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Fed Brief

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FOMC reaction function implies rate forecasts likely to rise

Recent developments, especially related to fiscal policy, suggest that FOMC members' forecasts for the appropriate path of the federal funds rate could be revised higher at upcoming meetings. At the time of the December 2017 policy meeting, median forecasts from FOMC members anticipated 3 quarter-point rate hikes in 2018, 2 in 2019, and either 1 or 2 in 2020. It is unclear whether those median estimates will change this month, but we do expect individual forecasts to be revised up at the policy meeting on March 20 and 21. To help assess potential revisions to FOMC interest-rate forecasts, we employ a simple policy rule with inertia. This enables us to develop a plausible reaction function *for interest rate policy.*

Overview

During recent congressional testimony, Chairman Powell indicated that confidence in his inflation forecast (for a rise to 2%) had been boosted by recent data.[1] In addition, he cited stimulus from new fiscal policies and favorable global developments as reasons to expect strong growth. His personal outlook for the economy had strengthened since December. As a result, we think it likely that the Chair will revise his forecast for the path of the federal funds rate to include 4 rate hikes this year, instead of the 3 that we estimate he projected back in December. It is possible that the Chair could revise up his forecast for interest rates as soon as the upcoming FOMC meeting that begins on March 20. Other FOMC members have also hinted that they may be poised to revise up their interest rate forecasts.[2]

FOMC interest-rate forecasts

upper end of target range for the federal funds rate
for year ends and in the long run
as of December 2017

	2017	2018	2019	2020	long run
Median	1.50	2.25	2.75	3.13	2.75
Mean	1.47	2.14	2.81	3.11	2.78
Highest-lowest	0.25	1.50	2.25	2.75	0.75

[1] During his testimony to the House Committee on Financial Services on February 27, 2018.

Forecast revisions for interest rates

How far might FOMC forecasts be raised at the upcoming meeting on March 20 and 21? The median estimate submitted in December was for 3 rate hikes in 2018; we estimate that the Chair's forecast for 2018 matched that median. It would take a total of four FOMC members revising up their 2018 forecasts from 3 or fewer rate hikes to 4 or more, to raise the median estimate to 4. In addition to the Chair, a few other members could fall into a group revising up from 3 rate hikes to 4 in 2018, including Governor Quarles and President Dudley, and possibly Presidents Williams and Kaplan. Of course, because FOMC forecasts are not identified, we are unlikely to know with certainty who, if anyone, revises their forecasts.

If there are revisions to interest-rate forecasts at the upcoming meeting, they are likely to be persistent but not permanent. Higher paths for the funds rate in 2018, and in particular, an upward revision to the appropriate level of the target rate for the end of this year, are likely to translate into higher paths for subse-

[2] During remarks on March 6, Governor Lael Brainard seemed to hint that she had revised up her expectations for the appropriate path of the federal funds rate, in particular citing a shift from headwinds that "sapped the momentum of the recovery and weighted down the path of policy" to tailwinds that were reinforcing recovery (and presumably raising the policy path).

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quent years given forecasts for above-trend growth, already low unemployment, and expectations that inflation will rise to at least 2%. The fiscal factors that support a stronger outlook — namely, the stimulative effects of the TCJA and the BBA 2018 — are likely to persist beyond 2018. However, estimates of the long-run anchor for the funds rate are unlikely to change significantly at the upcoming FOMC meeting: in December, most such estimates were either 2¾% or 3%.[3] Nevertheless, the extent to which FOMC forecasts are revised will depend on the response of economic activity to fiscal policy, which is estimated with notable uncertainty.

Calibrating the FOMC's reaction function

Among Chairman Powell's goals are to increase the transparency of the Fed's policy decisions and to facilitate a greater understanding by the public of factors that influence Fed decision-making. To that end, he has suggested that simple policy rules could be a useful point of reference for indicating how Fed decisions on interest-rate policy might respond to economic developments.[4] It may be possible to illustrate the FOMC's views on the appropriate path for the funds rate, and how the FOMC consensus might respond to forecast developments, through a particular rule that we describe below.

The proposed rule embodies three principles. *First*, it reflects inertia in rate-setting: the policy rate typically moves gradually toward the level that would be appropriate over the longer run, to minimize the risk of disrupting markets. *Second*, there is a "penalty" for inflation: the rule specifies a greater than 1-to-1 response of the nominal target rate to inflation that differs from the target (of 2%). *Third*, the policy rate responds to resource slack as measured by the difference between unemployment and the level of unemployment that is believed to be sustainable over the longer run — what is often referred to as the non-accelerating inflation rate of unemployment, or the NAIRU.

