Policy Rules and Forward Guidance Following the Covid-19 Recession

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Abstract

The Federal Open Market Committee raised the target range for the federal funds rate above the Effective Lower Bound in March 2022 for the first time since March 2020 and projected six more rate increases in 2022. The Committee's actions follow the August 2020 revised Statement on Longer-Run Goals and Monetary Policy Strategy and the September 2021 Statement specifying forward guidance for when to first raise the federal funds rate. The Committee's forward guidance, however, failed to predict liftoff from the Effective Lower Bound. We first show how to modify the rules in the Fed's Monetary Policy Report to be consistent with the revised statement. We then show how policy rule forward guidance using inertial rules would have provided a much more stable benchmark for liftoff from the Effective Lower Bound and projected rate increases through 2024 than either non-inertial rules or the Committee's forward guidance. As of March 2022, the federal funds rate was between 1.0 and 1.25 percent below the rate prescribed by the inertial policy rules. While the Committee raised the federal funds rate by 50 basis points in May and signaled that there would be two more 50 basis point increases in June and July, it would still need 50 basis point percent increases in at least two of its three additional meetings to close the gap by the end of 2022.

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1. Introduction

The Federal Open Market Committee (FOMC or Committee) raised the target range for the federal funds rate (FFR) by 1/4 percent from 0.25 – 0.5 percent to 0.75 – 1.0 percent at its May meeting and "anticipates that ongoing increases in the target range will be appropriate." This followed a 1/4 percent increase from the effective lower bound (ELB) of 0.0 – 0.25 percent in its March meeting, the first increase from the ELB in two years. In the press conference following the May meeting, Fed Chair Powell went further by saying that "There is a broad sense on the committee that additional 50 basis point increases should be on the table for the next couple of meetings." The minutes of the May meeting went even further by stating "Most participants judged that 50 basis point increases in the target range would likely be appropriate at the next couple of meetings"[1]

In August 2020, the FOMC adopted a far-reaching Revised Statement on Longer-Run Goals and Monetary Policy Strategy. The framework contains two major changes from the original 2012 statement. First, policy decisions will attempt to mitigate *shortfalls*, rather than *deviations*, of employment from its maximum level. Second, the FOMC will implement Flexible Average Inflation Targeting where, "following periods when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time."[2]

At its September 2020 meeting, the Committee approved outcome-based forward guidance. It expected to maintain the target range of the federal funds rate (FFR) at the effective lower bound (ELB) of 0 to ¼ percent "until labor market conditions have reached levels consistent with the Committee's assessment of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time."[3] In the Summary of Economic Projections (SEP) released following the meeting, the median projection of the members for the FFR was 0.1 percent through the end of 2023. Vice Chair Richard Clarida (2020) provided additional details about how interest rate setting might work in practice. He describes the framework as temporary price-level targeting at the ELB, as in Bernanke, Kiley, and Roberts (2019), until the maximum employment and inflation conditions are attained.

[1] See Federal Open Market Committee (2022a,b,c)
[2] The revised statement replaced the original 2012 and amended 2019 statements. See Federal Open Market Committee (2020a).
[3] See Federal Open Market Committee (2020b).

Robert Kaplan of the Dallas Fed voted in favor of the revised statement but against the monetary policy action that contained the forward guidance on the basis that he "expects that it will be appropriate to maintain the current target range until the Committee is confident that the economy has weathered recent events and is on track to achieve its maximum employment and price stability goals as articulated in its new policy strategy statement, but prefers that the Committee retain greater policy flexibility beyond that point." In Kaplan (2020), he expanded on his views by emphasizing the distinction between "accommodative" policy and keeping rates at zero as the economy comes close to achieving the FOMC's objectives. He also discussed the costs of keeping rates at zero for prolonged periods, including adversely impacting savers, encouraging excessive risk taking and creating distortions in financial markets.

The FOMC's forward guidance failed to predict liftoff from the ELB. Between September 2020 and March 2021, the projections in the SEP were consistent with liftoff occurring in 2024 at the earliest. While the projected liftoff dates moved up with each subsequent SEP, even the projections in the December 2021 SEP were not consistent with liftoff before June 2022.[4] The most common explanation for the dichotomy between the forecasted and actual liftoff dates is that the FOMC was surprised by how fast inflation rose in 2021. At the press conference following the March 2022 FOMC meeting, Fed Chair Jerome Powell responded to a question about the monetary policy framework by saying "We can't blame the framework. It was a sudden, unexpected burst of inflation."[5] While it is correct that the members of the FOMC (as well as most others) did not predict the rise in inflation, the cause of the dichotomy lies in the FOMC's forward guidance, not the revised statement or the errors in predicting the recovery.

We consider an alternative to the FOMC's forward guidance that we call policy rule forward guidance. Monetary policy rules have been discussed by the FOMC since 1995 and federal funds rate prescriptions from the Taylor and balanced approach rules have been presented to the FOMC since 2004. Policy rule forward guidance combines forecast data from the SEP with one or more policy rules to structure expectations about the path of the FFR going forward. While it does not commit the FOMC to follow a particular path for the FFR, it creates a benchmark for policy conditional on realizations of the forecasts. All of the policy rules incorporate the Taylor principle that the nominal interest rate is increased more than point-for-point when inflation rises.

[4] Powell (2022a) illustrates the shifts in the FFR path between June 2021 and March 2022.
[5] See Federal Open Market Committee (2022b).

There is a major difference between policy rule and FOMC forward guidance when the FFR starts at the ELB. With FOMC forward guidance liftoff from the ELB does not occur until the FOMC's inflation and employment goals have been attained. With policy rule forward guidance liftoff occurs earlier so that, when the goals are achieved, the FFR is at the neutral nominal rate. In contrast, policy rule forward guidance can be fully in accord with the revised statement.

FOMC policy in the second half of 2021 is often described as being "behind the curve" for the failure to raise the FFR above the ELB as inflation increased. Policy rule forward guidance provides a precise definition of "behind the curve" as the difference between the FFR prescribed by the policy rule and the actual FFR. Our results do not depend on the FOMC's being surprised by the rise in inflation, as all of the inputs to the policy rule prescriptions are from various SEP's.

We compare FFR prescriptions using policy rule forward guidance to projections with FOMC forward guidance for the SEP's between September 2020 and March 2022. We start by considering two policy rules that have been included in the Monetary Policy Report since 2017 and are consistent with the original 2012 statement. The Taylor (1993) rule prescribes that the FFR equal the inflation rate plus 0.5 times the inflation gap, the difference between the inflation rate and the 2 percent inflation target, plus 1.0 times the unemployment gap, the difference between the rate of unemployment in the longer run and the realized unemployment rate, plus the neutral real interest rate.[6] The balanced approach rule in Taylor (1999) and Yellen (2012) raises the coefficient on the unemployment gap to 2.0 while maintaining the coefficient of 0.5 on the inflation gap. These rules are not in accord with the revised statement because they do not incorporate flexible average inflation targeting and prescribe increasing the FFR when unemployment falls below the rate of unemployment in the longer run.

We then consider the balanced approach (shortfalls) rule, which was introduced in the February 2021 Report. This rule is identical to the balanced approach rule except that it does not prescribe a rise in the FFR when unemployment falls below longer-run unemployment. We also consider a Taylor (shortfalls) rule, which was not included in the February 2021 MPR. It is identical to the balanced approach (shortfalls) rule except for having a lower coefficient on the unemployment gap.

[6] While policy rules are usually written in terms of the output gap, the percentage deviation of GDP from potential GDP, we use the unemployment gap for consistency with the MPR and the focus on maximum employment in the revised statement.

While the Taylor and balanced approach (shortfalls) rules are inspired by the revised statement, they are not consistent with the statement for two reasons. First, they prescribe raising the federal funds rate when inflation rises above 2 percent rather than attempting to achieve inflation moderately above 2 percent for some time. Second, they define the unemployment gap relative to longer-run unemployment, which is not consistent with the FOMC's desire to decrease unemployment by exploiting a flat Phillips Curve by running the economy "hot" until inflation rises. [7] This is illustrated in Powell (2021) who describes the economy in February 2020, with unemployment at 3.5 percent and longer-run unemployment defined by the SEP at 4.1 percent, and states that, "There was every reason to expect that the labor market could have strengthened even further without causing a worrisome increase in inflation were it not for the onset of the pandemic." Powell subsequently expanded on the same theme by saying "4 percent would be a nice unemployment rate to get to, but it will take more than that to get to maximum employment." [8]

We introduce two new rules that modify the Taylor and balanced approach rules to be consistent with the revised 2020 statement. First, we replace the rate of unemployment in the longer run with the unemployment rate consistent with maximum employment, and base FFR prescriptions on shortfalls instead of deviations. Second, if inflation rises above 2 percent, the rule is amended to allow it to equal the inflation rate "moderately" above 2 percent that the FOMC is willing to tolerate "for some time" before raising rates in order to bring inflation down to the 2 percent target.

Starting with Taylor (1993), normative policy rule prescriptions, including those in the Monetary Policy Report, are typically "non-inertial" as the prescribed FFR depends on the realized values of the right-hand-side variables. Following Clarida, Gali, and Gertler (1999), estimated Taylor-type rules are typically "inertial" to incorporate slow adjustment of the actual FFR to changes in the prescribed FFR. Policy rule forward guidance, however, involves normative policy rule prescriptions that need to be inertial when inflation rises in order to be in accord with the FOMC's preference for 25 basis point rate increases.[9]

[7] Federal Reserve Board (2021) discusses the first but not the second reason.
[8] See Smialek (2021). In contrast to previous statements, the revised statement does not refer to estimates of longer-run unemployment from the Summary of Economic Projections.
[9] This is not symmetric, as the FOMC decreased the FFR very quickly to the ELB in 2008 and 2020 when unemployment spiked. This does not affect the paper because we start after the Covid-19 recession ended.

