR): The market rate at which banks lend to one another in the overnight market on an uncollateralized basis.
- Zero-lower bound (ZLB): The zero-lower bound issue occurs when short-term interest rates get close to or are reduced to 0% causing liquidity issues and hindering the ability of central banks to further stimulate the economy.
- Shadow Rate: An unobservable economic variable that can be used a proxy for interest rates when rates hit the ZLB.
- Negative interest rate policy (NIRP): Occurs when a central bank lowers interest rates below 0%.
- Yield curve control (YCC): A policy adopted by the Bank of Japan to fix the shape of the Japanese government yield curve by using asset purchases to hold yields within a target range.

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