One such rule, which we think fairly embodies a consensus-like reaction function for the FOMC, can be described as follows. The effective federal funds rate is denoted by i^{eff}, inflation is denoted by π, the unemployment rate is denoted by u, and the NAIRU is denoted by u^{NR}. The "equilibrium" level of the real federal funds rate — the level of the real federal funds rate that would be consistent with stable inflation at the target when the unemployment gap is zero and expected to remain there — is denoted by r^*. Inertia is reflected in the non-zero coefficient applied to the lagged effective federal funds rate (with a value of 0.7). The inflation target is 2%.

$$(1) \quad i_t^{eff} = 0.7 * i_{t-1}^{eff} + (1-0.7) * \left[r_t^* + \pi_t + 0.5 * (\pi_t - 2) - 0.7 (u_t - u_t^{NR}) \right]$$

The rule is applied to quarterly data.

The expression (1) in is similar to a policy rule with inertia described by the Chairman last year.[5] It differs most importantly in that it specifies a lower weight on the unemployment gap. Among FOMC members, there is uncertainty about both the level of the NAIRU and the responsiveness of inflation to differences between the unemployment rate and estimates of the NAIRU. This uncertainty could be justification for down-weighting the response of the policy rate to the unemployment gap — other rules often assume coefficients between 1 and 2. Indeed, one FOMC member (President Kashkari) has adopted the position that, under current circumstances, the FOMC should focus almost exclusively on the shortfall of inflation, underscoring the somewhat

[3] The TCJA and BBA of 2018 imply larger deficits and a higher trajectory for government debt that could raise estimates of the appropriate long-run anchor for the federal funds rate. However, we do not expect significant changes to most FOMC estimates of the long-run funds rate at the upcoming policy meeting.

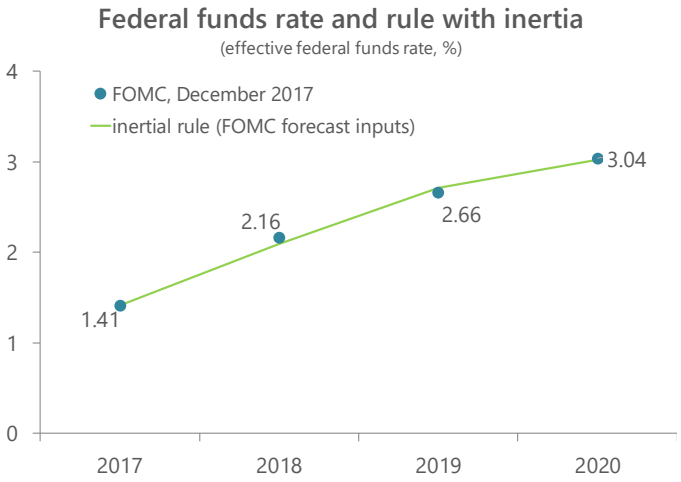
[4] Like virtually every other member on the current FOMC, the Chairman is opposed to the use of a simple policy rule as a *mechanical* prescription for interest-rate decisions.

[5] See Powell, J., "The Economic Outlook and Monetary Policy," remarks delivered at the Forecasters Club of New York Luncheon, February 22, 2017.

diminished responsiveness of the policy rate to the level of unemployment as reflected in (1). A few other FOMC members have expressed a greater willingness to focus on inflationary developments than on estimates of labor-market slack when determining the appropriate path of the funds rate.

Forecast uncertainty and the desire to reduce the risk of quick reversals of policy moves are often cited as justification for a gradual response of the policy rate to economic factors, as reflected in the partial adjustment (inertial) structure of rules such as (1). The desire to avoid unnecessarily upsetting financial markets is also sometimes used to justify a more gradual response of the policy rate.[6]

We apply the rule in (1) to the FOMC's economic forecasts submitted at the time of their December 2017 FOMC meeting. In particular, we use median estimates for the unemployment rate, core PCE inflation, and the sustainable level of the unemployment rate in the long run (4.6%). We jump-off from the actual level of the federal funds rate in December 2017 (that is, taking into account the FOMC's decision to raise the upper end of the target to 1½%). We assume that r^* rises gradually from zero toward the FOMC's median estimate of 0.75%. The model is quarterly, so we interpolate to generate plausible quarterly paths for inflation and unemployment consistent with the FOMC's fourth-quarter forecasts.[7] The rule-consistent path for the effective funds rate is shown, along with median FOMC estimates, in the next chart. (Recently the effective federal funds rate has averaged 9 basis points less than the upper end of the target range established by the FOMC.)