While policy rule forward guidance with both inertial and non-inertial rules are both much more consistent with the actual liftoff from the ELB than FOMC forward guidance, there are major differences between the two types of specifications. Once liftoff is attained, the non-inertial rules prescribe unrealistically large increases for the FFR that are clearly not consistent with FOMC practice. The inertial rules, in contrast, prescribe rate increases that are close to the FOMC's preference for 25 basis point increases when inflation rises. As of March 2022, the federal funds rate was between 1.0 and 1.25 percent below the rate prescribed by the inertial policy rules. While this is much smaller than the gap with the non-inertial rules, it is still substantial. In order the close the gap by the end of 2022, the Committee would have to raise the federal funds rate by 1/2 percent in at least four of its five remaining meetings. If the FOMC had followed policy rule forward guidance with an inertial rule (or rules), it could have avoided both falling "behind the curve" with FOMC forward guidance and too large increases in the FFR with non-inertial rules.

2. Monetary Policy Rules and the Revised Statement

The Taylor rule in the Monetary Policy Report is as follows,

$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + (U_t^{LR} - U_t), \quad (1)$$

where R_t is the level of the short-term federal funds interest rate prescribed by the rule, π_t is the inflation rate, π^{LR} is the 2 percent target level of inflation, U_t^{LR} is the rate of unemployment in the longer run, U_t is the current unemployment rate, and r_t^{LR} is the neutral real interest rate that is consistent with inflation equal to the target level of inflation and unemployment equal to the rate of unemployment in the longer run. The neutral real interest rate and the rate of unemployment in the longer run are time-varying and trend downward during the period.[10] When inflation equals its 2 percent target and unemployment equals the rate of unemployment in the longer run, the federal funds rate equals the neutral real interest rate plus the 2 percent inflation target.

The Taylor rule has a coefficient on the inflation gap of 0.5 and a coefficient on the unemployment gap of 1.0. While the rule in Taylor (1993) is written in terms of the output gap with a coefficient of 0.5 and a fixed neutral real interest rate, we follow the MPR and use the unemployment gap and a time-varying neutral real interest rate. The coefficient of 1.0 on the unemployment gap is equivalent to a coefficient of 0.5 on the output gap with an Okun's Law coefficient of 2.0.

[10] See Powell (2020), Figures 2 and 4.

Taylor (1999) and Yellen (2012) analyzed an alternative to the Taylor rule that is called the balanced approach rule in the MPR, where the coefficient on the inflation gap is 0.5 but the coefficient on the unemployment gap is raised to 2.0.

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

The balanced approach rule received considerable attention following the Great Recession because, with the then-conventional neutral real interest rate of two percent, it prescribed a negative FFR and thus provided a justification for quantitative easing and a longer period before exiting the ELB.[11]

The Taylor and balanced approach rules are not consistent with the revised statement. First, when inflation rises above the 2 percent target, the prescribed FFR increases immediately rather than waiting for inflation to be moderately above 2 percent for some time. Second, when unemployment falls below longer-run unemployment, the prescribed FFR increases based on the expectation that low unemployment will cause higher future inflation rather than waiting for actual inflation to rise. In particular, when inflation equals the 2 percent target, the prescribed FFR is raised above the neutral nominal rate when unemployment falls below longer-run unemployment.

The balanced approach (shortfalls) rule was introduced in the February 2021 MPR. The rule mitigates employment shortfalls instead of deviations by having the FFR only respond to unemployment if it exceeds longer-run unemployment,

$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2\min\{(U_t^{LR} - U_t), 0\}. \quad (3)$$

If unemployment exceeds longer-run unemployment, the FFR prescriptions are the same as with the balanced approach rule. If unemployment is below longer-run unemployment, the FOMC will not raise the FFR solely of low unemployment. The balanced approach (shortfalls) rule is also not consistent with the revised statement because it prescribes raising the federal funds rate when inflation rises above 2 percent rather than attempting to achieve inflation moderately above 2 percent for some time and it defines the unemployment gap relative to longer-run unemployment rather than to unemployment consistent with maximum employment.

We also consider a Taylor (shortfalls) rule,

$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + \min\{(U_t^{LR} - U_t), 0\}. \quad (4)$$

[11] The Reports include three additional rules. The adjusted Taylor and price level rules are examples of mechanical make-up rules and the first-difference rule incorporates the change, rather than the level, of the unemployment gap. The price level rule was eliminated in favor of the balanced approach (shortfalls) rule in the February 2021 Report.

The FFR prescriptions with this rule are the same as with the Taylor rule when unemployment exceeds longer-run unemployment and the same as with the balanced approach (shortfalls) rule when unemployment is below longer-run unemployment. It is not consistent with the revised statement for the same reasons discussed above in regard to the balanced approach (shortfalls) rule.

We propose two policy rules that are consistent with the revised statement. The Taylor (consistent) rule is,

$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{Mod}, \pi_t - \pi^{LR}) + \min\{(U_t^{ME} - U_t), 0\}, \quad (5)$$

and the balanced approach (consistent) rule is,

$$R_t = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{Mod}, \pi_t - \pi^{LR}) + 2\min\{(U_t^{ME} - U_t), 0\}, \quad (6)$$

where r_t^{LR} is the neutral real interest rate, $\pi^{LR} = 2$, π^{Mod} represents the rate of inflation moderately above 2 percent for some time in the revised statement, and U_t^{ME} is the rate of unemployment consistent with maximum employment. The consistent rules differ from the shortfalls rules in three respects. First, the prescribed FFR does not increase until inflation is moderately above 2 percent for some time. Second, the prescribed FFR responds to employment shortfalls until the unemployment rate is consistent with maximum employment.

Suppose that inflation has been running persistently below 2 percent. The inflation gap is negative and equals $\pi_t - \pi^{Mod}$ until inflation rises so that $\pi_t = \pi^{Mod}$, at which point the gap becomes zero. Once inflation moderately above 2 percent has been achieved, the gap becomes positive and equals $\pi_t - \pi^{LR}$ until inflation falls to the 2 percent target. The unemployment gap is negative and equals $U_t^{ME} - U_t$ if $U_t > U_t^{ME}$ and is 0 if $U_t \leq U_t^{ME}$. Unlike the original and shortfall rules, these rules are consistent with the revised statement because the FFR responds to unemployment shortfalls from the rate of unemployment consistent with maximum employment and inflation is allowed to run moderately above 2 percent before the FFR is raised.

According to the policy rules in Equations (1) – (6), as well as the rules in the Monetary Policy Report, the FFR fully adjusts whenever the target FFR changes. This is not in accord with FOMC practice when inflation rises, as FFR increases are typically 0.25 percentage points. We specify inertial versions of our policy rules based on Clarida, Gali,and Gertler (1999),

$$R_t = pR_{t-1} + (1-p)\, R_t^P, \quad (7)$$

where p is the degree of inertia and R_t^P is the target level of the federal funds rate prescribed by each of the six policy rules in Equation (1) – (6). We set $p = 0.85$ as in Bernanke, Kiley, and

Roberts (2019), Bernanke (2020), and Fuentes-Albero and Roberts (2021).[12] R_{t-1} equals the rate prescribed by the rule if it is positive and zero if the prescribed rate is negative.[13]

3. Policy Rule and FOMC Forward Guidance

We now compare policy rule and FOMC forward guidance. For each of the SEP's, we report the median of the projected appropriate policy path for the FFR. These projections are made for the end of the calendar year from 2020 – 2023 for the September and December 2020 SEP's and the end of the calendar year from 2020 – 2024 for the others. The FOMC projections are shown in Figures (1) – (7). The projected liftoff from the ELB is after the end of 2023 for the September 2020, December 2020, and March 2021 SEP's, during 2023 for the June 2021 SEP, and during 2022 for the September 2021, December 2021, and March 2022 SEP's.

Policy rule prescriptions involve taking one or more of the rules in Equations (1) – (6), assuming values for the neutral real interest rate r_t^{LR}, the rate of inflation in the longer run π^{LR}, the rate of unemployment in the longer run U_t^{LR}, the rate of inflation moderately above 2 percent π^{Mod}, and the rate of unemployment consistent with maximum employment U_t^{ME}, taking projections for inflation and unemployment from the SEP and calculating the prescribed federal funds rates from the rules.

We set the neutral real interest rate equal to 0.5 percent from the SEP's, where the median federal funds rate in the longer run is 2.5 percent and median inflation in the longer run is 2 percent. The unemployment rate in the longer run is set equal to 4.0 percent from the median value starting in the March 2021 SEP. We set the rate of inflation moderately above 2 percent equal to 2.2 percent in accord with the numerical examples in Clarida (2020). Since inflation in the reports is measured on an annual basis, this means that the FOMC would attempt to increase inflation until it averaged 2.2 percent for one year.[14] We set the rate of unemployment consistent with maximum employment equal to 3.5 percent in accord with its value in February 2020 and the FOMC's willingness, as discussed by Powell (2021), to be more aggressive about reducing unemployment below its longer-run value until it sees inflation rising.

[12] Clarida (2020) proposes an inertial rule with a coefficient of zero on the unemployment gap following liftoff from the ELB. Fuentes-Albero and Roberts (2021) conduct dynamic simulations of an inertial version of the balanced approach (shortfalls) rule that incorporates FOMC forward guidance using the FRB/US model.

[13] If we had used the lagged federal funds rate when it was negative, the path of the FFR would have depended on an arbitrary choice of the starting date.

[14] Because the inflation gap is multiplied by one-half in all rules, changing "moderately above" to 2.1 percent or 2.3 percent would make very little difference to the results.

