HOW MONETARY POLICY GOT BEHIND THE CURVE—AND HOW TO GET BACK

EDITED BY

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What Monetary Policy Rules and Strategies Say

CHAPTER TWO

Perspectives on US Monetary Policy

Richard H. Clarida

I would like to thank John Taylor, John Cochrane, and the other organizers for inviting me to participate, once again, in the Hoover Monetary Policy Conference. When this group last convened in May 2019, none of us anticipated—nor really could have foreseen—the public health calamity and economic catastrophe that would, months later, befall the economy as a consequence of the COVID-19 pandemic. The pandemic, and the mitigation efforts subsequently put in place to contain it in 2020, delivered the most severe blow to the US economy since the Great Depression. GDP collapsed at an annual rate of over 30% in the second quarter of 2020. More than 22 million jobs were lost in just the first two months of the crisis, and the unemployment rate rose from a 50-year low of 3.5% in February to a postwar peak of almost 15% by April of 2020. A precipitous decline in aggregate demand pummeled the consumer price level and inflation fell sharply in 2020. The resulting disruptions to economic activity significantly tightened financial conditions and impaired the flow of credit to US households and businesses.

The monetary and fiscal policy response to the COVID crisis in the United States, and in many other advanced economies, was unprecedented in its scale, scope, and speed.[1] Legislation passed by Congress in March 2020, December 2020, and March 2021 provided

1. Richard H. Clarida, Burcu Duygan-Bump, and Chiara Scotti, "The COVID-19 Crisis and the Federal Reserve's Policy Response," Finance and Economics Discussion Series 2021-035, Board of Governors of the Federal Reserve System, Washington, DC, June 2021.

a total of nearly $5.8 trillion in fiscal support to the US economy—about 28% of US GDP. The Federal Reserve acted decisively and with dispatch as it deployed all the tools in its conventional kit—cutting the federal funds rate to the zero lower bound (ZLB), launching large-scale purchase programs for Treasury and mortgage-backed securities, and providing outcome-based guidance for the future path of the policy rate. And it did this while designing, developing, and launching a series of temporary backstop facilities to support the flow of credit to households and businesses in a matter of weeks.

But if 2020 was the year of the pandemic, economic collapse, and the policy response, then 2021 was the year of vaccines, economic recovery, and repercussions flowing from the policy response. In 2021, the real side of the economic recovery was about as good as it gets with strong growth and robust hiring. And in the first half of the year, this rapid return to the economy's potential was accompanied by indicators of underlying inflation that remained consistent with the Fed's 2% objective. But in the second half of 2021, and continuing into 2022, there was a surge in inflation that was about as bad as it gets, not only in the United States but also in many other countries. It was certainly not moderate, nor foreseen in the Fed's Summary of Economic Projections, and it is turning out to be distressingly persistent and increasingly broad based as evidenced in both price and wage data.

Speaking for myself, I entered 2021 with the assumptions that inflation expectations were well anchored, that in the aggregate there remained substantial slack in the economy, and that there were also some significant, but likely short-lived, sectoral imbalances between supply and demand that would require large increases in some relative prices—for example, the relative prices of durable goods versus contact intensive services.[2] As a starting point, with well-anchored inflation expectations, the textbook monetary policy response

2. Richard H. Clarida, "US Economic Outlook and Monetary Policy," speech at the 2021 Institute of International Finance Washington Policy Summit, Washington, DC (via webcast), Board of Governors of the Federal Reserve System, March 25, 2021.

would be to look through such relative price changes caused by supply shocks as long as inflation expectations stayed well anchored and economic slack remained evident. That was certainly my view in the spring of 2021, since it was not inconsistent with the data on price and wage inflation available at the time. It was also the view of virtually all private sector forecasters as documented in the *Wall Street Journal*, *Bloomberg*, and *Survey of Professional Forecasters* surveys, which were conducted in the first half of 2021.

But of course, these assumptions proved to be wrong, and beginning in the summer of 2021, the incoming data—for example, the data on trimmed-mean inflation calculations, on wage and compensation dynamics, and on unit labor cost trends—began to reveal, at least to me, that the balance of risks to the inflation outlook were skewed decidedly to the upside. I indicated as much in remarks delivered at the Peterson Institute for International Economics event in August.[3]

It was taking longer to reopen and rebalance the $20 trillion economy than it did to shut it down. The US labor market tightened much faster than the Fed and most others had been expecting in the spring, and the cause of the aforementioned sectoral imbalances was revealed to be due more to excess demand than to transitorily depressed deficient supply.

Certainly by the fall of 2021, the monetary policy rules I consult based on my research with Mark Gertler and Jordi Galí—for example as highlighted in a presentation I delivered (virtually) to a Hoover seminar in January 2021 and as studied in a recent paper by David Papell and Ruxandra Prodan—were indicating that liftoff from the ZLB was or soon would be warranted (figure 2.1).[4]

3. Richard H. Clarida, "Outlooks, Outcomes, and Prospects for US Monetary Policy," speech delivered (via webcast) Peterson Institute for International Economics, Washington, DC, August 4, 2021.

4. Richard H. Clarida, Jordi Galí, and Mark Gertler, "The Science of Monetary Policy: A New Keynesian Perspective," *Journal of Economic Literature* 37 (December 1999): 1661–707; Richard H. Clarida, Jordi Galí, and Mark Gertler, "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory," *Quarterly Journal of Economics* 115,

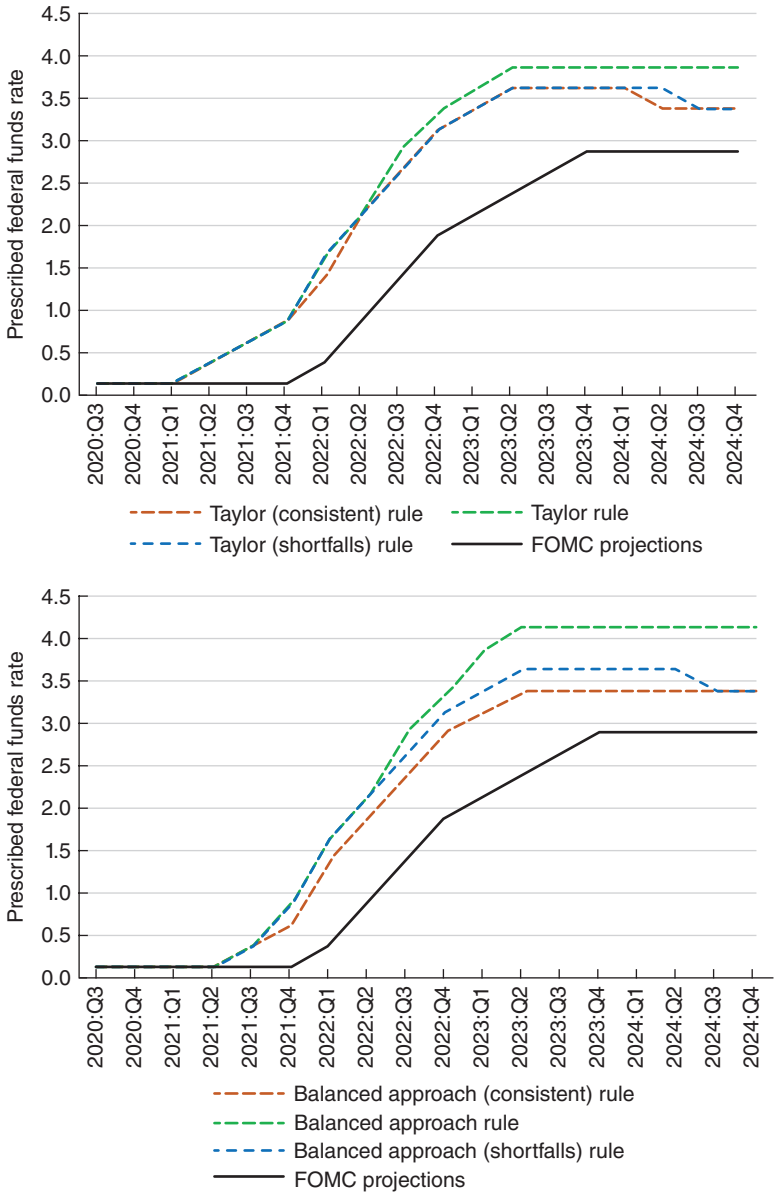

FIGURE 2.1. Inertial Policy Rules from Papell and Prodan

Source: David H. Papell and Ruxandra Prodan, "Policy Rules and Forward Guidance following the Covid Recession," University of Houston Department of Economics, May 1, 2022.

