It's Time to Get Back to Rules-Based Monetary Policy[1]

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This paper examines the recent deviation from rules-based monetary policy in the United States, and proposes a way for the Federal Reserve to return quickly to a more effective rules-based policy. The paper reviews the impact of the COVID pandemic on the economy, and the key monetary policy developments that led to an increase in inflation and today's precarious economic situation. This review sets the stage and suggests a way for the Federal Reserve to improve economic performance and achieve low inflation by getting back to more rules-based policy decisions.

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[1] John B. Taylor is the Mary and Robert Raymond Professor of Economics at Stanford University and the George P. Shultz Senior Fellow in Economics at the Hoover Institution. This paper was prepared for the Conference "How Monetary Policy Got behind the Curve and How to Get Back," held at the Hoover Institution at Stanford University on May 6, 2022. It is part of the session, "What Monetary Policy Rules and Strategies Say." Some of the historical references in this paper were presented on April 13, 2021 at the Seminar in Applied Economics, at The Graduate Center, City University of New York in a presentation entitled "The Optimal Reentry to a Monetary Policy Strategy" Taylor (2021).

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Abstract. This paper examines the recent deviation from rules-based monetary policy in the United States, and proposes a way for the Federal Reserve to return quickly to a more effective rules-based policy. The paper reviews the impact of the COVID pandemic on the economy, and the key monetary policy developments that led to an increase in inflation and today's precarious economic situation. This review sets the stage and suggests a way for the Federal Reserve to improve economic performance and achieve low inflation by getting back to more rules-based policy decisions.

For several years, starting around 2017, the Federal Reserve began to move back to a more rules-based monetary policy that had worked well in the United States in the 1980s, 1990s, and in other years. Many papers written at the Fed and elsewhere reflected this revival and showed the benefits of rules-based policies. In July 2017, when Janet Yellen was Chair, the Fed began to include a whole section on rules-based monetary policy in its *Monetary Policy Report,* and many policy makers made favorable comments about rules-based policy. The evidence was that the move toward rules-based policy was beneficial and economic performance improved.

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The Fed halted that move in early 2020 when COVID-19 hit the American economy and many other economies around the world. The Fed stopped reporting on monetary policy rules in the July 2020 *Monetary Policy Report.* It also embarked on new efforts to deal with the pandemic crisis on the economy, including a rapid reduction in the federal funds rate, large-scale purchases of Treasury and mortgage backed securities, which caused a large expansion of the Fed's balance sheet, and a sharp increase in the growth rate of the monetary aggregates. These actions were special and were not generally consistent with rules-based policies.

In February 2021, however, the Fed began to put monetary policy rules back in its *Monetary Policy Report*. Though the section on policy rules was back in the *Report* and remained there through July 2021, there was little evidence that actual monetary policy decisions followed those rules. Thus, a gap developed between the reported rules-based policy and the policy actions of the Fed. Inflation began to rise.

Perhaps seeing this gap, the Fed then reversed again, and removed the section on policy rules from the *Monetary Policy Report* in February 2022. In a Congressional hearing on March 3, 2022, several members of Congress asked Fed Chair Jerome Powell questions about why the policy rules section was missing. Fed Chair Powell responded that the Fed would aim to put the rules section back in the *Report* later in the year, perhaps in the July *Monetary Policy Report*. However, only small changes have yet occurred in actual monetary policy.

A big gap thus still exists between most measures of rule-based policy and actual policy actions, and this gap occurred before and accompanied the rise of inflation. Thus, we are in a high inflation era unless the Fed and other central banks take sensible actions to bring policy in line with known policy rules and strategies. Recent events in Ukraine have raised measured inflation of many goods, such as gasoline, but have not changed this basic story.

1. A Revival of Research on Monetary Policy Rules

Monetary policy rules were the subject of much research in the 1970's through the early 2000s. For the next several years, there was a lull in policy rule research and applications, but starting in 2017, there was a big pickup, and there is plenty of evidence for this revival. As mentioned above, a new section on monetary policy rules for the instruments appeared in the Fed's *Monetary Policy Report* with five different policy rules presented and compared with actual policy. In addition, papers were given at a monetary policy conference at the Hoover Institution at Stanford held in May 2019, at the Federal Reserve Review conference in Chicago in June 2019, and at the Macro Model Comparison Conference in Frankfurt also in June 2019. There are many takeaways, but that there was a revival of research on monetary policy rules is quite evident.

At the conference at Stanford, for example, Mertens and Williams (2020) evaluated different policy rules for the interest rate with a new Keynesian model. They considered three types of monetary policy rules. First was a standard inflation-targeting interest rate rule in which the Fed reduces its response to higher inflation and output, in order to bias the economy toward higher interest rates and inflation and thereby reduce the probability of hitting the lower bond. Second was a rule in which the average inflation target is higher than with standard inflation targeting, though the strength of responses to deviations is unchanged. Third was a price-level targeting rule, in which the Fed allows substantial inflation after a low-inflation episode, until the price level recovers to its target, and vice versa.