For each of the SEP's, we report policy rule prescriptions for original, shortfalls, and consistent versions of Taylor and balanced approach rules with non-inertial and inertial specifications. We focus on comparing the prescribed liftoffs from the ELB when the prescribed FFR exceeds 0.25 percent with policy rule and FOMC forward guidance.

The projections from the September 2020 SEP are depicted in Figure 1. According to FOMC forward guidance, the projected appropriate policy path for the FFR is at the ELB through at least the end of 2023. Projected core PCE inflation is 2.0 percent for 2023 and projected unemployment is 4.0 percent for 2023:Q4, so neither the inflation nor the maximum employment conditions for liftoff from the ELB are satisfied. FOMC forward guidance therefore projects liftoff in 2024 at the earliest.

Policy rule forward guidance, in contrast, prescribes liftoff from the ELB before the end of 2023 for all 12 policy rules. For the non-inertial rules in Panel A, the prescribed liftoff is 2021:Q4 for the Taylor and Taylor (shortfalls) rules, 2022:Q2 for the Taylor (consistent) rule, 2022:Q3 for the balanced approach and balanced approach (shortfalls) rules, and 2023:Q1 for the balanced approach (consistent) rule. For the inertial rules in Panel B, each liftoff date is two quarters later than the date for the corresponding non-inertial rule. The inertial balanced approach consistent rule with a liftoff date of 2023:Q3 is closest to the FOMC's forward guidance while the average of the three non-inertial Taylor rules matches the realized 2022:Q1 liftoff date.

Figure 2 illustrates the projections from the December 2020 SEP. The projected appropriate policy path for the FFR is again at the ELB through at least the end of 2023, which is consistent with projected core PCE inflation of 2.0 percent for 2023 and projected unemployment of 3.7 percent for 2023:Q4. The prescribed liftoff from the ELB is earlier with the December 2020 SEP than with the September 2020 SEP for all 12 policy rules. For the non-inertial rules in Panel A, the prescribed liftoff is 2021:Q3 for the Taylor and Taylor (shortfalls) rules, 2021:Q4 for the Taylor (consistent) rule, 2022:Q1 for the balanced approach and balanced approach (shortfalls) rules, and 2022:Q3 for the balanced approach (consistent) rule. For the inertial rules in Panel B, each liftoff date is either one or two quarters later than the date for the corresponding non-inertial rule.

The policy rule prescriptions from the December 2020 SEP start to highlight issues in using non-inertial rules for policy rule forward guidance. With the exception of the balanced approach (consistent) rule, all of the policy rule prescriptions call for a 50 basis point increase in the FFR upon liftoff from the ELB. This is problematic given the FOMC's preference for gradual rate increases, shown most recently in the 25, rather than 50, basis point increase when exiting the ELB

in March 2022. This is not an issue for the inertial rules, as the exit from the ELB for each rule is consistent with a 25 basis point increase in the prescribed FFR.

The projections from the March 2021 SEP are shown in Figure 3. According to FOMC forward guidance, the projected appropriate policy path for the FFR is still at the ELB through at least the end of 2023, which is consistent with projected core PCE inflation of 2.1 percent for 2023 and projected unemployment of 3.5 percent for 2023:Q4 if the unemployment, but not the inflation, goals are achieved by then. The prescribed liftoff from the ELB is earlier with the March 2021 SEP than with the December 2020 SEP for all 12 policy rules. For the non-inertial rules in Panel A, the prescribed liftoff is 2021:Q2 for the Taylor and Taylor (shortfalls) rules, 2021:Q3 for the Taylor (consistent), balanced approach, and balanced approach (shortfalls) rules, and 2021:Q4 for the balanced approach (consistent) rule. For the inertial rules in Panel B, each liftoff date is again either one or two quarters later than the date for the corresponding non-inertial rule. Upon liftoff from the ELB, the prescribed FFR increases by 25 basis points for two of the non-inertial rules and 50 basis points for the four others while, for the inertial rules, the prescribed FFR increases by 25 basis points for all six rules.[15]

Figure 4 depicts the projections from the June 2021 SEP. While the FFR is projected to be at the ELB at the end of 2022, the projection is 0.6 percent at the end of 2023. This is consistent with two 25 basis point rate increases in 2023 from 0.0 – 0.25 percent to 0.5 – 0.75 percent. It is puzzling that projected core PCE inflation of 2.1 percent for 2023 and projected unemployment of 3.5 percent for 2023:Q4 are the same in the June 2021 SEP as in the March 2021 SEP. One difference is that projected core PCE inflation for 2021 rose from 2.2 percent in the March SEP to 3.0 percent in the June SEP, raising concerns about how transitory inflation would be.

The prescribed liftoff from the ELB is earlier with the June 2021 SEP than with the March 2021 SEP for all 12 policy rules. For the non-inertial rules in Panel A, the prescribed liftoff is 2021:Q2 for the Taylor and Taylor (shortfalls) rules, 2021:Q3 for the Taylor (consistent), balanced approach, and balanced approach (shortfalls) rules, and 2021:Q4 for the balanced approach (consistent) rule. For the inertial rules in Panel B, each liftoff date is again either one or two quarters later than the date for the corresponding non-inertial rule. Policy rule forward guidance with non-inertial rules starts to fall apart with the June 2021 SEP. The prescribed FFR at the liftoff from the ELB increases by 75 basis points for the balanced approach and balanced approach

[15] Taylor (2022) discusses prescriptions from non-inertial rules.

(shortfalls) rules, 125 basis points for the balanced approach (consistent) rule, 200 basis points for the Taylor (consistent rule) and 250 basis points for the Taylor and Taylor (shortfalls) rules. For the inertial rules, in contrast, the prescribed FFR at liftoff again increases by 25 basis points for all six rules.

The projections from the September 2021 SEP are shown in Figure 5. The projected appropriate path calls for one 25 basis point FFR rate increase in 2022, three more rate increases in 2023, and three additional increases in 2024. The projected FFR at the end of 2024 is 1.8 percent, considerably below the neutral nominal rate of 2.5 percent. The liftoff from the ELB by the end of 2022 reflects a change in the definition of maximum employment as, while projected core PCE inflation is 2.3 percent for the end of 2022, projected unemployment is 3.8 percent in 2022:Q4. Clarida (2021) clarifies this change, stating that 3.8 percent is consistent with his definition of maximum employment and expecting that it would be attained by the end of 2022.

The prescribed liftoff from the ELB is 2021:Q3 or earlier for all 12 policy rules. Policy rule forward guidance with non-inertial rules completely falls apart with the September 2021 SEP. The prescribed FFR in 2021:Q3 is 1.7 percent with the balanced approach (consistent) rule, 2.7 percent with the balanced approach and balanced approach (shortfalls) rules, 3.3 percent with the Taylor (consistent) rule, and 3.8 percent with the Taylor and Taylor (shortfalls) rules. These jumps in the prescribed FFR are both unprecedented and unrealistic. For the inertial rules, in contrast, the prescribed FFR in 2021:Q3 increases by 25 basis points over the 2021:Q2 prescription for all six rules.

The prescribed paths for the FFR following liftoff from the ELB are also shown in Figure 5. For the non-inertial rules, the prescribed FFR increases in 2021:Q4 before decreasing towards the neutral nominal rate. For the Taylor and balanced approach (consistent and shortfalls) rules, the prescribed FFR in 2024:Q4 is 2.65 percent in accord with the neutral nominal rate. For the Taylor rule, the prescribed FFR is 3.15 percent and, for the balanced approach rule, it is 3.65 percent, both considerably above the neutral nominal rate. For the inertial rules, the projected FFR's for 2024:Q4 are between 2.35 and 2.61 percent in accord with the neutral nominal rate while, for the Taylor rule, the prescribed FFR is 2.96 percent and, for the balanced approach rule, it is 3.24 percent, both considerably above the neutral nominal rate. These results emphasize why the original Taylor and balance approach rules are not in accord with the Revised Statement.

Figure 6 illustrates the projections from the December 2021 SEP. The projected appropriate path calls for three 25 basis point FFR rate increases in 2022, three more rate increases in 2023,

and two additional increases in 2024. The three rate increases in 2022 are consistent with liftoff from the ELB occurring in June because a March increase would require a pause between the 2022 and 2023 increases. This is consistent with FOMC forward guidance with projected core PCE inflation of 2.7 percent for the end of 2022 and projected unemployment of 3.5 percent in 2022:Q4. The projected FFR at the end of 2024 is 2.1 percent, still below the neutral nominal rate of 2.5 percent. The language in the statement accompanying the FOMC meetings also changed in December 2021. For the meetings between September 2020 and November 2021, keeping the target range for the FFR at the ELB was justified on the basis that neither the inflation nor the labor market conditions consistent with maximum employment had been satisfied. For the December 2021 meeting, the statement said that inflation had exceeded 2 percent for some time and what remained to be satisfied were the labor market conditions.

Policy rule forward guidance with non-inertial rules is even more unrealistic with the December 2021 SEP than with the September 2021 SEP. The prescribed FFR in 2021:Q4 is 4.5 percent with the balanced approach (consistent) rule, 5.3 percent with the Taylor (consistent) rule, 5.5 percent with the balanced approach and balanced approach (shortfalls) rules, and 5.8 percent with the Taylor and Taylor (shortfalls) rules. For the inertial rules, the prescribed FFR in 2021:Q4 is 0.7 percent with the balanced approach (consistent) rule, 0.8 percent with the Taylor (consistent) rule, balanced approach and balanced approach (shortfalls) rules, and 0.9 percent with the Taylor and Taylor (shortfalls) rules. With the FFR at the ELB range of 0.0 – 0.25 at the end of 2021, the FFR prescriptions for the inertial rules are two 25 basis point rate increases above the FFR for the balanced approach (consistent) rule and three 25 basis point rate increases above the FFR for the other rules. For all six non-inertial rules, the prescribed FFR for 2024:Q4 is identical for the September 2021 and the December 2021 SEP's. For the inertial rules, the FFR prescriptions for 2024:Q4 are slightly higher for the December 2021 SEP than for the September 2021 SEP.