Subsequently, the FOMC began pivoting in the fall of 2021 to end quantitative easing earlier than expected. It also commenced rate hikes sooner than had been expected, signaled a faster pace of policy normalization than had been previously projected, and made it clear it was also likely to commence balance sheet normalization much sooner and at a much faster pace than was the case following the global financial crisis of 2008. Taken together these actions have tightened financial conditions considerably and pushed nominal (but not real) bond yields and mortgage rates to levels last seen at the peak of the previous rate hike cycle when the fed funds rate reached 2.5%, roughly equal to the FOMC's current assessment of long-run neutral. Indeed, there appears to be broad support on the Committee to return the funds rate "expeditiously" to neutral.

But I judge, at least from my vantage point back at Columbia University, that simply and even expeditiously "getting to long-run neutral" will not be enough to return inflation over the forecast horizon back to the 2% longer run goal during this cycle. And let me be clear, even if through good policy or good luck inflation does return to 2% over the forecast horizon, average personal consumption expenditures (PCE) inflation as calculated using either backward- or forward-looking windows of two, three, even five years will work out to be well above 2%.[5] That was another point I made in my August 2021 Peterson Institute remarks. Because of the size and nature of the pandemic shock and the monetary and fiscal policy response to the shock, the ZLB in this cycle did not turn out to have been ex post a binding constraint on the ability of monetary and

no. 1 (2000): 147–80; Richard H. Clarida, "The Federal Reserve's New Framework: Context and Consequences," speech delivered (via webcast) at "The Road Ahead for Central Banks," a seminar sponsored by the Hoover Economic Policy Working Group, Hoover Institution, Stanford University, January 13, 2021; David H. Papell and Ruxandra Prodan, "Policy Rules and Forward Guidance Following the Covid Recession," University of Houston Department of Economics, May 1, 2022.

5. Federal Reserve Bank of Atlanta, Underlying Inflation Dashboard, https://www.atlantafed.org/research/inflationproject/underlying-inflation-dashboard.

fiscal policy to return inflation to 2% from below, or for inflation to average 2% over time. And monetary policy should, I argued, reflect this reality.

In practice, this will mean that, even under a plausible best case scenario in which most of the inflation overshoot in 2021 and 2022 turns out to have been transitory, the funds rate will, I believe, ultimately need to be raised well into restrictive territory—by at least a percentage point above the estimated nominal long-run neutral rate of 2.5%—for inflation to be credibly projected to return to 2%. The Taylor-rule arithmetic is both simple and compelling: if PCE inflation a year from now is running at, say, 3%, a policy rate reaching 4% would be implied by the Taylor principle and the policy rule I outlined in my 2021 Hoover remarks.

The policy path for the funds rate I have just described does not incorporate the possible additional tightening of financial conditions that could arise as the Fed allows its balance sheet to shrink over time, although bond yields have likely already priced in some assumptions about the ultimate destination for the size of the balance sheet and duration of the program. Were the term premium to increase substantially from current levels—due to the Fed's balance sheet policy, coupon supply, a decline in the value of Treasuries as a hedge against equity risk, or a global rise in term premia as major central banks shrink their balance sheets in tandem—the required rise in the funds rate to return inflation to 2% could be somewhat smaller than indicated by popular policy rules.[6] On the other hand, if the consensus and SEP forecast that inflation will fall below 3% in 2023 turns out to be overly optimistic, then the tightening of monetary policy required to return inflation to the 2% longer run goal would be greater than in the baseline scenario that is consistent with the SEP projections and many private sector

6. Richard H. Clarida, "Monetary Policy, Price Stability, and Equilibrium Bond Yields: Success and Consequences," speech delivered at the High-Level Conference on Global Risk, Uncertainty, and Volatility, Zurich, Switzerland, November 12, 2019.

inflation forecasts. And of course, r-star itself is unobserved and time varying and could turn out to be higher than the committee expects, in which case the peak funds rate in this cycle that would be consistent with returning inflation to 2% would be higher than indicated in figure 2.1.

In closing, the Fed in March 2020 faced a "whatever it takes" moment and I believe, without any pretense of impartiality, that history will judge that it rose to that challenge. Today, the Fed faces a different challenge, that of insuring that the hard-won battles under Paul Volcker and Alan Greenspan to achieve price stability are not squandered. The Fed has the tools to meet this challenge, officials understand the stakes, and are determined to succeed. But the Fed's instruments are blunt, the mission is complex, and difficult trade-offs lie ahead.

CHAPTER THREE

A Labor Market View on Inflation

Lawrence H. Summers

This paper presents four arguments relating to the Fed's response to recent inflation. First, using a simple output-gap framework, I argue that inflation should have been predictable in early 2021. Second, given the extremely elevated level of job vacancies and quits, I show that labor markets are currently extraordinarily tight, and the non-accelerating inflation rate of unemployment (NAIRU) has likely risen substantially. This suggests the labor market is significantly tighter than would have previously been implied by the current unemployment rate. Third, high levels of inflation and low levels of unemployment are significant predictors of future recessions, implying a significant risk of a hard landing for the economy. And fourth, I argue that the epistemic approach taken by the Fed using specific numerical targets for forward guidance undermines its credibility, and that it should return to a more modest framework with broad, clearly stated objectives.

THE OUTPUT-GAP VIEW OF INFLATION

The output gap, defined as the difference between actual output and potential output, is a useful indicator for the degree of inflationary pressure in the economy. In the first quarter of 2021, measures of the output gap were already sending an alarming signal about the

I would like to thank Alex Domash for assistance in preparing this paper.

possibility of an overheating economy in the near future. The best estimate for the 2021 gap was about $600 billion (or $50 billion per month), based on the Congressional Budget Office's (CBO) July 2020 projections and economic data released in late 2020. At the same time, $2.8 trillion of fiscal stimulus was being delivered to the economy between the $900 billion COVID-19 Relief Bill passed in December 2020 and the $1.9 trillion stimulus package passed in March 2021. Depending on the precise multiplier used, this translated to approximately $150 billion per month in fiscal stimulus—or three times the size of the output gap.

Figure 3.1 puts the magnitude of the fiscal stimulus into perspective by comparing it to the 2009 stimulus package created in response to the Great Recession. In 2009, the output gap between actual and estimated potential output was about $80 billion a month, according to CBO projections. The 2009 stimulus measures provided an incremental $30 billion to $40 billion a month during 2009—an amount equal to about half the output shortfall. Relative to the size of the output gap addressed, the COVID stimulus was essentially six times as large as the 2009 stimulus package.

These estimates of the output gap are meant to be illustrative rather than precise—as well-known estimates of potential GDP may be inaccurate since the potential output cannot be observed directly (see Williams 2017 or Powell et al. 2021). Yet, there was good reason to believe that the fiscal stimulus in 2021 would overshoot the output gap by even more than projected. At the time, households had amassed nearly $2 trillion in excess savings, most of which had been deposited in checking accounts (Greig and Deadman 2022). Monetary policy was also much more expansionary than in 2009, with nominal interest rates at the zero lower bound and the Fed balance sheet expanding at a record pace. Even without COVID-related supply shocks or adverse impact on potential output, the output gap was signaling a substantial risk of overheating.

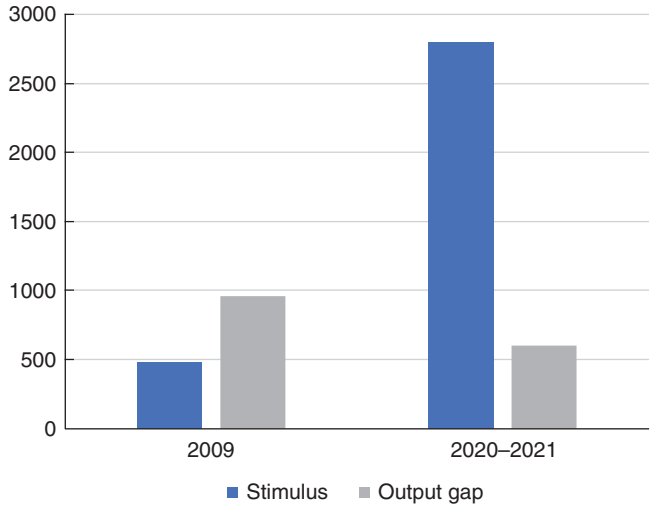

FIGURE 3.1. Output Gap vs. Size of Fiscal Stimulus ($Billion)

Sources: Congressional Budget Office, "Estimated Impact of the American Recovery and Reinvestment Act on Employment and Economic Output in 2014" and "An Update to the Budget Outlook: 2020 to 2030."

Despite the above, the Federal Open Market Committee's March 2021 economic projections had personal consumption expenditures (PCE) inflation at 2.4% in 2021 and 2.0% in 2022. One reason these projections likely underestimated the possibility of inflation is the nature of the Fed's primary macroeconomic model, the FRB/US. Figures 3.2 and 3.3 show the results of a simulation of the FRB/US model under the assumption that the economy had $2 trillion of GDP (about 9%) in extra government spending maintained for the next six years. The figures show that inflation would rise by only 70 basis points at the end of the six years—which suggests a significant limitation in the model's ability to detect inflation stemming from expansionary fiscal policy.