Cochrane, Taylor and Wieland (2020) evaluated rules with seven different models. These rules include the Taylor rule, a "balanced-approach" rule, a difference rule that responds to

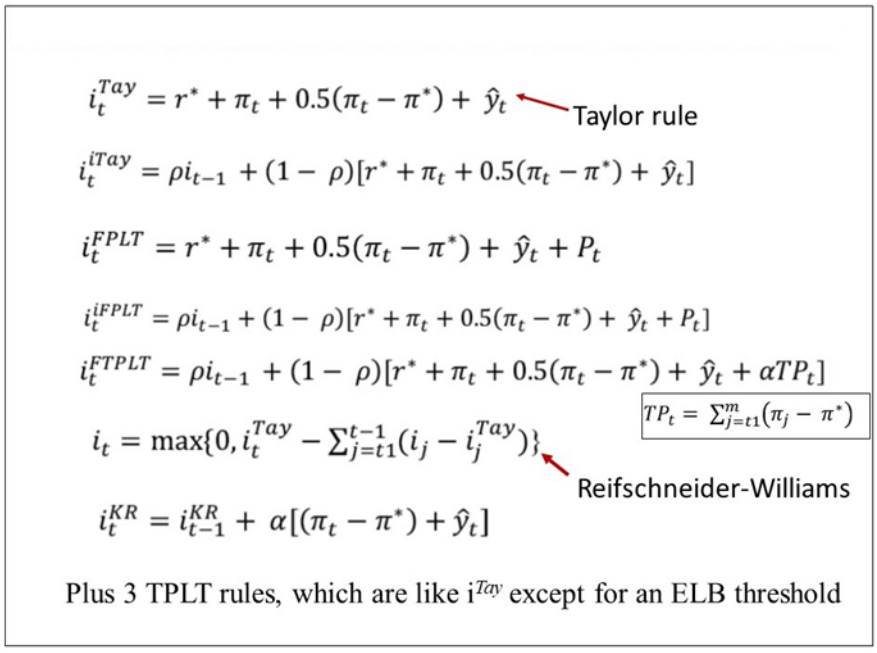
growth rather than levels of inflation and unemployment, and two rules that take particular account of periods with near-zero federal funds rates by implementing a forward-guidance promise to make up for zero bound periods with looser subsequent policy. The paper evaluated these monetary policy rules in seven well-known macroeconomic models—a small New Keynesian model, a small Old Keynesian model, a larger policy-oriented model, and four other models from the Macro Model Data Base. The robustness across models was an essential part of the evaluation process.

At the conference at the Federal Reserve Bank of Chicago, Sims and Wu (2019) evaluated different monetary policy rules with a new structural model, and Eberly, Stock and Wright (2019) evaluated monetary policy rules using the FRB/US model. At the conference in Frankfurt, Andreas Beyer (2019), Gregor Boehl (2019) and many others evaluated interest rate rules in specific models. These included interest rate rules as well as rules for purchases of assets and corresponding expansion of the central bank's balance sheet. Of particular note is the paper by Nikolsko-Rzhevskyy, Papell and Prodan (2021) which compared policy rules and discretion historically using new econometric techniques. Their paper considered a specific policy rule for the interest rate and measured discretion as a deviation of the actual interest rate from that rule. They did calculations for 400 rules and found that the average loss in high deviation periods was greater than the average loss in low deviation periods. Some researchers, including Belognia and Ireland (2019), looked at other instruments such as the money supply, but most continued to look at interest rate instruments.

An important example of this revival of research on policy rules is the paper by Bernanke, Kiley and Roberts (2019a) which examined the stabilizing properties of ten different monetary policy rules for the instruments using the Federal Reserve Board/United States

(FRB/US) model. Figure 1 shows seven of these ten interest rate rules, using the notation of Bernanke, Kiley and Roberts (Appendix, 2019b). The symbol i_t^{Tay} is the nominal interest rate implied by the Taylor rule, r^* is the real natural rate of interest (assumed to be 1 percent), π^* is the inflation target (assumed to be 2 percent), π_t is the inflation rate defined as the four-quarter percent change in core consumer price index, and $\hat{y}_t$ is the output gap. In addition, i_t^{FPLT} is the flexible price-level targeting rule, i_t^{KR} is a rule for the interest rate proposed by Kiley and Roberts (2017), and P_t is the deviation of the consumer price index from its target level, assumed to grow by 2 percent each year. Two of the policy rules (the Taylor rule and the Reifschneider-Williams rule are shown by the arrows in Figure 1. The other three rules considered by Bernanke, Kiley and Roberts (2019b) are temporary price-level targeting rules (TPLT) that are very similar to these seven rules, but take into account the effective lower bound (ELB) of zero in the interest rate.