In December 2020, the Committee announced that it would "continue to increase its holdings of Treasury securities by at least $80 billion per month and of agency mortgage-backed securities by at least $40 billion per month until substantial further progress has been made toward the Committee's maximum employment and price stability goals."[16] Starting in November 2021, the monthly pace of asset purchases was reduced each meeting and brought to an end in early March 2022. Asset purchases affect the liftoff from the ELB because, since the purchases increase

[16] See Federal Open Market Committee (2020c).

accommodation while the liftoff decreases accommodation, it makes no sense to raise the FFR above the ELB until the asset purchases tapering is complete. If the FOMC had instead followed policy rule forward guidance with one or more inertial rules, there would have been more time for the pace of asset purchases to adjust to the prescribed liftoff.

The FOMC raised the target range for the FFR from its ELB level of 0.0 – 0.25 percent to a range of 0.25 – 0.5 percent in March 2022. This was foreshadowed by the language in the January 2022 statement that said "With inflation well above two percent and a strong labor market, the Committee expects it will soon be appropriate to raise the target range for the federal funds rate." With unemployment at 3.6 percent and inflation well above target, this was in accord with the FOMC's forward guidance. The SEP projected six more 1/4 percent raises in 2022, four additional 1/4 percent raises in 2023, and no changes in 2024. This would bring the target for the FFR in 2023 and 2024 to 2.8 percent, above the neutral nominal rate of 2.5 percent.

The projections from the March 2022 SEP are depicted in Figure 7. The major reason for the much faster path of projected FFR increases between the December 2021 and March 2022 SEP's is that core PCE inflation for 2022 is projected to rise to 4.1 percent in the March 2022 SEP versus 2.7 percent in the December 2021 SEP. Inflation is also projected to come down more slowly to 2.6 percent in 2023 and 2.3 percent in 2024 versus 2.3 percent in 2023 and 2.1 percent in 2024 in the December 2021 SEP. The unemployment projections of 3.5 percent in the last quarter of 2022 and 2023 and 3.6 percent in the last quarter of 2024 are almost identical to the December 2021 projection.

Clarida (2020) proposed an inertial Taylor-type rule after liftoff with a zero coefficient on the unemployment gap but did not specify the degree of inertia. With projected unemployment below 4.0 percent, this rule is identical to either the inertial Taylor or the inertial balanced approach (shortfalls) rule. We calculate prescriptions from this rule using projections from the March 2022 SEP and assuming the degree of inertia $p = 0.85$. The prescriptions follow the path of the FOMC projections. While the prescriptions are between 25 and 50 basis points higher than the projections in 2022:Q2, they are within 25 basis points in 2022:Q3 and virtually identical starting in 2023:Q1.

Policy rule forward guidance with non-inertial rules continues to be unrealistic. The prescribed FFR in 2022:Q1 is 4.8 percent with the balanced approach (consistent) rule, 5.4 percent with the Taylor (consistent) rule, 5.8 percent with the balanced approach and balanced approach (shortfalls) rules, and 5.9 percent with the Taylor and Taylor (shortfalls) rules. For the inertial rules, the prescribed FFR in 2022:Q1 is 1.3 percent with the balanced approach (consistent) rule,

1.5 percent with the Taylor (consistent) rule, 1.6 percent with the Taylor, balanced approach, Taylor (shortfalls), and the balanced approach (shortfalls) rules. With the FFR at the range of 0.25 – 0.5 in 2022:Q1, the FFR prescriptions for the inertial rules are 1.0 percent above the FFR for the Taylor and balanced approach (consistent) rules and 1.25 percent above the FFR for the other rules. James Bullard of the St. Louis Fed voted against the 0.25 percentage point raise because he preferred to raise the target range for the FFR by 0.5 percentage point. If the Committee had followed his preference, the FFR prescriptions for the inertial rules would have been closer to, although still above, the actual FFR.[17]

The balanced approach (consistent) rule is the only policy rule that is in the intersection of rules preferred by the Fed since the Great Recession (balanced approach) and rules in accord with the revised statement (consistent). It is also the inertial rule for which deviations between policy rule prescriptions and FOMC forward guidance projections are the smallest. Even with this rule, liftoff from the ELB was two quarters behind liftoff prescribed by the rule and the FOMC was "behind the curve" by 1.0 percent at the time of liftoff in March 2022.

4. Policy Rule and FOMC "Back on Track" Prescriptions

We compare policy rule prescriptions from the seven SEP's between September 2020 and March 2022 with the FFR to see how the FOMC fell "behind the curve" and forecasted policy rule prescriptions from the March 2022 SEP with the FFR necessary to get "back on track" from June 2022 to December 2024. The policy rule prescriptions are the midpoint of the FOMC's target range for comparability with the FFR projections in the SEP. The prescriptions are reported in Table 1 and Panel A of Figure 8 for the six non-inertial rules and in Table 2 and Panel B of Figure 8 for the six inertial rules.

Panel A of Table 1 reports the results for the Taylor, Taylor (shortfalls) and Taylor (consistent) non-inertial rules. Between September 2020 and March 2021 the prescribed and actual FFR's are all 0.125, the midpoint of the 0.0 – 0.25 range for the FFR at the ELB. In June 2021 the prescribed FFR's for the Taylor (original and shortfalls) rules jump to 2.625 and the prescribed FFR for the Taylor (consistent) rule jumps to 2.125 while the actual FFR stays at the ELB of 0.125. By March 2022 the prescribed FFR's for the Taylor (original and shortfalls) rules rise to 5.875 and the prescribed FFR for the Taylor (consistent) rule rises to 5.375 while the actual FFR stays at the

[17] See Federal Open Market Committee (2022a).

ELB of 0.125 until March 2022 when it rises to 0.375. Taking the Taylor rule prescriptions as a benchmark, the FOMC was "behind the curve" by at least 5 percent in March 2022.

Panel B of Table 1 reports the results for the balanced approach, balanced approach (shortfalls) and balanced approach (consistent) non-inertial rules. Between September 2020 and March 2021 the prescribed and actual FFR's are all 0.125. In June 2021 the prescribed FFR's for the balanced approach (original and shortfalls) rules rise to 0.875 while the prescribed FFR for the balanced approach (consistent) rule and the actual FFR stay at the ELB of 0.125. By March 2022 the prescribed FFR's for the balanced approach (original and shortfalls) rules rise to 5.875 and the prescribed FFR for the balanced approach (consistent) rule rises to 4.875. Taking the balanced approach rule prescriptions as a benchmark, the FOMC was "behind the curve" by over 5 percent for the original and shortfalls rules and over 4 percent for the consistent rule in March 2022.

Panel A of Table 2 reports the results for the Taylor, Taylor (shortfalls) and Taylor (consistent) inertial rules. Between September 2020 and March 2021 the prescribed and actual FFR's are all 0.125. Between March 2021 and March 2022 the prescribed FFR's for the Taylor (original and shortfalls) rules rise to 1.625 and the prescribed FFR for the Taylor (consistent) rule rises to 1.375. Taking the Taylor rule prescriptions as a benchmark, the FOMC was "behind the curve" by either 1.0 or 1.25 percent in March 2022.

Panel B of Table 2 reports the results for the balanced approach, balanced approach (shortfalls) and balanced approach (consistent) inertial rules. Between September 2020 and June 2021 the prescribed and actual FFR's are all 0.125. Between June 2021 and March 2022 the prescribed FFR's for the balanced approach (original and shortfalls) rules rise to 1.625 and the prescribed FFR for the balanced approach (consistent) rule rises to 1.375. Taking the balanced approach rules prescriptions as a benchmark, the FOMC was "behind the curve" by either 1.0 or 1.25 percent in March 2022.

The FOMC raised the FFR from 0.375 percent in March 2022 to 0.875 in May 2022. How can it get back on track by the end of 2022? Since it would take about a 1.0 percent increase in each of the five remaining meetings to close the gap for the non-inertial rules, which is obviously unrealistic, we focus on the inertial rules. In December 2022, the Taylor rule FFR prescriptions are 3.375 for the original rule and 3.125 percent for the shortfalls and consistent rules. It would take 1/2 percent rate increases in all five remaining meetings to close the gap for the original rule and four 1/2 percent rate increases and one 1/4 percent rate increase to close the gap for the shortfalls and the consistent rules by the end of 2022. For the balanced approach rule, the FFR

prescriptions in December 2022 are 3.375 for the original rule, 3.125 percent for the shortfalls rule and 2.875 for the consistent rule. It would take 1/2 percent rate increases in all five remaining meetings to close the gap for the original rule, four 1/2 percent rate increases and one 1/4 percent rate increase to close the gap for the shortfall rule, and four 1/2 percent rate increases to close the gap for the consistent rule.

The median prescribed FFR in December 2022 is 3.125 for the Taylor (shortfalls and consistent) and balanced approach (shortfalls) rules, with the original rules higher and the balanced approach (consistent) rule lower. One reason to focus on the median prescription is that it predominantly reflects the shortfalls rules. As described above, the original rules are not in accord with the revised statement because they respond to deviations rather than shortfalls from maximum employment. While the consistent rules are more in accord with the revised statement than the shortfalls rules, this stopped reflecting Fed policy by May 2022. With inflation far higher than "moderately" above 2 percent, Flexible Average Inflation Targeting has become irrelevant and Fed Chair Jerome Powell has made it clear that his overarching goal is to reduce inflation even if unemployment rises.[18] The shortfalls rules therefore reflect current Fed policy better than the original or the consistent rules.