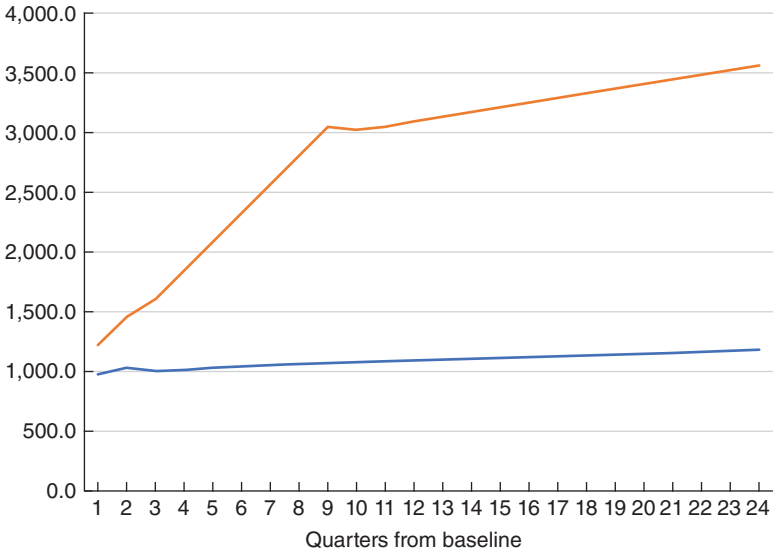

FIGURE 3.2. Federal Spending ($Trillion)
Source: Federal Reserve, FRB/US dataset.

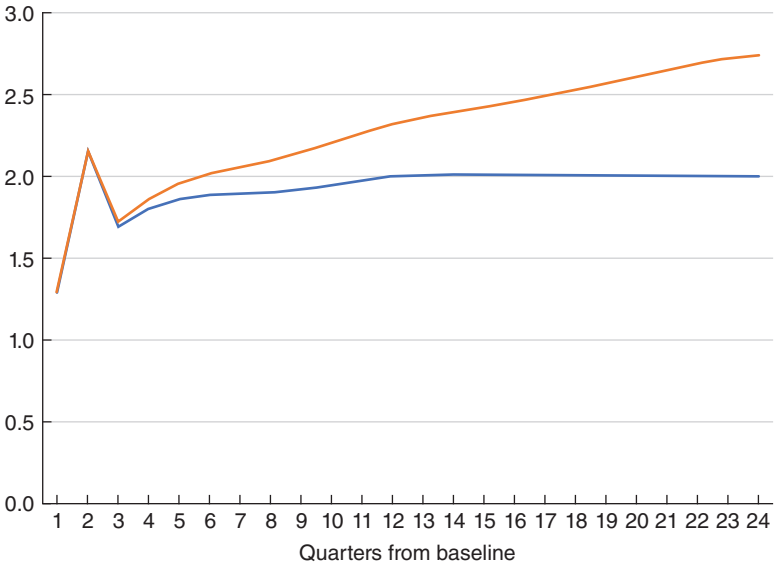

FIGURE 3.3. Inflation Rate (%)
Source: Federal Reserve, FRB/US dataset.

THE LABOR MARKET VIEW OF INFLATION

Another way to understand the inflationary pressure in the economy is to estimate the degree of slack in the labor market. Today, the US labor market is extraordinarily tight. Figure 3.4 shows that the number of job vacancies per unemployed is higher than it's been in seventy years. In April 2022, the vacancy-to-unemployment (v/u) ratio was at 1.92 (after reaching a high of 1.99 in March). For perspective, the v/u ratio has averaged 0.65 since the 1950s and reached a pre-pandemic peak of 1.5 in 1969. The quits rate in the US is also at a historic high of 2.7%, compared to a historical average of 1.8% and a pre-pandemic peak of 2.2%.

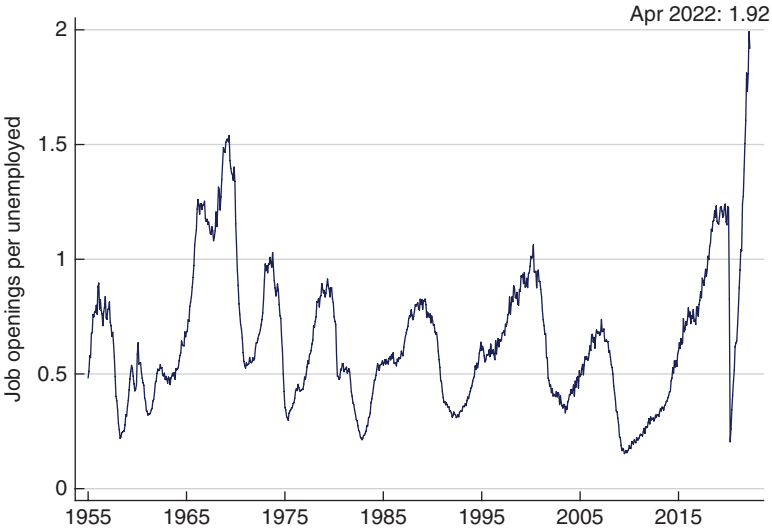

FIGURE 3.4. Vacancy-to-Unemployment Ratio, January 1955–April 2022

Sources: Bureau of Labor Statistics (BLS) Current Population Survey (CPS) and Job Openings and Labor Turnover Survey (JOLTS) via Federal Reserve Economic Data, Federal Reserve Bank of St. Louis (FRED), Barnichon (2010); author's calculations.

Notes: Vacancy data before 2001 uses vacancy estimates constructed from Barnichon (2010) using the Help-Wanted Index published by the Conference Board. All values are seasonally adjusted.

The surge in demand-side labor market measures like the vacancy rate and quits rate since the outset of the pandemic has led to a significant outward shift in the famous Beveridge-type curves, which relate demand-side and supply-side labor market measures. Figure 3.5 shows how the relationships between the job vacancy rate and the unemployment rate, and the quits rate and the unemployment rate have deviated significantly from their historical trends. This suggests that the labor market is significantly tighter today than implied by the unemployment rate.

The relevant question for determining the inflationary pressure in the labor market is how much the non-accelerating inflation rate of unemployment (NAIRU) has increased as a result of the outward shift in these Beveridge-type curves. In what follows, I present a very crude analysis that suggests that it is plausible the NAIRU has increased somewhere between 1.5 and 2.5 percentage points.[1]

One way to crudely estimate the rise in the NAIRU is to calculate the unemployment rate that is consistent with the current measures of the job vacancy rate and the quits rate. In a recent paper (Domash and Summers 2022), we calibrate a model of the unemployment rate on the log of the vacancy rate and the log of the quits rate using monthly Job Openings and Labor Turnover Survey (JOLTS) data from January 2001 to December 2019. We then use this model to predict what rate of unemployment is consistent with current levels of vacancies and quits post-2020. Figure 3.6 shows the difference between the actual and predicted unemployment rates, using a model with twelve-month lags and a time trend. Given the historical relationship between the unemployment rate and the vacancy and quits rates, the unemployment rate consistent with the current levels of vacancies and quits is between 1.5 and 2 percentage points lower than its current value.

1. I am currently working on a more sophisticated analysis with Olivier Blanchard and Alex Domash that incorporates changes in the labor matching process to estimate the increase in the NAIRU.

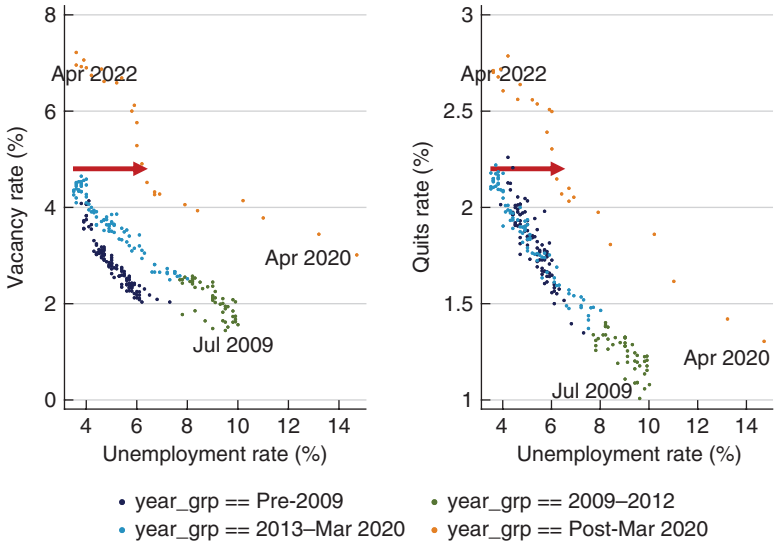

FIGURE 3.5. Beveridge-Type Curves, January 2001–April 2022
Sources: BLS and JOLTS; author's calculations.