Figure 1. Policy Rules Studied by Bernanke, Kiley and Roberts (2019b)



What explains this revival? One explanation is a revealed preference for such research on the part of monetary policy officials and others interested in monetary policymaking. At the Chicago Fed conference, Cecchetti & Schoenholtz (2019) found "The most frequently mentioned topic is the desirability of having a clear understanding of policymakers' reaction function." There were also statements by central bank leaders. Raghu Rajan, former governor of the Reserve Bank of India, said, "what we need are monetary rules." Mario Draghi, then President of the European Central Bank, said, "we would all clearly benefit from…improving communication over our reaction functions…" Jay Powell, Chair of the Federal Reserve Board, said, "I find these rule prescriptions helpful".

Another explanation for the revival was the desire to figure out how to deal with the effective or zero lower bound on the interest rate. There was genuine concern about the lower bound in the case of a need for substantial easing. How else can one evaluate alternative proposals for "lower for longer" policy, such as the Reifschneider-Williams (2000) proposal, than with a rule? This is also a huge motivation behind the work by Lilley and Rogoff (2020).

Another possible explanation was the disappointment with monetary policy leading to the great recession and especially the deviation from rules in the 2003-2005 "too low for too long" period. Yet another explanation was the recognition that rules are necessary to evaluate quantitative easing proposals. At the Chicago conference, for example, Brian Sack said "'Talking more about the policy rules…is appropriate' to guide future bond purchase programs and improve their impact." Perhaps concern about proposed policy rules legislation that was circulating around Congress in 2017-18 led the Fed to talk more openly about policy rules in the *Monetary Policy Report*.

2. A Retreat from Policy Rules

The pandemic that started in the first quarter of 2020 with COVID-19 was a jolt to the American economy and many other economies. It interrupted around the world the revival of rules-based policies as many central banks, including the Fed, took special actions to deal with the effects of a health crisis on the economy.

These actions included a rapid reduction in the target for the federal funds rate during the period around March 2020, as shown in Figure 2. It also included large-scale purchases of Treasury and mortgage backed securities causing a large expansion of the Fed's balance sheet as shown in Figure 3. Total assets at the Fed rose from $3.8 trillion to $8.9 trillion. Both M1 and M2 measures of the money supply also grew rapidly. As mentioned above, the Fed also stopped reporting on rules-based policy in its *Monetary Policy Report* in the July 2020 issue of the Report.

Figure 2 The Federal Funds Rate in the United States (Weekly averge data from January 4, 2017 to May 25, 2022)

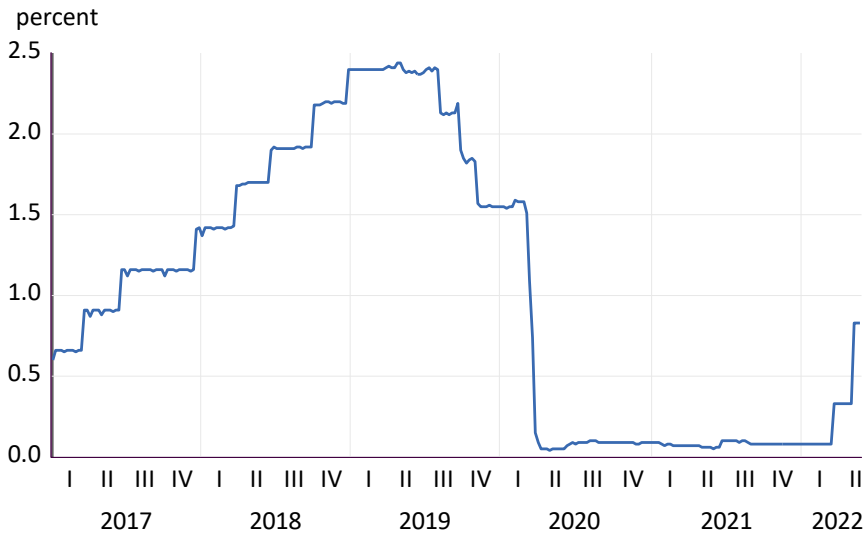
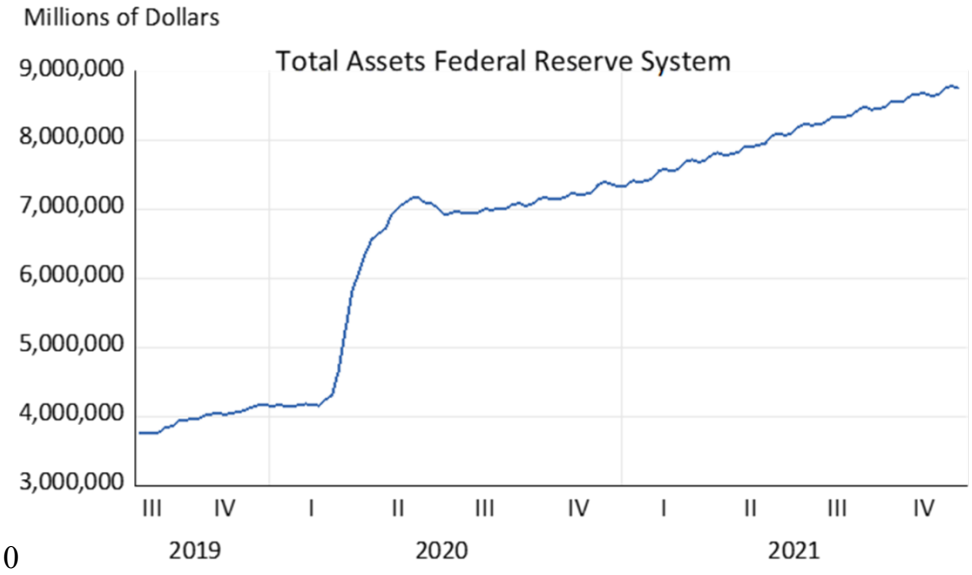