The results labeled "FOMC" show the path of the FFR that will get back on track by attaining the medium policy rule prescription in December 2022. We illustrate the difference between policy rule prescriptions and the FOMC's falling behind the curve and getting back on track path by using the three median inertial rules. With the balanced approach (shortfalls) rule, liftoff from the ELB occurs in September 2021 followed by nine meetings with 25 basis point rate increases and one meeting with a 50 basis point increase. With the Taylor (shortfalls and consistent) rules, liftoff occurs in June 2021 followed by nine meetings with 25 basis point increases, one meeting with a 50 basis point increase, and two meetings with no rate increases. With the FOMC's path, liftoff occurs in March 2022 followed by five meetings with 50 basis point increases and one meeting with a 25 basis point increase. While the result that the FFR equals 3.125 percent at the end of 2022 is the same, the path is much smoother and there is no need for a pivot with the policy rules.

There has been recent discussion of a "September pause" where, after raising the FFR by 50 basis points in June and July, the FOMC raises rates by 25 basis points for the remaining three

[18] See Powell (2022b).

meetings in 2022. Fed Governor Christopher Waller (2022) how this is roughly in line with the expectations of financial markets. While the rate of 2.625 would be above neutral, is would still be 50 basis points below the median prescription from the policy rules.

How should the FOMC proceed after December 2022? The median prescribed FFR with the inertial rules continues to rise, reaching 3.625 in December 2023. In contrast, the median with the non-inertial rules peaks at 5.875 in September 2022 before starting to fall. While the median of 3.875 with the non-inertial rules is higher than the median of 3.625 with the inertial rules in September 2023, it falls to 3.375 and is lower than the median of 3.625 with the inertial rules in December 2023.

While inertial rules slow the rise in the prescribed FFR compared to non-inertial rules, they also slow the fall in the prescribed FFR. The rise and fall, however, are not symmetric. While inertial rules would have allowed the FOMC to achieve its prescribed FFR's in 2021 without unrealistically large jumps, non-inertial rules do not prescribe rate decreases of more that 0.25 percent in any of the 2024 meetings. Since non-inertial rules represent the desired prescriptions, we use the median of non-inertial rules for the "on track" prescriptions starting in December 2023. The median prescriptions with non-inertial rules fall from 3.375 in December 2023 to 2.875 in December 2024, while those with inertial rules fall from 3.625 to 3.375.

5. Conclusions

In response to the Covid-19 recession, the Federal Open Market Committee kept the target range for the federal funds rate at the Effective Lower Bound of 0.0 – 0.25 percent from March 2020 to March 2022. This policy has been guided by three FOMC statements, the Revised Statement on Longer-Run goals and Monetary Policy in August 2020, forward guidance for liftoff from the Effective Lower Bound in September 2020, and the schedule for asset purchases in December 2020. In response to high inflation in 2021, the FOMC has been left "behind the curve" and caught between keeping rates too low and raising rates too quickly.

The August 2020 Revised Statement specified that, following periods (such as the previous decade) of inflation persistently below 2 percent, it would aim for inflation "moderately above 2 percent for some time." It also changed from mitigating deviations around maximum employment to mitigating shortfalls from maximum employment. Neither of these changes caused the FOMC to keep rates too low. Inflation rose quickly from below 2 percent to well above any definition of "moderately" above 2 percent and unemployment did not fall below the

4 percent unemployment in the longer run in the Summary of Economic Projections until March 2022.

The September 2020 forward guidance stated that the FFR would stay at the ELB until maximum employment and inflation at 2 percent and "on track to moderately exceed 2 percent for some time" was attained. Using the inflation, unemployment, and FFR projections from the SEP's from September 2020 to March 2022, these goals were not realized until liftoff from the ELB in March 2022 raised the target range for the FFR from 0.0 – 0.25 percent to 0.25 – 0.5 percent.

We develop policy rule forward guidance based on based on policy rule prescriptions using inflation and unemployment forecasts from the SEP as an alternative to FOMC forward guidance. Policy rule prescriptions with the rules in Taylor (1993), the Monetary Policy Reports, and additional rules in our paper are "non-inertial" in the sense that the prescribed FFR adjustments occur immediately. These are not appropriate for policy rule forward guidance when inflation is rising because the prescribed FFR increases much too quickly to be in accord with FOMC practice. While policy rule forward guidance with non-inertial rules avoids falling behind the curve, it does so at the cost of prescribing large increases in the FFR. Policy rule forward guidance with inertial rules avoids falling "behind the curve" without resorting to unrealistically large jumps in the FFR.

We focus on policy rule forward guidance using inertial rules. Using these rules, the prescribed liftoff from the ELB occurs in either June or September 2021 and, at the point of liftoff in March 2022, the prescribed FFR was between 1.0 and 1.25 percent above the actual FFR. The Fed fell behind the curve by not following prescriptions from policy rules that are consistent with its own goals and strategies. Raising the FFR by 50 basis points in May and signaling more increases was a good first step but, in order get back on track and close the gap by the end of 2022, the FOMC would have to raise the FFR by 1/2 percent in at least four of its five remaining meetings. Getting back on track, however, is only the first step. In order to stay on track, the FOMC would need to continue raising the FFR in 2023 before lowering in 2024.

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Table 1. Policy Rule and FOMC Prescriptions with Non-Inertial Rules

Panel A. Taylor Rules

Quarter	Taylor Rule	Taylor (shortfalls) Rule	Taylor (consistent) Rule	FOMC
2020:Q3	0.125	0.125	0.125	0.125
2020:Q4	0.125	0.125	0.125	0.125
2021:Q1	0.125	0.125	0.125	0.125
2021:Q2	2.625	2.625	2.125	0.125
2021:Q3	3.875	3.875	3.375	0.125
2021:Q4	5.875	5.875	5.375	0.125
2022:Q1	5.875	5.875	5.375	0.375
2022:Q2	5.875	5.875	5.375	1.375
2022:Q3	6.125	5.875	5.625	2.375
2022:Q4	6.125	5.625	5.625	3.125
2023:Q1	5.625	5.125	5.125	3.375
2023:Q2	5.125	4.625	4.625	3.625
2023:Q3	4.375	3.875	3.875	3.625
2023:Q4	3.875	3.375	3.375	3.375
2024:Q1	3.875	3.375	3.375	3.375
2024:Q2	3.625	3.125	3.125	3.125
2024:Q3	3.625	3.125	3.125	3.125
2024:Q4	3.375	2.875	2.875	2.875

Note: The first three columns depict non-inertial Taylor rule prescriptions for the midpoint of the target range for the FFR. Between 2020:Q3 and 2022:Q1, they report prescriptions using contemporaneous data. Between 2022:Q2 and 2024:Q4, they report prescriptions based on the inflation and unemployment projections in the March 2022 SEP. The fourth column depicts the midpoint of the target range of the FFR for 2020:Q3 to 2022:Q1 and the "back on track" prescriptions for 2022:Q3 – 2024:Q4.

Panel B. Balanced Approach Rules

Quarter	Balanced Approach Rule	Balanced Approach (shortfalls) Rule	Balanced Approach (consistent) Rule	FOMC
2020:Q3	0.125	0.125	0.125	0.125
2020:Q4	0.125	0.125	0.125	0.125
2021:Q1	0.125	0.125	0.125	0.125
2021:Q2	0.875	0.875	0.125	0.125
2021:Q3	2.625	2.625	1.625	0.125
2021:Q4	5.375	5.375	4.375	0.125
2022:Q1	5.875	5.875	4.875	0.375
2022:Q2	6.125	5.875	5.125	1.375
2022:Q3	6.375	5.875	5.375	2.375
2022:Q4	6.625	5.625	5.625	3.125
2023:Q1	6.125	5.125	5.125	3.375
2023:Q2	5.625	4.625	4.625	3.625
2023:Q3	4.875	3.875	3.875	3.625
2023:Q4	4.375	3.375	3.375	3.375
2024:Q1	4.375	3.375	3.375	3.375
2024:Q2	4.125	3.125	3.125	3.125
2024:Q3	4.125	3.125	3.125	3.125
2024:Q4	3.875	2.875	2.875	2.875

Note: The first three columns depict non-inertial balanced approach rule prescriptions for the midpoint of the target range for the FFR. Between 2020:Q3 and 2022:Q1, they report prescriptions using contemporaneous data. Between 2022:Q2 and 2024:Q4, they report prescriptions based on the inflation and unemployment projections in the March 2022 SEP. The fourth column depicts the midpoint of the target range of the FFR for 2020:Q3 to 2022:Q1 and the "back on track" prescriptions for 2022:Q3 – 2024:Q4.