Another way to roughly estimate the increase in the NAIRU is to calculate the unemployment rate needed to bring the vacancy and quits rates back to their December 2019 levels. The red arrows in figure 3.5 visually depict this. They conceptually are equivalent to asking where on the new Beveridge-curve line (highlighted in orange in figure 3.5) the December 2019 values of the vacancy rate and the quits rate fall. Estimating a basic model of the unemployment rate on lagged log vacancy rate and log quits rate between April 2020 and April 2022 indicates that the unemployment rate implied by December 2019 levels of quits and vacancies is 6.7%. This suggests a substantial increase in the NAIRU and a labor market that is significantly tighter than the current unemployment rate would have implied in the past.

The historically tight labor market has corresponded with record levels of wage inflation. According to the best available wage data from the Federal Reserve Bank of Atlanta, which matches the hourly

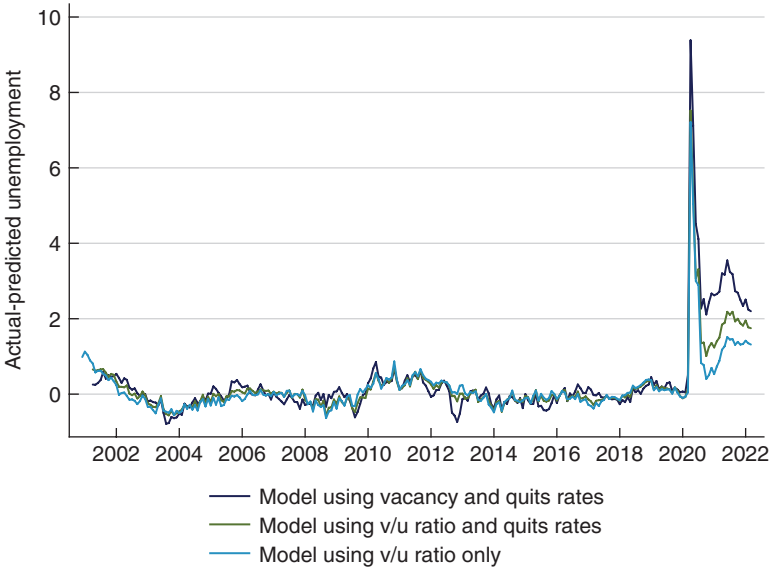

FIGURE 3.6. Residual from Firm-Side Unemployment Regressions

Sources: BLS and JOLTS; author's calculations.

Notes: Predicted unemployment rates are estimated using a model with 12-month lags of each slack variable and a time trend. The model is trained on data from January 2001 through December 2019, and then predicts out-of-sample estimates post-2020. The vacancy and quits rates use JOLTS data, and the v/u ratio is calculated as total vacancies/total unemployed.

earnings of individuals across twelve months, median year-over-year wage inflation in May 2022 reached a series high of 6.6% (using the weighted 3-month moving average of median wages). This series is shown in figure 3.7, going back to 1997. Other wage series show a similar story. According to the Employment Cost Index for private-sector workers, wages and salaries increased by an annualized rate of 5.2% in the first quarter of 2022. The average hourly earnings for all private-sector production and nonsupervisory employees from the Bureau of Labor Statistics shows that month-over-month wage inflation (using a 3-month moving average) reached 5.6% in May 2022.

Historically, wage inflation is highly correlated with price inflation. While the precise relation depends on productivity growth

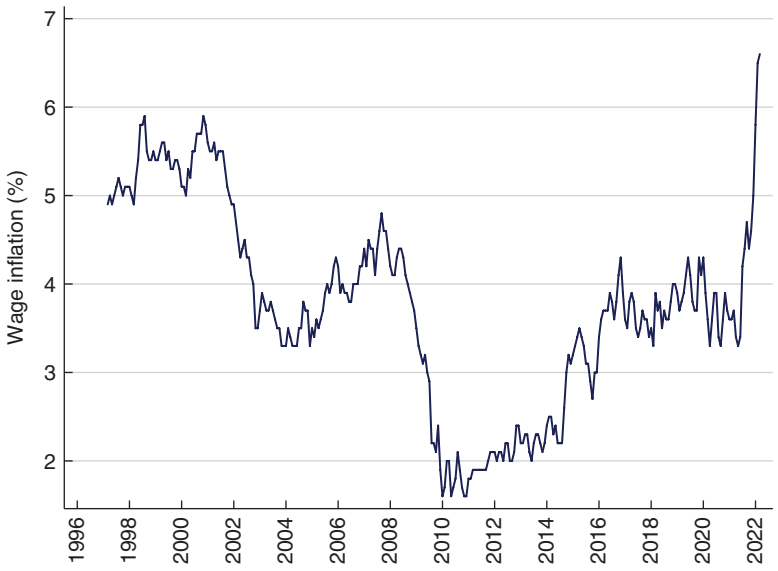

FIGURE 3.7. Weighted 3-Month Moving Average of 12-Month Percentage Change in Wages

Source: Atlanta Federal Reserve Wage Tracker.

and margins, the empirical evidence suggests that wage inflation usually runs about 1 percentage point higher than price inflation. Tables 3.1 and 3.2 below show the relationship between wage inflation (measured using the Atlanta Wage Tracker and Employment Cost Index) and price inflation over the last two decades, using both core PCE and CPI. Since 2001, annual wage inflation has been 0.6 percentage points higher, on average, than the CPI using the Employment Cost Index and 1.3 percentage points higher, on average, using the Atlanta Wage Tracker. Current levels of both the ECI and the Atlanta Wage Tracker imply price inflation of around 5 percent. This evidence implies that it is highly improbable average price inflation will fall below 3% without a significant slowdown in wage growth from its current levels.

TABLE 3.1. Average Difference between Wage and Price Inflation, 2001–20

	Core PCE				CPI			
Wage Measure	**Avg.**	**SD**	**Highest**	**Lowest**	**Avg.**	**SD**	**Highest**	**Lowest**
Employment Cost Index (ECI)	0.9	0.6	2.3	–0.04	0.6	1.1	3.1	–2.2
Atlanta Wage Tracker	1.7	0.8	3.5	0.05	1.3	1.3	3.9	–1.8

Sources: BLS via FRED; Atlanta Federal Reserve; author's calculations.

Notes: Calculations show the difference between nominal wage growth and price inflation, using quarterly data from 2001 to 2020. The Employment Cost Index (ECI) uses the total compensation for all civilian workers, seasonally adjusted. The Atlanta Fed series is the weighted 3-month trailing average of median wage growth. Core PCE uses the personal consumption expenditures excluding food and energy, and CPI uses the Consumer Price Index for all urban consumers.

TABLE 3.2. Predicted Price Inflation Based on Wage Inflation, March 2022

Wage Measure	**Wage Inflation (2022 Q1)**	**Predicted Core PCE**	**Predicted CPI**
Employment Cost Index (ECI)	5.2	4.3 (0.6)	4.6 (1.1)
Atlanta Wage Tracker	6.6	4.9 (0.8)	5.3 (1.3)

Sources: BLS via FRED; Atlanta Federal Reserve; author's calculations.

Notes: Predicted price inflation is calculated using the average difference between wage inflation and price inflation from 2001 Q1 to 2020 Q4. The Employment Cost Index (ECI) uses the total compensation for all civilian workers, seasonally adjusted. ECI inflation in 2022 Q1 is calculated using the percent change from the previous quarter (annualized). The Atlanta Fed series is the weighted 3-month trailing average of median wage growth. Predicted PCE uses the personal consumption expenditures excluding food and energy (Core PCE), and predicted CPI uses the Consumer Price Index for all urban consumers. Standard errors are shown in parentheses.