The rule-consistent path fits the median path from the FOMC (for the effective funds rate) very closely, embodying 3 quarter-point rate hikes in 2018, 2 in 2019, and between 1 and 2 in 2020, with the effective federal funds rate rising slightly above 3% by late 2020.[8,9]

We can use this rule to infer an FOMC *reaction function* to recent developments. We begin by noting differences between our latest forecasts for growth, unemployment, and inflation, and those submitted by FOMC members last December, as shown in the table on the next page.

To be clear, it is not our assertion that FOMC members will update their projections for growth, unemployment, and inflation to *match* our most recent forecasts. However, a comparison with our forecasts does provide an indication of the direction in which forecasts will be adjusted when FOMC members meet later this month. One of the most important developments since FOMC members last submitted their forecasts in December is the expectation for significant fiscal stimulus to de-

[6] Our intent here is not to argue, from a normative perspective, for any particular degree of inertia in adjusting interest rates. The use of an inertial rule as in (1) reflects a plausible interpretation of FOMC behavior as reflected in their recent decisions and in their actual interest-rate forecasts at the time of the December 2017 meeting. There is a robust debate about whether or under what circumstances policy should adjust gradually to new developments.

[7] Changes in FOMC forecasts for inflation and unemployment from one year to the next are very small, so different methods for interpolation would produce nearly identical results for the policy rate.

[8] For the December 2017 meeting, 8 FOMC members submitted interest-rate forecasts for 2020 that were 3% or lower, and the other 8 members submitted forecasts above 3%.

[9] We readily acknowledge that median interest-rate forecasts do not necessarily correspond to median forecasts submitted by FOMC members for unemployment and inflation. Nevertheless, median economic forecasts are likely to be broadly representative of the economic forecasts associated with those FOMC members who submitted interest-rate forecasts equal to median forecasts.

Economic projections from the FOMC and MA by IHS [10]

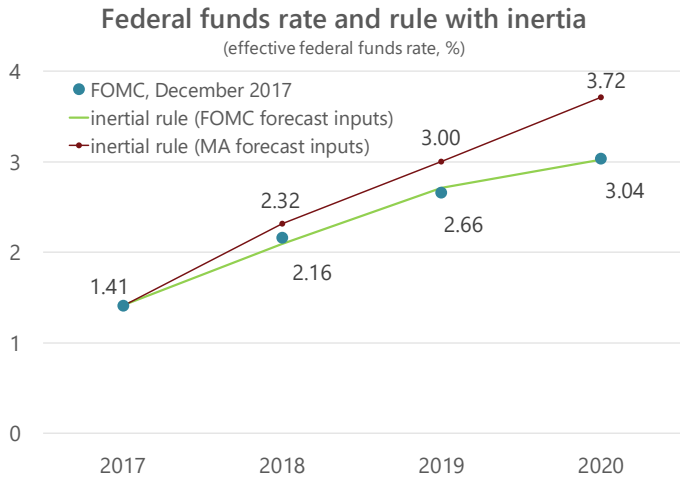
	2017	2018	2019	2020	Long run
GDP					
FOMC (December 2017)	2.5	2.5	2.1	2.0	1.8
MA (March 2018)	2.5	2.9	2.7	2.0	2.0
difference (FOMC-MA)	*0.0*	*-0.4*	*-0.6*	*0.0*	*-0.2*
Unemployment rate					
FOMC	4.1	3.9	3.9	4.0	4.6
MA	4.1	3.7	3.5	3.5	4.7
difference	*0.0*	*0.2*	*0.4*	*0.5*	*-0.1*
PCE inflation					
FOMC	1.7	1.9	2.0	2.0	2.0
MA	1.7	1.7	1.9	2.5	2.0
difference	*0.0*	*0.2*	*0.1*	*-0.5*	*0.0*
Core PCE inflation					
FOMC	1.5	1.9	2.0	2.0	
MA	1.5	1.9	2.1	2.3	2.0
difference	*0.0*	*0.0*	*-0.1*	*-0.3*	
Federal funds rate					
FOMC	1.41	2.16	2.66	3.04	2.91
MA	1.41	2.41	3.16	3.41	2.66
difference	*0.00*	*-0.25*	*-0.50*	*-0.37*	*0.25*

mand growth over the next few years stemming from the Tax Cut and Jobs Act and the more recent Bipartisan Budget Act of 2018, which enables substantial increases in discretionary spending for defense and nondefense. We do expect that FOMC members will revise up their GDP growth forecasts for 2018 and 2019, and revise down their projections for the path of the unemployment rate. We would be surprised to see a material increase in inflation forecasts, even in 2020, (and in contrast to our expectation that inflation will overshoot the 2% target), as some policymakers seem to be averse to showing an inflation overshoot under "appropriate" monetary policy.[11]