Table 2. Policy Rule and FOMC Prescriptions with Inertial Rules

Panel A. Taylor Rules

Quarter	Taylor Rule	Taylor (shortfalls) Rule	Taylor (consistent) Rule	FOMC
2020:Q3	0.125	0.125	0.125	0.125
2020:Q4	0.125	0.125	0.125	0.125
2021:Q1	0.125	0.125	0.125	0.125
2021:Q2	0.375	0.375	0.375	0.125
2021:Q3	0.625	0.625	0.625	0.125
2021:Q4	0.875	0.875	0.875	0.125
2022:Q1	1.625	1.625	1.375	0.375
2022:Q2	2.125	2.125	2.125	1.375
2022:Q3	2.875	2.625	2.625	2.375
2022:Q4	3.375	3.125	3.125	3.125
2023:Q1	3.625	3.375	3.375	3.375
2023:Q2	3.875	3.625	3.625	3.625
2023:Q3	3.875	3.625	3.625	3.625
2023:Q4	3.875	3.625	3.625	3.375
2024:Q1	3.875	3.625	3.625	3.375
2024:Q2	3.875	3.625	3.375	3.125
2024:Q3	3.875	3.375	3.375	3.125
2024:Q4	3.875	3.375	3.375	2.875

Note: The first three columns depict inertial Taylor rule prescriptions for the midpoint of the target range for the FFR. Between 2020:Q3 and 2022:Q1, they report prescriptions using contemporaneous data. Between 2022:Q2 and 2024:Q4, they report prescriptions based on the inflation and unemployment projections in the March 2022 SEP. The fourth column depicts the midpoint of the target range of the FFR for 2020:Q3 to 2022:Q1 and the "back on track" prescriptions for 2022:Q3 – 2024:Q4.

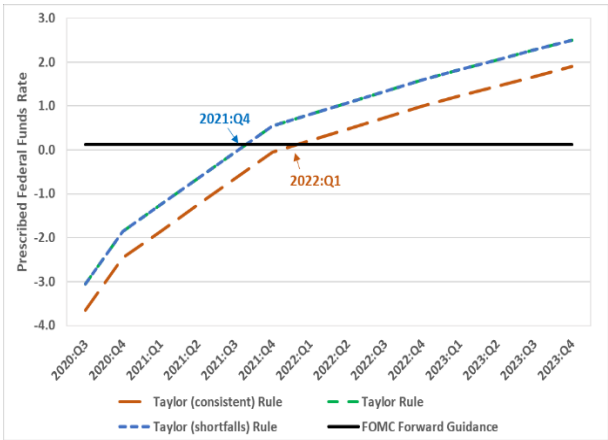
Panel B. Balanced Approach Rules

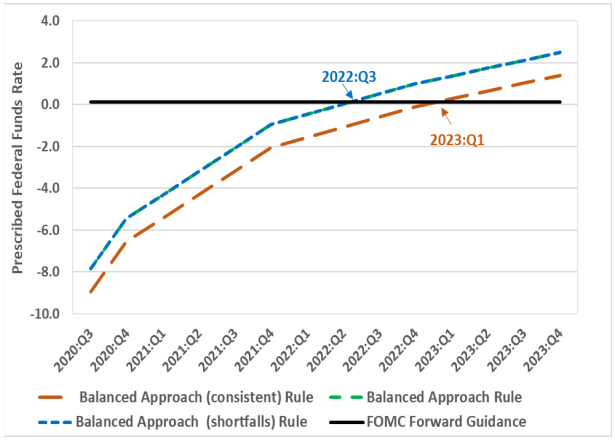
Quarter	Balanced Approach Rule	Balanced Approach (shortfalls) Rule	Balanced Approach (consistent) Rule	FOMC
2020:Q3	0.125	0.125	0.125	0.125
2020:Q4	0.125	0.125	0.125	0.125
2021:Q1	0.125	0.125	0.125	0.125
2021:Q2	0.125	0.125	0.125	0.125
2021:Q3	0.375	0.375	0.375	0.125
2021:Q4	0.875	0.875	0.625	0.125
2022:Q1	1.625	1.625	1.375	0.375
2022:Q2	2.125	2.125	1.875	1.375
2022:Q3	2.875	2.625	2.375	2.375
2022:Q4	3.375	3.125	2.875	3.125
2023:Q1	3.875	3.375	3.125	3.375
2023:Q2	4.125	3.625	3.375	3.625
2023:Q3	4.125	3.625	3.375	3.625
2023:Q4	4.125	3.625	3.375	3.375
2024:Q1	4.125	3.625	3.375	3.375
2024:Q2	4.125	3.625	3.375	3.125
2024:Q3	4.125	3.375	3.375	3.125
2024:Q4	4.125	3.375	3.375	2.875

Note: The first three columns depict inertial balanced approach rule prescriptions for the midpoint of the target range for the FFR. Between 2020:Q3 and 2022:Q1, they report prescriptions using contemporaneous data. Between 2022:Q2 and 2024:Q4, they report prescriptions based on the inflation and unemployment projections in the March 2022 SEP. The fourth column depicts the midpoint of the target range of the FFR for 2020:Q3 to 2022:Q1 and the "back on track" prescriptions for 2022:Q3 – 2024:Q4.

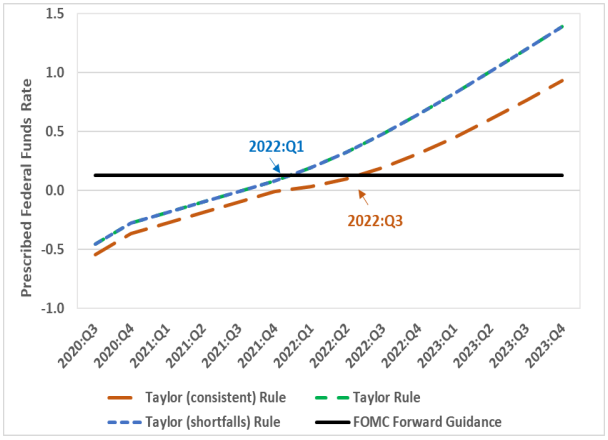
Figure 1. Summary of Economic Projections for September 2020

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



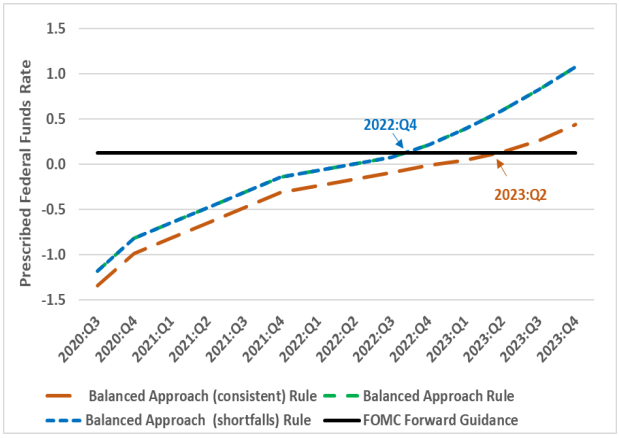
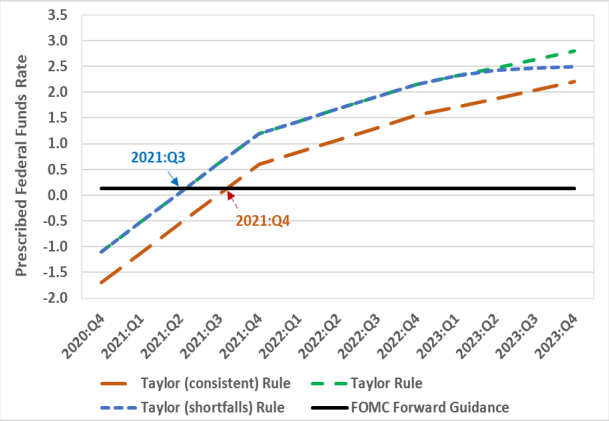
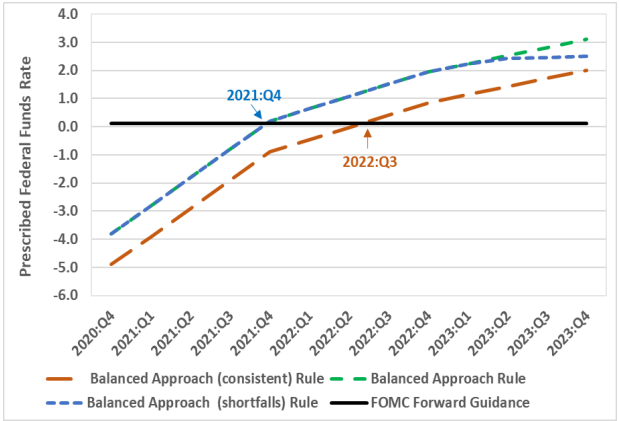


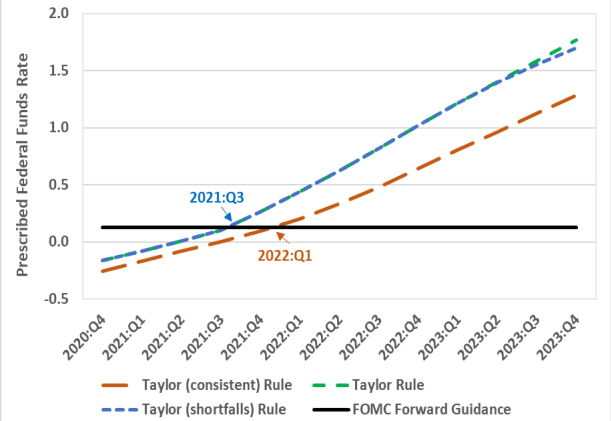
Figure 2. Summary of Economic Projections for December 2020