THE RISK OF A HARD LANDING IS SUBSTANTIAL

Given the extraordinarily tight labor market and high inflation levels, the likelihood of a soft landing for the economy is very low. Table 3.3 looks at quarterly data going back to the 1950s and calculates the probability that the economy will go into recession within the next one to two years, conditioning on alternative measures of

TABLE 3.3. Historical Probability of a Recession Conditional on Different Levels of CPI Inflation and Unemployment, 1955–2019

	Avg. Quarterly Inflation above:	Avg. Quarterly UR below:	Probability of Recession over Next 4 Quarters	Probability of Recession over Next 8 Quarters	Number of Quarters	When Did US Economy Most Recently Cross Threshold?
Inflation	3%	#N/A	27%	48%	95	Q2 2021
only	4%	#N/A	37%	59%	51	Q2 2021
	5%	#N/A	45%	62%	29	Q3 2021
UR only	#N/A	6%	25%	47%	142	Q2 2021
	#N/A	5%	31%	57%	83	Q4 2021
	#N/A	4%	42%	69%	26	Q1 2022
Inflation	3%	6%	43%	75%	53	Q2 2021
and UR	3%	5%	54%	85%	26	Q4 2021
	3%	4%	54%	85%	13	Q1 2022
	4%	6%	59%	89%	27	Q2 2021
	4%	5%	73%	100%	11	Q4 2021
	4%	4%	57%	100%	7	Q1 2022
	5%	6%	83%	100%	12	Q3 2021
	5%	5%	100%	100%	5	Q4 2021
	5%	4%	100%	100%	3	Q1 2022

Sources: BLS via FRED; author's calculations.

Notes: The calculation for the probability of recession over the next 4 quarters and 8 quarters excludes quarters when the US economy is already in a recession. Recession is defined using NBER-based recession indicators for the United States from the period following the peak through the trough. The measure of inflation used is the Consumer Price Index for all urban consumers.

price inflation and unemployment. The results indicate that lower unemployment and higher price inflation significantly increase the probability of a recession. Historically, when average quarterly inflation is above 4%, and the unemployment rate is below 4%, a recession has always started within the next two years.

Measuring labor market tightness with the job vacancy rate rather than the unemployment rate yields nearly identical probabilities for the risk of recession over the next one and two years. Using the Core PCE or nominal wage growth to measure inflation, rather than using CPI inflation, also shows similar results. Given the

few business cycles from which to draw data for the US, this analysis is repeated across thirty member countries of the Organisation for Economic Co-operation and Development (OECD). Table 3.4 presents the results, which largely corroborate the findings that high inflation and low unemployment are strong predictors of future recessions. Across the OECD, when countries experience inflation above 5% and unemployment below 5%, the probability of recession within the next two years is 90%. This cross-country historical evidence strongly substantiates the claim that a soft landing will be very difficult.

Some have argued that there are grounds for optimism on the basis that softish landings have occurred several times in the postwar period—including in 1965, 1984, and 1994. But inflation and labor market tightness in each period had little resemblance to the current moment. Table 3.5 summarizes the labor market conditions during these alleged soft landings. In all three episodes, the Fed was operating in an economy with an unemployment rate significantly higher than today, a vacancy-to-unemployment ratio significantly lower than today, and wage inflation still below 4%. In these historical examples, the Fed also raised interest rates well above the inflation rate—unlike today—and explicitly acted early to preempt inflation from spiraling, rather than waiting for inflation to already be excessive. These periods also did not involve major supply shocks such as those currently being experienced in the US.

Another argument that has been made in favor of the soft-landing view is that given the extremely elevated levels of job openings, the Fed may be able to curb demand in such a way that job openings fall considerably without a corresponding increase in unemployment. Unfortunately, this claim also goes against the historical evidence. Table 3.6 shows that the vacancy rate has never come down in a significant way without large increases in unemployment. For each of the previous nine vacancy rate peaks, the table calculates the increase in unemployment that follows a substantial fall in the vacancy rate. To be conservative in the estimate, we look at a 20% decline in vacancies,

TABLE 3.4. Historical Probability of a Recession for OECD Countries, Conditional on Different Levels of CPI Inflation and Unemployment, 1955–2019

	Avg. Quarterly Inflation above:	Avg. Quarterly UR below:	Probability of Recession over Next 4 Quarters	Probability of Recession over Next 8 Quarters	Number of Quarters	When Did US Economy Most Recently Cross Threshold?
Inflation	3%	#N/A	38%	65%	841	Q2 2021
only	4%	#N/A	37%	64%	559	Q2 2021
	5%	#N/A	38%	65%	392	Q3 2021
UR only	#N/A	6%	42%	68%	872	Q2 2021
	#N/A	5%	46%	73%	545	Q4 2021
	#N/A	4%	48%	75%	292	Q1 2022
Inflation	3%	6%	53%	81%	275	Q2 2021
and UR	3%	5%	56%	85%	188	Q4 2021
	3%	4%	52%	80%	124	Q1 2022
	4%	6%	57%	82%	157	Q2 2021
	4%	5%	57%	85%	100	Q4 2021
	4%	4%	51%	80%	71	Q1 2022
	5%	6%	64%	88%	104	Q3 2021
	5%	5%	66%	90%	70	Q4 2021
	5%	4%	63%	86%	51	Q1 2022

Sources: OECD; author's calculations.

Notes: The table includes data from 30 OECD countries from 1960 to 2019, where data is available. Lithuania, Latvia, Iceland, and the Netherlands are excluded due to lack of available data. The analysis also excludes Japan and Mexico. The unemployment rates are OECD seasonally adjusted harmonized unemployment rates. Recession data uses the OECD Composite Leading Indicators dataset, which identifies business cycles and turning points based on a growth cycle approach. Inflation is measured using the CPI for all items and taking the 4-quarter percentage change on the same period from the previous year. All data comes from the OECD.

TABLE 3.5. Labor Market Conditions Today Compared to Past Periods

	1965	1984	1994	Today
Unemployment rate	4.9%	7.9%	6.6%	3.6%
Vacancy-to-unemployment ratio	0.7	0.5	0.5	1.9
Wage inflation	3.6%	3.8%	2.5%	6.6%
Interest rate > inflation rate?	YES	YES	YES	NO

Source: BLS.

Note: This table uses quarterly averages from the first quarter of the tightening cycle.

TABLE 3.6. Change in Unemployment Rate (pp) after Vacancy Rate Falls 20% from Its Peak, 1950–2019

Month of Peak Vacancy Rate	Vacancy Rate (%)	Unemployment Rate (%)	Number of Months to Reduce Vacancy Rate by 20%	Sacrifice Ratio: Increase in Unemployment (pp) to Reduce Vacancy Rate by 20%
March 1953	4.4	2.6	4	3.3
February 1956	3.5	3.9	18	3.6
February 1960	3.1	4.8	8	2.3
May 1969	5.2	3.4	11	2.7
July 1973	4.8	4.8	14	5.2
April 1979	5.2	5.8	12	2.0
October 1988	4.4	5.4	22	1.5
February 2000	4.1	4.1	14	1.8
June 2007	3.1	4.6	12	4.9
March 2022	7.2	3.6	#N/A	#N/A
AVERAGE			13 months	3.0pp

Sources: BLS, JOLTs, Barnichon (2010); author's calculations.

Notes: The sacrifice ratio is calculated as the difference between the highest unemployment rate within one year after the vacancy rate falls by 20% and the unemployment rate when the vacancy rate is at a peak. The vacancy rate is calculated as the total number of nonfarm job openings divided by the size of the labor force. Job vacancy data from 2001 onward uses estimates from JOLTS, while vacancy data before 2001 uses job vacancy estimates constructed from Barnichon (2010) using the Help-Wanted Index published by the Conference Board. All values are seasonally adjusted.

which would bring the vacancy rate down from its March 2022 peak of 7.2% to a still-elevated level of 5.6%.

The results show that each time the vacancy rate falls by 20% from its peak, the unemployment rate increases substantially. On average, a 20% decline in vacancies requires a 3-percentage point increase in the unemployment rate. The smallest increase in unemployment associated with a 20% drop in vacancies in the postwar period was 1.5 percentage points. The largest increase occurred in the mid-1970s when unemployment rose by more than 5 percentage points.

According to the Sahm rule, a recession starts when the three-month moving average of the national unemployment rate rises by 0.5 percentage points or more relative to its low during the previous twelve months. Based on the evidence provided above, it seems

highly plausible that the economy will pass this threshold over the next year or two.

While none of the evidence asserts with certainty that a recession will start, the historical experience strongly suggests that recession risks are substantially greater than is commonly thought likely.

OBSERVATIONS ON FED TACTICS

Finally, I conclude with a few comments on the specific tactics used by the Fed. Given the need to change policy in the face of changing data, the idea of providing forward guidance by setting specific numerical targets around price stability and through the provision of dot plots is problematic. Central banks can't know what they will do in the future—they must constantly react to incoming data. However, when the Fed gives specific forward guidance, it feels constrained to follow through on it, and so it diverts policy from what would otherwise be the optimal path. A more prudent path forward would be a return to a more modest framework with broad objectives clearly stated and a reliance on forward-looking anticipations in policy. The Fed should use policy rules to signal when it needs to change course, rather than constructing specific doctrines that must be displaced when unexpected shocks occur.