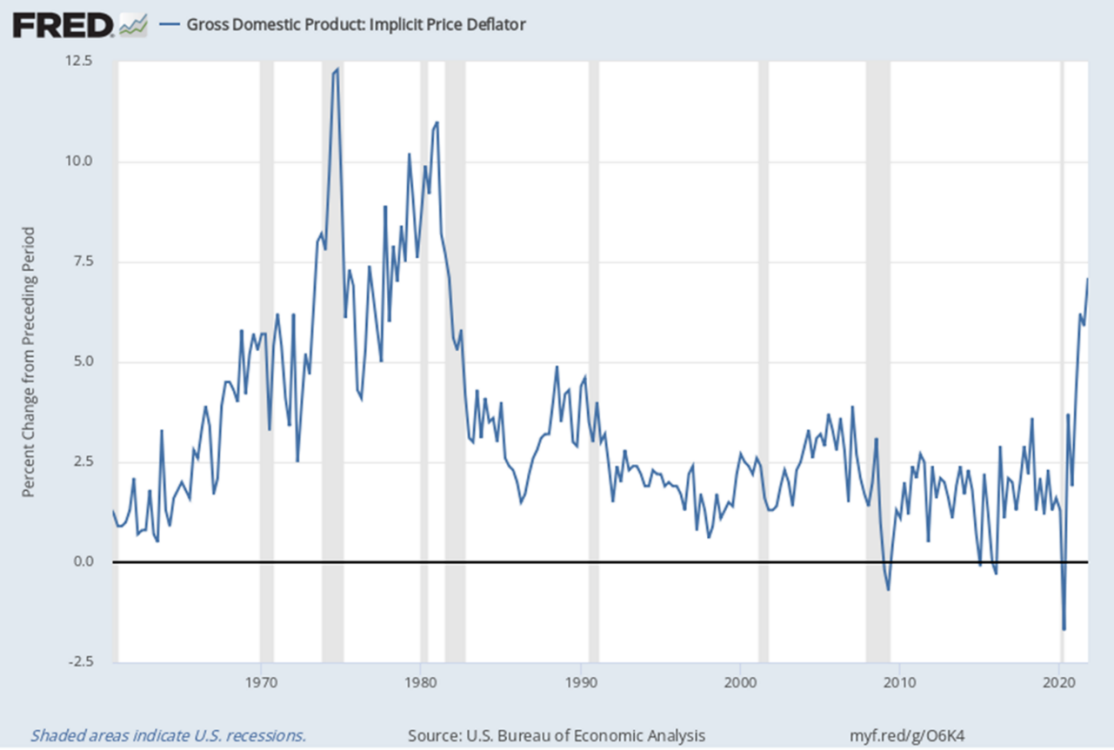
Figure 3.Total Assets. Federal Reserve System



Source: FRED, Federal Reserve Bank of St. Louis. Wednesday Levels

By many accounts, these actions were discretionary and were not consistent with rules-based policies. Indeed, as would be expected from the large difference between these interest rate actions and a more rules-based policy, the inflation rate rose. As measured by the GDP deflator, the inflation rate shown in Figure 4 rose by very large amounts. The inflation rate as measured by the consumer price index rose to 8.5% in March 2022.

Figure 4. Inflation rose starting in early 2021 reaching 8.1 % in the 1st quarter of 2022.