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



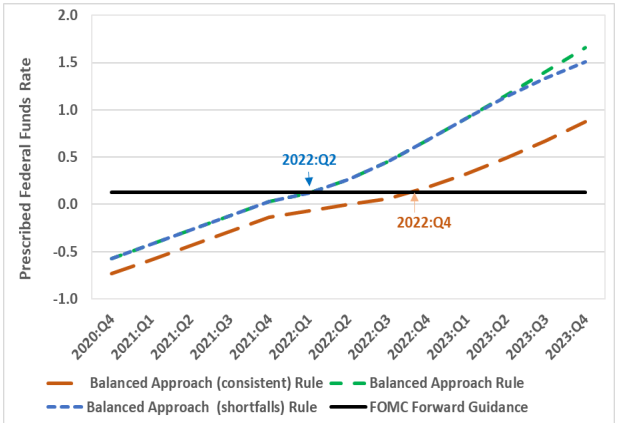
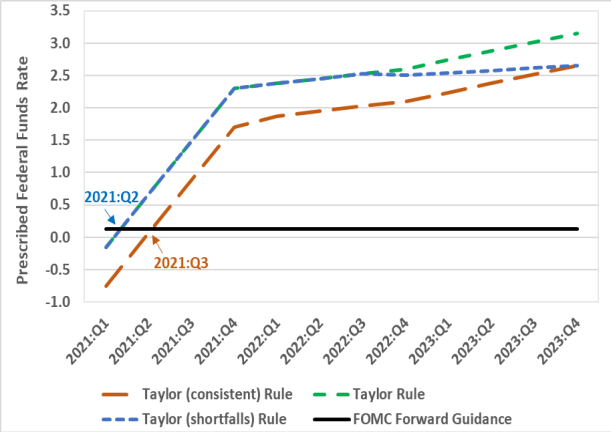
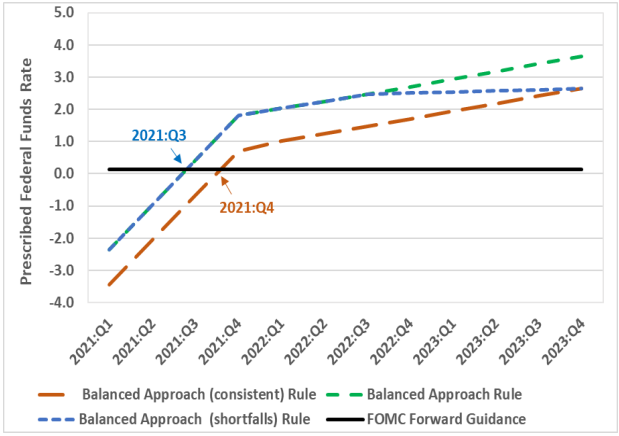


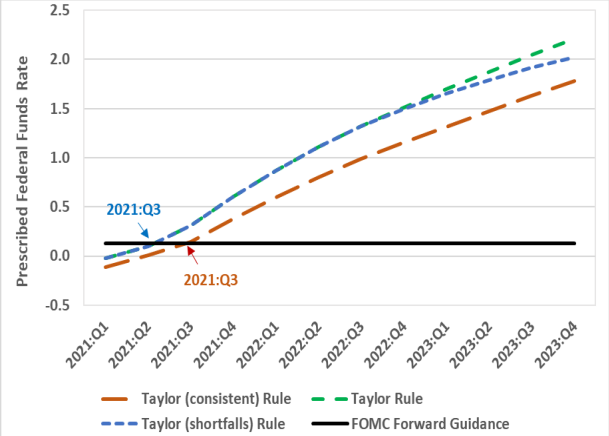
Figure 3. Summary of Economic Projections for March 2021

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



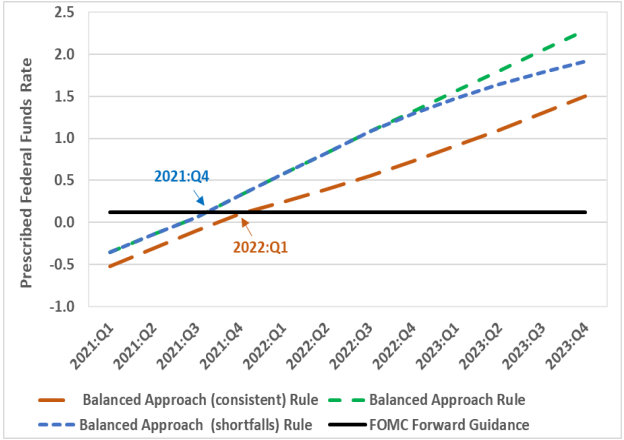
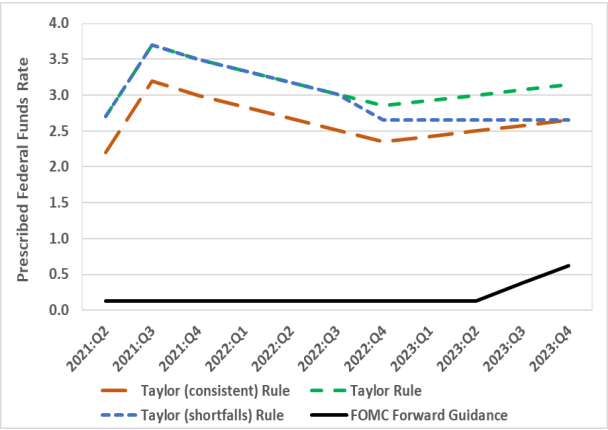
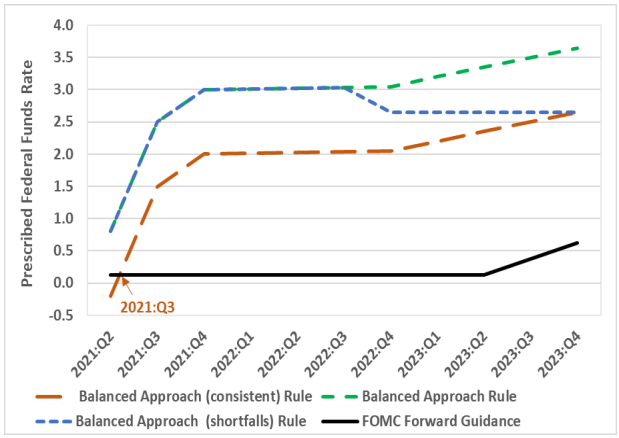


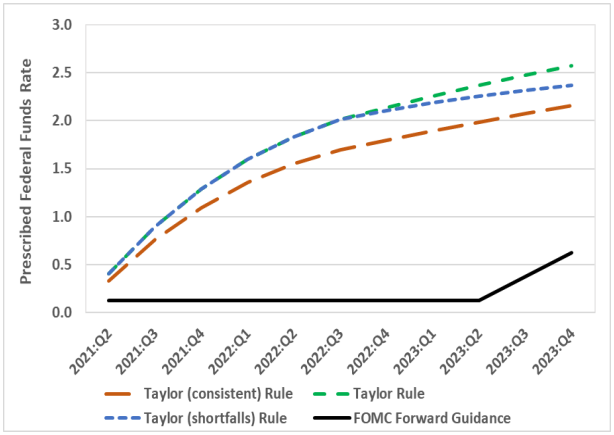
Figure 4. Summary of Economic Projections for June 2021

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



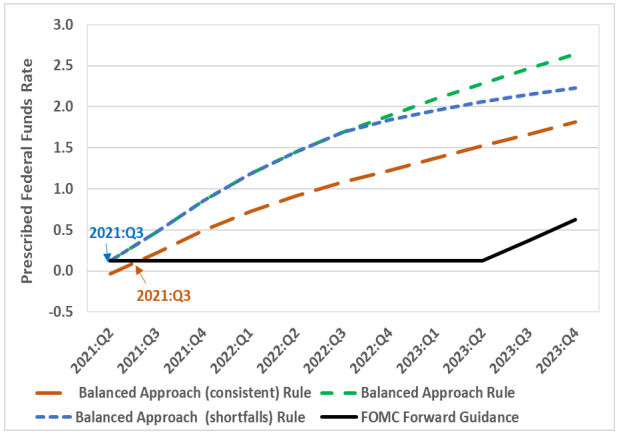
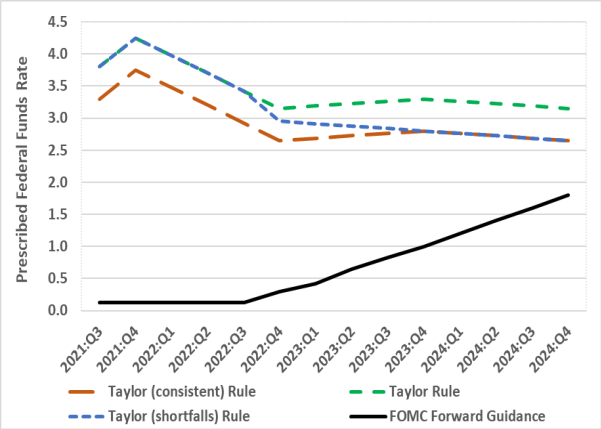
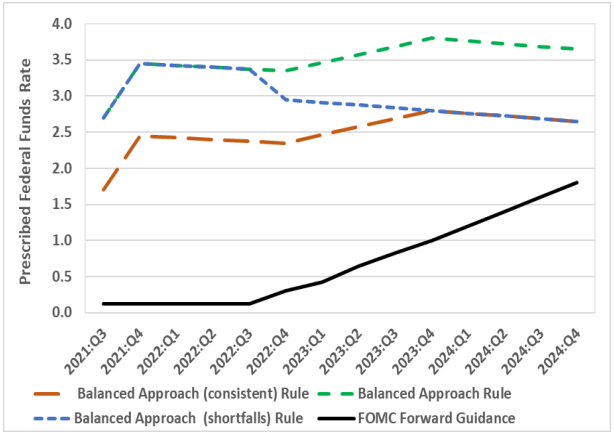