Moreover, by not setting policy on an anticipatory basis, the Fed acted too slowly in responding to credible inflationary threats in the economy. The first two sections of this chapter showed that inflation should have been predictable in early 2021 using basic forecasts of the output gap and by looking at tightness in the labor market. The amount of stimulus being pushed through the economy amounted to approximately three times the size of the output gap. The outward shift in the Beveridge curve signaled that the NAIRU had likely risen substantially, and that the labor market was significantly tighter than implied by the unemployment rate. These strong inflationary indicators should have justified action far sooner than

the actual point when the Fed acted—which would have helped to avoid the need to engineer an extremely difficult disinflation over the coming years.

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CHAPTER FOUR

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

John B. Taylor

For several years, starting around 2017, the Federal Reserve began to move back to a more rules-based monetary policy, which 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.

The Fed halted that move in early 2020 when the COVID-19 pandemic 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 effects of the pandemic-fueled crisis on the economy, including a rapid reduction in the federal funds rate, large-scale purchases of Treasury and mortgage-backed securities, which led to 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, removing 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*. And, true to Powell's word, on June 17, 2022, soon after this Hoover conference took place, the Fed put policy rules back in the *Report*. However, only small changes have occurred in actual monetary policy.

A big gap thus still exists between most measures of rules-based policy and actual policy actions. When this gap occurred before, it was accompanied by the rise of inflation. Thus, we are in, and will remain 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.

A REVIVAL OF RESEARCH ON MONETARY POLICY RULES

Monetary policy rules were the subject of much research in the 1970s 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 presented at a monetary

policy conference at the Hoover Institution at Stanford University in May 2019, at the Federal Reserve Review conference in Chicago in June 2019, and at the Macroeconomic Modelling and Model Comparison Network 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 Stanford conference, 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. The first was a standard inflation-targeting interest rate rule in which the Fed reduces its response to higher inflation and output to bias the economy toward higher interest rates and inflation and thereby reduces the probability of hitting the lower bond. The second was a rule in which the average inflation target is higher than the one used with standard inflation targeting, though the strength of responses to deviations is unchanged. The 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 Macroeconomic 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 Federal Reserve Board/United States (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 the 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 the average loss in high-deviation periods was greater than the average loss in low-deviation periods. Some researchers, including Belongia 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 FRB/US model. Figure 4.1 shows seven of these ten interest rate rules, using the notation of Bernanke, Kiley, and Roberts (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%), $\pi^\star$ is the inflation target (assumed to be 2%), π_t is the inflation rate defined as the four-quarter percentage 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% each year. Two of the policy rules (the Taylor rule and the Reifschneider-Williams rule) are shown by the arrows in figure 4.1. The other three rules

$$i_t^{Tay} = r^* + \pi_t + 0.5(\pi_t - \pi^*) + \hat{y}_t \leftarrow \text{Taylor rule}$$
$$i_t^{iTay} = \rho i_{t-1} + (1-\rho)[r^* + \pi_t + 0.5(\pi_t - \pi^*) + \hat{y}_t]$$
$$i_t^{FPLT} = r^* + \pi_t + 0.5(\pi_t - \pi^*) + \hat{y}_t + P_t$$
$$i_t^{iFPLT} = \rho i_{t-1} + (1-\rho)[r^* + \pi_t + 0.5(\pi_t - \pi^*) + \hat{y}_t + P_t]$$
$$i_t^{\text{FTPLT}} = \rho i_{t-1} + (1-\rho)[r^* + \pi_t + 0.5(\pi_t - \pi^*) + \hat{y}_t + \alpha TP_t]$$
$$\boxed{TP_t = \textstyle\sum_{j=t1}^{m}(\pi_j - \pi^*)}$$
$$i_t = \max\left\{0, i_t^{Tay} - \textstyle\sum_{j=t1}^{t-1}(i_j - i_j^{Tay})\right\} \leftarrow \text{Reifschneider-Williams rule}$$
$$i_t^{KR} = i_{t-1}^{KR} + \alpha[(\pi_t - \pi^*) + \hat{y}_t]$$

Plus 3 TPLT rules, which are like i^{Tay} except for an ELB threshold

FIGURE 4.1. Policy Rules Studied by Bernanke, Kiley, and Roberts
Source: Bernanke, Kiley, and Roberts (2019b).

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.

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 policy making. At the Chicago Fed conference, Cecchetti and Schoenholtz (2019) shared that they found, "The most frequently mentioned topic is the desirability of having a clear understanding of policy makers' reaction function." There were also statements by central bank leaders. Raghuram 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 and 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, especially the deviation from rules in the 2003–5 "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*.

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 the revival of rules-based policies as many central banks, including the Fed, took special actions to deal with the effects of the health crisis on the global economy.

In the US, these actions included a rapid reduction in the target for the federal funds rate during the period around March 2020, as shown in figure 4.2. 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 4.3. 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

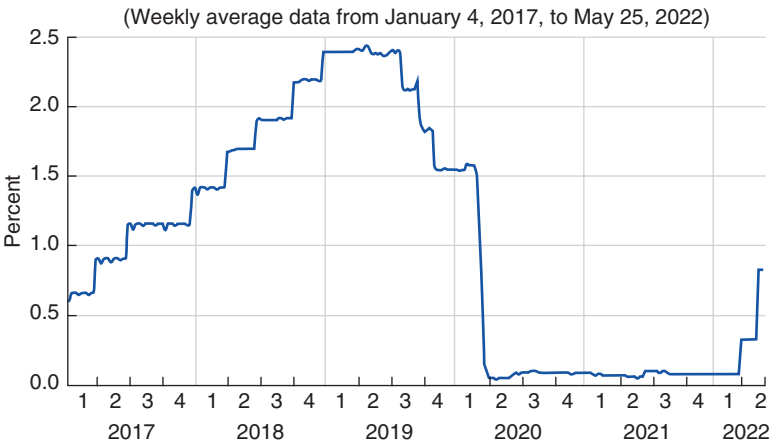

FIGURE 4.2. The Federal Funds Rate in the United States
Source: Federal Reserve Economic Data, Federal Reserve Bank of St. Louis (FRED).

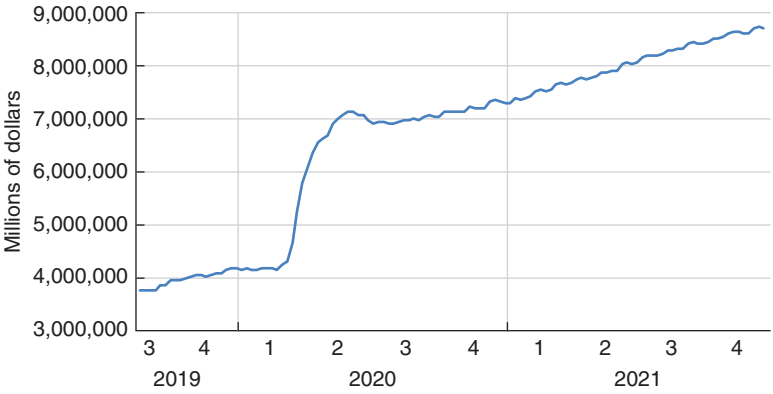

FIGURE 4.3. Total Assets Federal Reserve System
Source: FRED (Wednesday Levels).

also stopped reporting on rules-based policy in its *Monetary Policy Report* with the July 2020 issue.

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

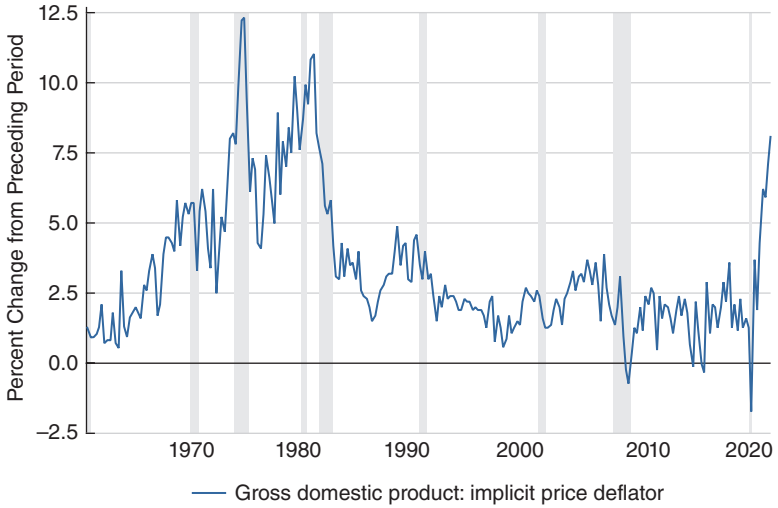

FIGURE 4.4. Inflation Reached 8.1% in Early 2022
Source: US Bureau of Economic Analysis (BEA) via FRED, myf.red/g/O6K4.
Note: Shaded areas indicate US recessions.

more rules-based policy, the inflation rate rose. As measured by the GDP deflator, the inflation rate shown in figure 4.4 rose by very large amounts. The inflation rate as measured by the consumer price index rose to 8.5% in March 2022.