3. Average Inflation Targeting: A Further Retreat?

While these changes in inflation were beginning, the Fed and other central banks began to review their monetary policy strategies in light of COVID-19 as summarized in Taylor (2020). One of the first to complete this review was the Fed, which decided to move to a new "flexible form of average inflation targeting," as Fed Chair Jerome Powell described it at the annual Jackson Hole monetary policy conference in August 2020. European Central Bank President Christine Lagarde explained at the annual *ECB and Its Watchers* conference in September 2020 that the ECB was in the middle of its own "monetary policy strategy review." At the Bank of Japan, Governor Haruhiko Kuroda was involved in a similar discussion with the government of Japan.

In fact, it looked like there was a move underway to reform the entire international monetary system, with each country or region taking actions similar to the Fed, though attuned to its own circumstances. It did not turn out that way. “At the very least,” argued Otmar Issing, a former chief economist and former member of the ECB Board who was largely responsible for charting the original course of ECB policymaking, “other central banks should not blindly follow the Fed’s new strategy.”

Others criticized the Fed’s new approach to average inflation targeting. In early September 2020, Robert Heller, former Federal Reserve governor, argued in a letter to the *Wall Street Journal* that the Fed should “not target an average inflation rate of 2%.” At a virtual conference convened by Stanford University’s Hoover Institution, Charles I. Plosser, a former president of the Federal Reserve Bank of Philadelphia, and Mickey D. Levy of Berenberg Capital Markets criticized the Fed for not being specific about the timespan over which average inflation is measured. Is it one year or several years?

Chair Powell acknowledged this lack of specificity at the Jackson Hole conference in August by saying “we are not tying ourselves to a particular mathematical formula that defines the average.” He added that, “Our decisions about appropriate monetary policy … will not be dictated by any formula.” Then, in a press release the same day, the Fed’s Board of Governors explained that policy decisions depended on “assessments of the shortfalls of employment from its maximum level” rather than by “deviations from its maximum level,” as it had previously stated.

Partly because of difficulty of distinguishing between “deviations” or “shortfalls,” this new approach added uncertainty. There was no mention of how monetary policy could create higher inflation.

In adopting this "flexible" approach, the Fed seemed to shift further away from the more rules-based policy that it had been pursuing since 2017. As mentioned, the *Monetary Policy Report* dropped the section on monetary policy rules, in contrast to previous *Reports*, which had featured a whole section on rules. This made it difficult to compare rules with actual policy.

It is understandable that Issing and others would be reluctant to go along with the Fed's apparently more discretionary approach, especially when there were alternatives that other central banks could pursue. Rather than casting about for something new or simply different from the Fed, they looked for a rules-based policy path that the Fed itself was on before the pandemic struck.

When it was first developed, the Taylor rule used an average inflation rate. However, the Taylor rule defined the "average" as "the rate of inflation over the previous four quarters." In other words, the Fed could still switch to a specific average-inflation approach.

Moreover, the formal policy rules previously listed in the *Monetary Policy Report* had variables to account for factors other than the inflation rate, such as the unemployment rate or the gap between real and potential GDP. These variables could be included in any new strategy without neglecting the inflation target, as could policy rules, to deal with asset purchases and their eventual unwinding. Developing such an approach would not be difficult to do.

The large increase in the inflation rate in 2021 and 2022, shown in Figure 4, raised even more basic question about the average inflation targeting. With the current inflation rate well above the level needed to raise average inflation by a small amount, the focus of everyone became how to reduce the current inflation rate rather than simply to allow the average inflation rate to rise.

That policy rules reentered the Federal Reserve's *Monetary Policy Report* in February 19, 2021 was a welcome development. It re-initiated a helpful reporting approach that began in the July 2017 *Monetary Policy Report* when Janet Yellen was Fed chair. The approach continued under Chair Jay Powell in 2018, 2019 and early 2020, but it was dropped in July 2020.

Five rules were in the February 2021 *Monetary Policy Report* on pages 45 through 48. To quote the *Report*, these include "the well-known Taylor (1993) rule, the 'balanced approach' rule, the 'adjusted Taylor (1993)' rule, and the 'first difference' rule. In addition to these rules," and this is very important, there is a new "'balanced approach (shortfalls) rule,' which represents one simple way to illustrate the Committee's focus on shortfalls from maximum employment."

Figure 5 shows the five rules from the July 2021 Report. Even though these were not in the February 2022 *Monetary Policy Report*, they state where the Fed was most recently regarding rules. Moreover, the Fed Chair suggested the rules would be in future Reports. There were also five rules in the earlier Reports, but one was out, and a new one—the Balanced-approach (shortfalls) rule—was in. This new modified simple rule would not call for increasing the policy rate as employment moves higher and unemployment drops below its estimated longer-run level. This modified rule aims to illustrate, in a simple way, the Committee's focus on shortfalls of employment from assessments of its maximum level.