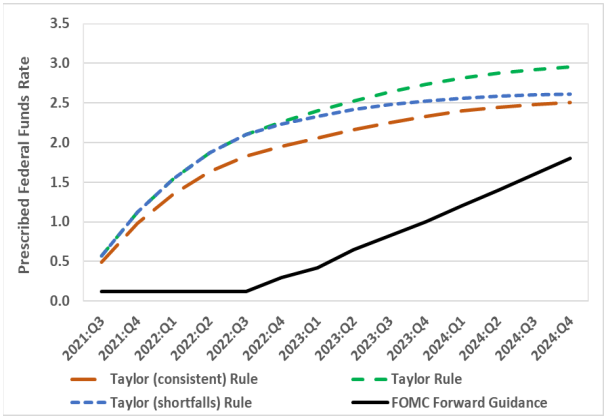
Figure 5. Summary of Economic Projections for September 2021

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



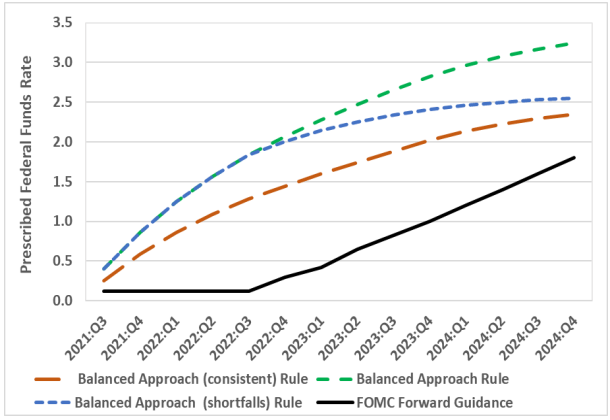
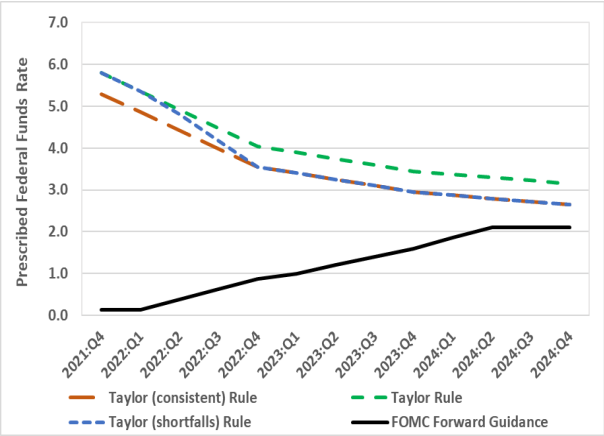
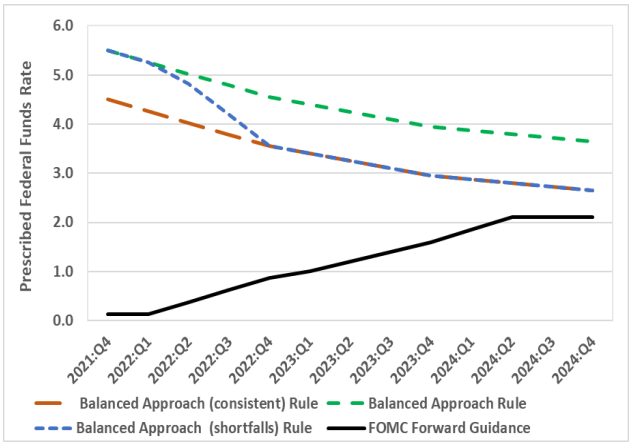


Figure 6. Summary of Economic Projections for December 2021

Panel A. Non-Inertial Rules





Panel B. Inertial Rules

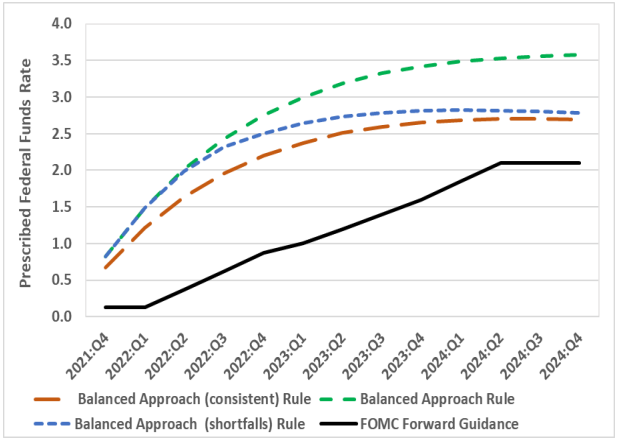
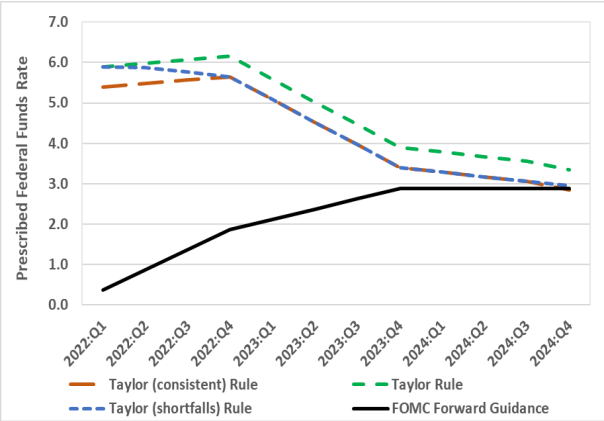
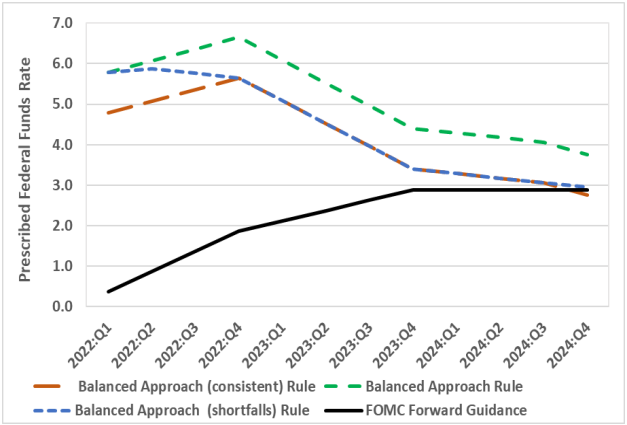


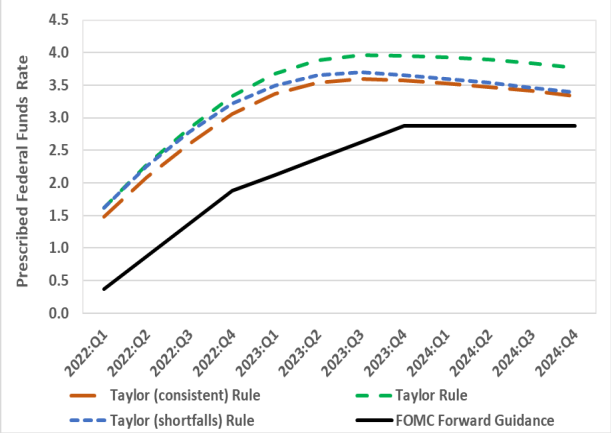
Figure 7. Summary of Economic Projections for March 2022

Panel A. Non-Inertial Rules





Panel B. Inertial Rules



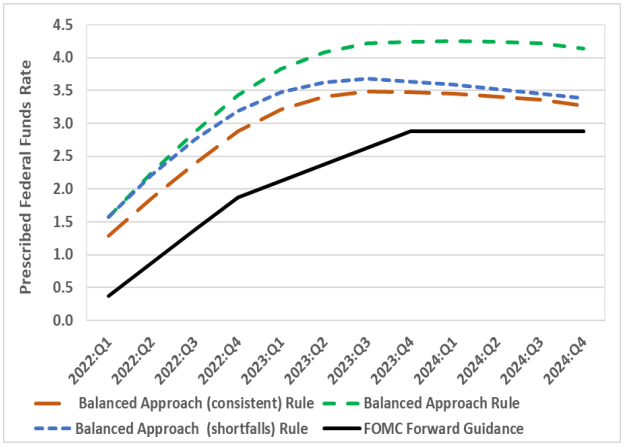
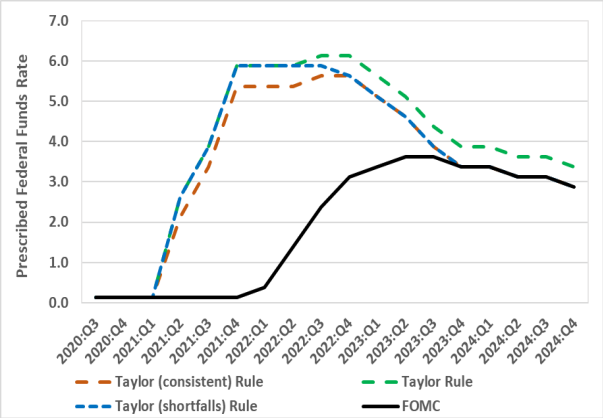
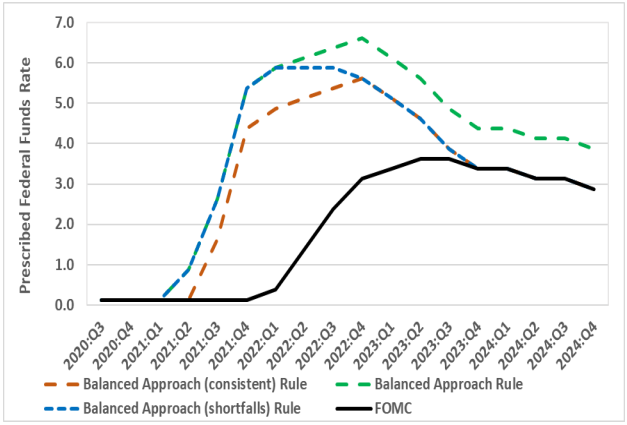


Figure 8. Policy Rule and FOMC Prescriptions

Panel A. Non-Inertial Rules





Panel B. Inertial Rules