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 policy making, "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 the difficulty distinguishing "deviations" from "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 4.4, raised an 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 allowing the average inflation rate to rise.

That policy rules reentered the Federal Reserve's *Monetary Policy Report* on February 19, 2021, was a welcome development. It reinitiated a helpful reporting approach that, as mentioned earlier,

began in the July 2017 *Monetary Policy Report* when Janet Yellen was Fed chair but 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 4.5 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.

In figure 4.5, 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 to 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 rules 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.

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

FIGURE 4.5. Five Policy Rules from the July 2021 *Monetary Policy Report*
Source: Federal Reserve, *Monetary Policy Report*, July 9, 2021, 44.

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% 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 Federal Open Market Committee (FOMC) interest rate and the settings of the three rules.

REENTRY INTO 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 on commodities from supply shortages and the war in Ukraine, the major effect on inflation has been due to monetary policy. The Fed's plan to halt or slow the purchases of Treasuries and mortgage-backed securities seemed like it might reduce inflation, but a policy rule was not part of the strategy.

This is illustrated in figure 4.6, 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 4.6 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% to 1% in the calculations in figure 4.6. 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 personal consumption expenditures (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.

Even with this smaller equilibrium real interest rate (1% rather than 2% 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's sake the average of the interest rates for the three different inflation rates in the final quarter of each

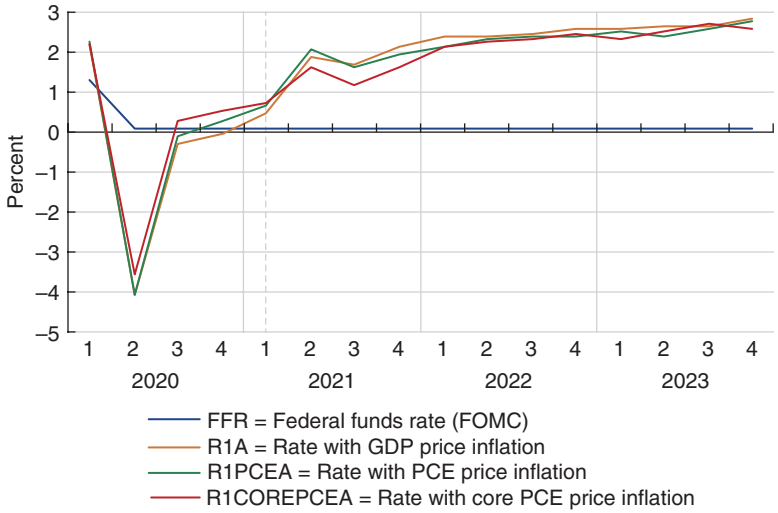

FIGURE 4.6. Federal Funds Rate and Monetary Policy Rules with Three Inflation Rates

Notes: The lines show the federal funds rates from three policy rules using the same parameters as those in the Taylor rule as discussed in the Fed's February 2021 *Monetary Policy Report*. The flat blue line shows the Fed's projection in April 2021.

year. If we average the three values, we get 1.9% in 2021Q4, 2.5% in 2022Q4, and 2.7% 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. Table 4.1 was created from the Fed's dot plot, which shows individual FOMC member views about future values of the federal funds rate. Table 4.1 shows the value at the end of different calendar years corresponding to different meeting times.

Note that the rates are higher than the blue line in figure 4.6, and that they rise over time at each meeting. The top line shows

TABLE 4.1. FOMC Projections of the Federal Funds Rate at Different Meeting Dates

Year	2021	2022	2023	2024
March 15–16, 2022	—	1.9	2.8	2.8
December 14–15, 2021	0.1	0.9	1.6	2.1
September 21–22, 2021	0.1	0.3	1.0	1.8

Source: Fed *Summary of Economic Projections* for dates shown.

Notes: 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.

the values at the meeting in March of 2022. According to the dots, the federal funds rate will be 1.9% at the end of 2022, and then will rise to 2.8% at the end of 2023 and at the end of 2024.

The averages in table 4.1 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% 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 table 4.1.

The solid red line in figure 4.7 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 December 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%

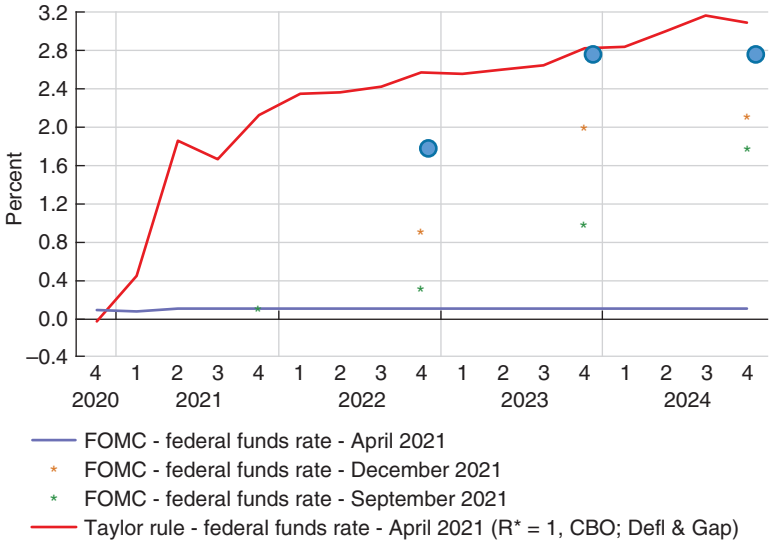

FIGURE 4.7. Taylor Rule as of April 2021 and Average of FOMC Dot Plots

Notes: The red line is from the Taylor rule as presented in the Fed's February 2021 *Monetary Policy Report*. The other points are as in table 4.1.

as of the 3rd quarter of 2021, which implies the interest rate should be about 6% even with a GDP gap of −1.6%. 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%, then the interest rate should be 5%. 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 four quarters, consistent with a form of "average inflation targeting." Even if the inflation rate falls sharply 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.

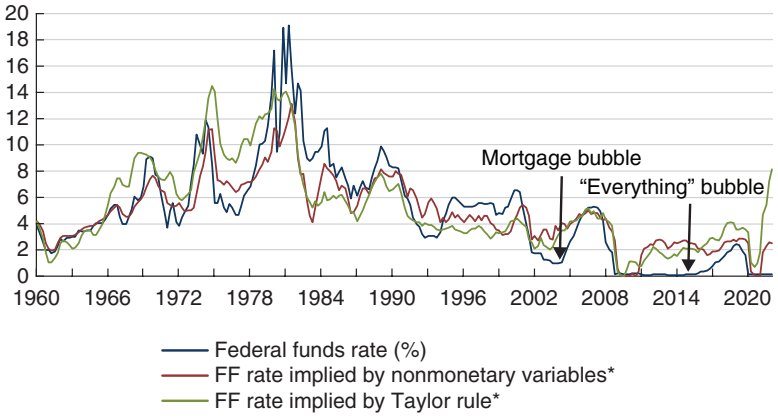

FIGURE 4.8. Federal Funds Rate and Taylor Rule

Source: Hussman (2022) from Federal Reserve data.

Notes: Nonmonetary explanatory variables include the real GDP output gap, inflation as measured by the core PCE deflator, and current and lagged growth rates of real GDP, nonfarm payroll employment, and real retail sales. Implied federal funds rate reflects a rolling regression to each date. Taylor rule estimates based on the real GDP output gap and core PCE inflation.

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 4.8. It is a time-series chart reproduced from research conducted by John Hussman (2022), which he recently published in the *Financial 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 the ideal rules-based policy interest rate may even be higher than in the above calculations.

CONCLUSION

This paper has examined reasons for returning to a rules-based monetary policy in the United States and has outlined a method for doing 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 with rules that markets understand. The policy interest rate would then increase as inflation rises, as has already happened. It would of course be a contingency plan, as are all rules. But this would greatly reduce the probability 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 market adjustments. It would remove uncertainty and remaining inconsistencies.

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GENERAL DISCUSSION

TOM STEPHENSON (INTRODUCTION): Welcome to the first session of Hoover's 2022 Monetary Policy Conference. Due to the impact of COVID-19, it's been several years since we've held this conference. Our introductory session this morning is entitled "What Monetary Policy Rules and Strategies Say" and features three extremely well-known experts in the field, Larry Summers, Richard Clarida, and John Taylor.

Larry, whom I've known dating back to his days as president of Harvard University, has subsequently served as secretary of the Treasury in the Clinton administration, director of the National Economic Council from 2009 to 2010, and is now the Charles W. Eliot [University] Professor at Harvard University.