Figure 5. Five Policy Rules from the July 9, 2021 *Monetary Policy Report*

A. Monetary policy rules

Taylor (1993) rule	$R_t^{T93} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t)$
Balanced-approach rule	$R_t^{BA} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2(u_t^{LR} - u_t)$
Balanced-approach (shortfalls) rule	$R_t^{SBA} = r_t^{LR} + \pi_t + 0.5(\pi_t - \pi^{LR}) + 2min\{(u_t^{LR} - u_t), 0\}$
Adjusted Taylor (1993) rule	$R_t^{T93\,adj} = max\{R_t^{T93} - Z_t, \text{ELB}\}$
First-difference rule	$R_t^{FD} = R_{t-1} + 0.5(\pi_t - \pi^{LR}) + (u_t^{LR} - u_t) - (u_{t-4}^{LR} - u_{t-4})$

In Table 5, the notation is standard: The symbol *r* is the interest rate, π is the inflation rate, *u* is the unemployment rate, and the superscript *LR* means the long run. How different would the shortfalls rule be compared with the regular balanced-approach rule? The 2021 Report endeavored to answer this question. The balanced-approach (shortfalls) rule was below the regular balanced-approach rule in 2017 through the start of the pandemic in 2020. Thus, the shortfalls rule did not increase the interest rate, as does the balanced approach rule without the shortfall. The shortfalls and the non-shortfalls rule then move together during the start of the pandemic as the unemployment rate rises well above the long run rate. The adjusted Taylor rule stays above zero, but then stays low for longer than the Taylor rule.

The useful contribution of this new shortfalls rule is that one now had an explicit way to think about the Fed's new "shortfalls from maximum employment" approach. One can see if the new rule performs better than the balanced approach or the modified Taylor rule, for example, by simulating various models. It was disappointing that, as the Report says, the aims "of having inflation average 2 percent over time to ensure that longer- term inflation expectations remain well anchored, is not incorporated in the simple rules analyzed in this discussion."

To summarize, the analysis in this section takes into account the shortfalls of unemployment rather than deviations and focusses on the average inflation rate by looking at moderate inflation rates slightly higher than the long run target inflation rate. Nevertheless, the results are similar to what one finds by looking at the regular Taylor rule. The results can be compared by looking at the average gap in percentage points between the FOMC interest rate and the settings of the three rules.

4. Reentry to a Monetary Strategy

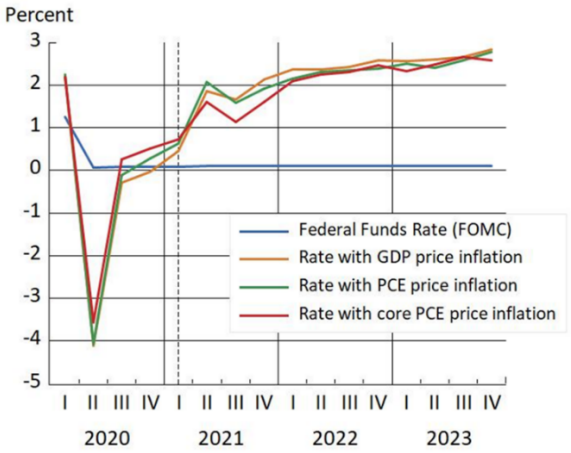
It is good that rules were in the Fed's *Monetary Policy Report* in 2021, and it is good that they might be back in future *Monetary Policy Reports*. It would be more helpful if the Fed incorporated some of these rules or strategy ideas into its actual decisions. Apparently, this has not yet happened, as I show below by comparing the interest rate path and policy rules for the interest rate.

One reason that there was little or no action is that the Fed viewed the resurgence of inflation as "transitory." It was very low in previous years and supply chains seemed to be a special factor. While there have been effects of supply shortages and the war in Ukraine on commodities, the major effect on inflation has been due to monetary policy. The Fed's plan to halt or slow the purchases of Treasuries & Mortgage Backed Securities seemed like it might reduce inflation, but a policy rule was not part of the strategy.

This is illustrated in Figure 6, which is based on the data as of April 10, 2021; thus the graph illustrates that the Fed has been behind the curve for a quite a while. The three lines in Figure 6 show the federal funds rates from three policy rules using the same parameters as those in the Taylor rule which is discussed in the February 2021 *Monetary Policy Report*.

The so-called equilibrium interest rate is reduced from 2 percent to 1 percent in the calculations in Figure 6. Such a reduction in the equilibrium interest rate was suggested by staff at the Fed but may be larger or smaller than assumed here. The policy rules use the four-quarter inflation rates of the GDP price index, the PCE price index, or the core PCE price index, based on the February 2021 Congressional Budget Office (CBO) projections. They use the same percentage deviation of real GDP from potential GDP as in the CBO report. Other economic forecasters have inflation and real GDP forecasts close to those of CBO.