An interesting exercise would be to assess how FOMC estimates for the "appropriate path" of interest rates would change in response to updated projections for unemployment and inflation. Using the simple policy rule in (1), we compute a path for the effective federal funds rate conditioned on MA's forecasts for unemployment and inflation. The next chart displays the median FOMC forecast from December, the rule-based projection shown earlier consistent with the FOMC's December economic projections, and a rule-based pro-

[10] GDP and both inflation measures are four-quarter percent changes as of the fourth quarter of the year indicated. Unemployment rate forecasts are fourth-quarter averages. Federal funds rate projections are for the effective funds rate at the end of the year (after the final scheduled FOMC meeting of the indicated year), assuming a spread to the interest rate on bank reserves of 9 basis points. FOMC projections are the median estimates submitted for the December 12–13, 2017 FOMC meeting. Longer-run projections for core PCE inflation are not collected from FOMC members. Forecasts from MA by IHS Markit are taken from our base forecast published on March 5, 2018.

[11] This leads to a separate issue not discussed here: whether the FOMC should actively seek to promote a moderate overshoot of the 2% inflation target for a few years, to more firmly anchor inflation expectations following the long period when inflation has mostly been below 2%.



jection based on MA's unemployment and inflation forecasts as prepared earlier this month.

The results are significant! More than a ¼-point higher funds rate in 2019 and nearly a ¾-point higher level of the federal funds rate in 2020 (from near 3% to nearly 3¾%) would certainly get markets' attention (and ours, and we are sure, yours). Such a major revision won't happen at the upcoming FOMC meeting in March. *It is much more likely that revisions to FOMC interest-rate projections will be smaller than suggested by this exercise, but the direction of revision seems clear: FOMC rate forecasts are poised to firm*.

It should be noted that when polled in December, FOMC members indicated they perceived the balance of risks to their growth forecasts to be weighted to the upside, risks to unemployment forecasts to be weighted to the downside, and risks to inflation forecasts to be about balanced. Those responses did seem to anticipate, at least directionally, the revisions that we expect will occur later this month when the FOMC next meets.

Is the reaction function stable?

A policy rule that is appropriate today may be useful for anticipating changes in interest-rate policy for moderate updates to economic forecasts that are within the range of likely alternatives anticipated by policymakers. However, in a more fundamental sense, the usefulness of any simple rule is not robust across substantially different circumstances, a point reiterated by many policymakers at the Federal Reserve over the last several years. A given policy rule may not be robust to substantial changes to the risk profiles associated with underlying forecasts for employment and inflation. Rules embodying inertia are less appropriate when there are significant changes in risks to the outlook not yet reflected in actual economic data, except, possibly, when those rules are sufficiently forward-looking.

One particular development that might alter the usefulness of the rule shown in (1) is the following. The weight placed on the unemployment gap could increase if uncertainty around estimates of the NAIRU shrinks and especially if evidence emerges of a significant response of inflation to tightness in labor markets. Recall the argument, noted above, that uncertainty about the NAIRU and about the responsiveness of inflation to estimates of the unemployment gap were reasons to down-weight the latter in interest-rate setting. Down-weighting is more plausible so long as inflation continues to run below the 2% target. In short, should future developments, such as a persistent rise of inflation, increase confidence on the part of the FOMC that inflation is responsive to estimates of the unemployment gap, weight on the latter is likely to rise relative to the parameterization in (1). Increasing the weight on the unemployment gap relative to (1) would result in further upward pressure on projections for the appropriate path of the federal funds rate.

Another source of uncertainty about the applicability of the policy rule is related to changes in the composition of the FOMC. In addition to a new Chairman (Powell) since last December, there is also one new Governor (Quarles), and one new President (Barkin). In addition, there is likely to be one other new President (New York, to replace Dudley) and there could be up to four more new Governors (to fill open positions) in the foreseeable future. For now, we assume that reactions by FOMC members to economic developments — especially for members whose views are close to the median — are likely to be qualitatively similar to reactions in the recent past, but that assumption is subject to change as the composition of the FOMC evolves.

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