Figure 6. Federal Funds Rate and Monetary Policy Rules with 3 Inflation Rates



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Even with this smaller equilibrium real interest rate (1 percent rather than 2 percent in the original Taylor rule), the FOMC's path for the federal funds rate is well below any of these policy rules. There is a difference in the first quarter of 2021, and the difference grows over time. Consider for simplicity the average of the interest rates for the three different inflation rates in the final quarter of each year. If we average the three values, we get 1.9 percent in 2021Q4, 2.5 percent in 2022Q4 and 2.7 percent in 2023Q4.

There has been little mention of why the discrepancy existed between the Fed's actual decisions reported here and the policy rules. Did this mean that the Fed actually intended to keep the rate this low under these circumstances regarding real GDP and inflation? Would it then raise the rate sharply in 2023 or 2024?

Now consider the current situation. Figure 7 is created from the Fed's dot plot, which shows individual FOMC member views about future values of the Federal Funds Rate. Figure 7 shows the value at the end of different calendar years corresponding to different meeting times.

Figure 7. FOMC Projections of the Federal Funds Rate at Different Meeting Dates.

Year	2021	2022	2023	2024
March 15-16 '22 meeting	---	1.9	2.8	2.8
December 14-15 meeting	0.1	0.9	1.6	2.1
September 21-21 meeting	0.1	0.3	1.0	1.8

"The projections for the federal funds rate are the value of the midpoint of the projected appropriate target range for the federal funds rate or the projected appropriate target level for the federal funds rate at the end of the specified calendar year…"

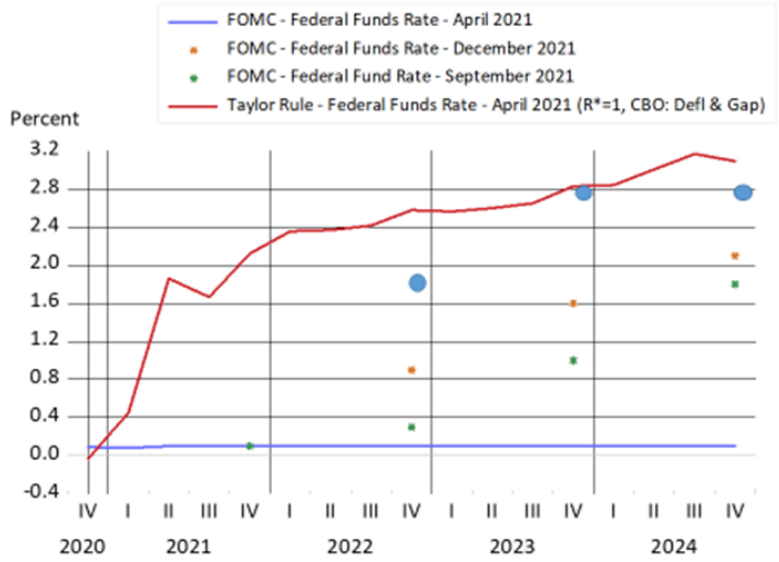
"'Appropriate monetary policy' is defined as the future path of policy that each participant deems most likely to foster outcomes for economic activity and inflation that best satisfy his or her individual interpretation of the statutory mandate to promote maximum employment and price stability."

Note that the rates are higher than the blue line in Figure 6, and that they rise over time at each meeting. The top line shows the values at the meeting in March of 2022. According to the dots, the Federal Fund Rate will be 1.9 percent at the end of 2022, and then will rise to 2.8 percent at the end of 2023 and at the end of 2024.

The averages in Figure 7 have been calculated from the projections of each FOMC member at various meetings. For example, the average at the December 2021 meeting for the end of 2022 is 0.9 percent and then rises over time. The averages at the more recent meeting in

March 2022 are higher as both the dots and the averages rise over time. Looking out into the later periods in 2023 and 2024, the results are higher in each row of Figure 7.

Figure 8. Taylor Rule as of April 2021 and Average of FOMC Dot Plots



The solid red line in Figure 8 is the Taylor rule recommendation from over a year ago in April 2021. The green and orange asterisks are the forward looking estimates of the FOMC in September 2021 and Decemer of 2021, respectively. The blue circles are from the FOMC meeting in March 2022. The FOMC values have been increasing toward the Taylor rule values during this period.

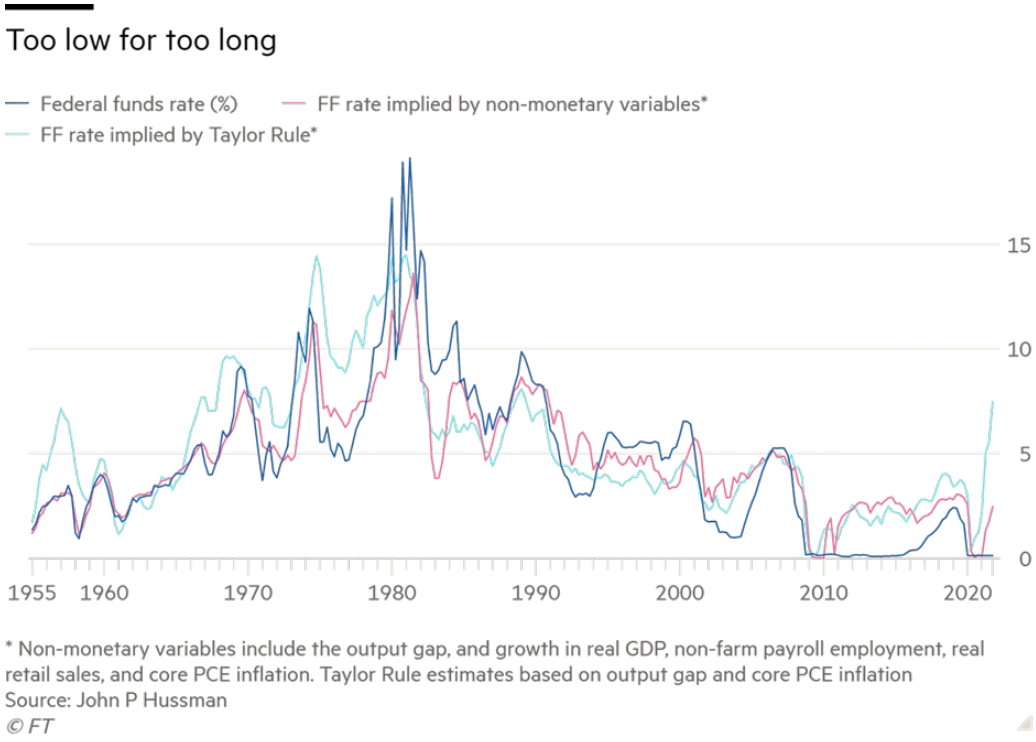
While the blue dots are close to the policy rule, the inputs to the policy rule have changed since a year ago and these have lead to a higher rules-based interest rate. Most important is that inflation has continued to rise. The 4 quarter average inflation rate was 4.575 percent as of the 3rd quarter of 2021 which imples that interest rate should be about 6 percent even with a GDP gap of -1.6 percent. That is, the Taylor rule rate is: r = 6 = 4.575+1+0.5*(4.575-2)+0.5(-1.60)

If the average inflation rate is rounded down to 4 perent, then the interest rate should be 5 percent. If you look at the July 9, 2021, *Monetary Policy Report* version of the "Taylor rule,"

and plug in an inflation rate over the past four quarters of 4%, the gap between GDP and its potential of about -2%, a target inflation rate of 2%, an equilibrium interest rate of 1%, you get a federal funds rate of 5%. Recall that this assumes an equilibrium interest rate of 1% rather than 2%. These calculations use an average inflation rate over 4 quarters, consistent with a form of "average inflation targeting". Even is the inflation rate falls sharply to to 2% by the end of 2022, and output equals potential, the federal funds rate should be about 3%, so the Fed is still behind.

These types of calculations and estimates have now become very well known and have appeared in many places. An excellent recent example is shown Figure 9. It is a time-series chart reproduced from reseach conducted by John Hussman (2022), which he recently pubished in the *Finacial Times*. It shows the Federal Funds rate and an estimate of that rate from the Taylor rule. It is based on up to date information, and it shows that the ideal rules-based policy interest rate may even be higher than in the above calculations.

Figure 9. Federal Fund Rate and Taylor Rule (source: John Hussman)



5. Conclusion

This paper has examined the reasons to return to a rules-based monetary policy in the United States and has outlined a method to do so. By reviewing the years leading up to the present monetary situation, it provides the background needed for analyzing current and future monetary policy decisions.

The answer to the key question "Are We Entering a New Era of High Inflation?" is clearly "yes," unless monetary policy makers change policy. There are now more reasons than ever for central banks to use a more rules-based policy. Central banks should start now on rules that markets understand. The policy interest rate would increase as inflation rises, as has already happened. It would of course be a contingency plan, as are all rules. This would greatly reduce chances of a large damaging change later.

Having a clearly stated policy rule would prepare the Federal Reserve and others for such a strategy in practice. Moreover, explaining how its policy rule or strategy would be consistent with its flexible average inflation targeting statements would further clarify the Fed's monetary policy and facilitate the market adjustments. It would remove uncertainty and remaining inconsistencies.

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