Richard Clarida is a well-known economist who most recently served as the vice chair of the Federal Reserve from 2018 to 2022. He is currently a professor of economics at Columbia University.

John Taylor, of course, needs no introduction to this group, as he is the [Mary and Robert] Raymond Professor of Economics at Stanford University, the George P. Shultz Senior Fellow [in Economics] at Hoover, and the former under secretary of the US Treasury for International Affairs during the George W. Bush administration.

US monetary policy is an extremely timely but very complicated subject, and we are most fortunate to have three insightful experts with us this morning to help us better understand just where we are or should be as a country on this subject. Larry Summers has been particularly outspoken for a number of months on stagflation and its impact on our economy in both the short and longer term if we don't take corrective action. Richard Clarida, having only recently stepped down from his post at the Fed, has been on the front line in analyzing and battling the threat of inflation. And, of course, John Taylor and his superanalytical

and closely followed "Taylor rule" for coherent monetary policy is looked to by all who seek to understand and manage interest rate policy and monetary flows at the national level.

Larry will lead off our discussion, to be followed by Richard Clarida and John Taylor, in that order, and then we will open it up to questions from the audience and our panelists to create what I'm sure will be a very interesting conversation. Larry, please.

* * *

ROBERT HALL: I taught Larry Summers a bit of macro in 1975 at MIT. This is the first time in my career that I just absolutely enthusiastically agreed with everything that Larry is saying. And I think it's really, really important for everyone to listen. The fact that there's a consensus between Larry and John Taylor is remarkable. Let me try to restate it in just the simplest possible way. We're about four percentage points above target on the inflation rate. The Taylor principle says raise the funds rate by 1.5 times the gap. So what's 1.5 times 4? It's 6. We should have raised the funds rate by 600 basis points to deal with the inflation situation, and instead, we got 50 basis points. So, cheer if you agree with these economists. [Laughter]

TERRY ANDERSON: Hi, Terry Anderson, senior fellow at Hoover. A question for Larry. Many years ago, I had the pleasure of fly fishing with Paul Volcker on a stream in Montana. Because I was teaching economics at that time, I asked Paul, "What do I tell my students are the constraints on what the Fed can do?" I expected him to say, "A call from the president or somebody with political powers rules." He said, "It's all in whether I can convince the press that what I'm doing is the right thing." And I think he did that. If he's still right today, how do rules apply, when it seems the press has been convinced that we need to have the Fed do what it thinks is best to stabilize our economy? How can a group like this, and the

consensus people in this room seem to share, communicate that there needs to be limits—rules—on what the Fed can do?

JOHN TAYLOR: So let me say something very brief. I've never seen so much reference to rules. Isn't the last six weeks or two months just amazing? I have a whole long list of things. I think that's an indication that there's somebody paying attention, and I think it's affecting policy.

KRISHNA GUHA: Krishna Guha with Evercore Partners. Question for everyone on the panel, if I may. So it's very clear we need a more systematic approach to monetary policy at this juncture. But the debate today—with the exception of a small aside from Rich—was about only one of the two instruments that the Fed is using to tighten the stance of policy going forward, namely rates and the balance sheet. So my question to each of you is, how would you integrate the balance sheet tightening in a systematic rule, and what difference would it make to the recommendations for rate policies in the current environment? Thank you.

LAWRENCE SUMMERS: I'll give a kind of extreme answer to that question as a place to start the conversation. If the Federal Reserve engaged in very large-scale operations that purchased $10 bills with $100 bills, I would expect that to be an irrelevance from the point of view of the economy. That's because $100 bills and $10 bills are essentially perfect substitutes. You can use either of them for pay. Ten-year bonds and 3-month bills are not perfect substitutes. But they're pretty good substitutes, because you can buy a sequence of 3-month bills and hold it for ten years. And so I think that something that is underappreciated in all of the conversation is that in a world where money pays interest, which is what happens when deposits at the Fed are remunerated, essentially all the Milton Friedman intuitions about money as a hot potato become wrong. And the right way to think about things is as shifts in the balance sheet between assets that are very close substitutes.

So I think that QE, aside from conditions of heavily distorted markets, heavily disrupted in illiquid markets, is a much smaller deal than most market participants think, because I think they have underinternalized the significance of the fact that we now pay interest on reserves.

The Jay Powell rough statement that all the QT was going to be the equivalent of one 25-basis-point tightening, seemed to me to be of the right order of magnitude.

. . . QE is very much like when the government issues a ton more long-term debt. If the price pressure effects that Bernanke emphasized on this topic were true, you would expect that there'll be a massive increase in term premiums associated with the huge run-ups in debt associated with major moments of deficit. And we mostly don't see that in the aftermath of either 2009 or in the aftermath of 2020. What I think gets too little attention is the fact that one should at least pause and ask the question: at a moment when every homeowner in America is shifting from a variable-rate to a fixed-rate mortgage, at a moment when every corporate treasurer in America is terming out their debt, is it really a great idea for taxpayers to be terming in their debt because of a financial policy made up by unelected officials? I was struck when I was in the White House in 2009 and 2010 that it seemed to me there was utter foolishness going on. That we had simultaneously, on a nearly monthly basis, the chairman of the Fed explaining how they were doing QE in order to reduce term premiums and whatever and stimulate the economy. And we had the Treasury department simultaneously announcing that we were terming *out* the debt in order to take advantage of the low rates. And it seemed to me that the only people who were really benefiting from this policy were the private-sector intermediaries, who were intermediating these transactions as the government went in opposite directions. And we had the president of the United States announcing that they were public enemies number one as large sources of systemic risk.

So in general, I think the only other thing I'd add to that is it is hard to imagine something more foolish than last December the Federal Reserve, in the name of stability, in large scale buying mortgage-backed instruments at a moment when housing prices were rising faster than they had ever risen before, and causing the mortgage-Treasury spread to be unusually small. So I think that QE should be conceptualized in a much more limited way as a tool for responding to disorderly and disrupted markets in some way. We should think of intervention in the bond market in the same kind of way we think about the Strategic Petroleum Reserve—as something we use in response to a particular kind of contingency, not as an ongoing policy instrument.

RICHARD CLARIDA: Let me just say a bit on that. This has been an excellent panel. Not surprisingly, I've learned a lot from both Larry and John. I'll make two comments on the term premium question specifically. And then on the related point that came up about the Greenspan and Volcker approach, especially the Greenspan approach to price stability.

On the term premium, I'm very sympathetic, Larry. I think I have some sense about what the sign of QT is, I have no idea about the magnitude. I do think term premia are important, but they may shift not because of QT but because of other factors I alluded to in my speech. For example, one of the reasons term premia have compressed in the last twenty years is because of the success of monetary policy to reduce inflation and risk premiums. So when Larry and I were in graduate school together, there was a significant part of what we call a term premium, which really was just an inflation risk premium term. And with price stability, that risk premium got compressed. So in a world where John and Larry worry about where the Fed does not succeed in maintaining price stability, that inflation term premium could come back, and obviously that would be a nominal as well as a real factor pushing up bond yields.

The other point, and I'll just stand on my soapbox here for a moment, the term premium in the Treasury market is a global general equilibrium outcome. It depends as much on what is going on in Japan, the Euro zone, China, and the Middle East as it does on what is going on in the US. And so term premia are important but perhaps not solely because of QT. I also wanted to second something Larry said and I think John alluded to. And I've grown to appreciate it more now than I did some years ago. Chair Greenspan, of course, was notoriously averse to ever signing on to a numerical inflation target. Roughly, Greenspan's definition was that price stability is achieved when no one's really thinking about inflation. And I think what we're observing now is what happens when that threshold is crossed. Ricardo Reis and others have written about rational inattention, but certainly the possibility that there are nonlinear responses to discrete moves in inflation outside of whatever the comfort zone is, I believe is a very important issue as it relates to inflation expectations.

ELLEN MEADE: Thank you. This has been a really interesting conversation. If we think for a minute about Fed communications and the kinds of sequencing steps that are necessary before you can actually raise the fed funds rate—that is, communicating about ending asset purchases and then not ending them immediately but tapering them off, and all the forward guidance and communications around ending the forward guidance—there was a tremendous number of hurdles that were in place before the Fed could take action. And I'm wondering to what extent you see those hurdles, which were useful in the post-GFC recovery environment, as not being so useful this time around? I'm wondering to what extent you see those as having posed a problem? I'd like to hear from all of you but am particularly interested to hear what Rich has to say in response, given his role at the Fed during this episode. Thank you.

CLARIDA: Well, truth in advertising, Ellen was my senior adviser at the Fed and did an incredible job. So let me be very concise.

Forward guidance, like everything in economics, has benefits and costs. I think the academic literature, which I contributed to, has at times been a bit off point, in the sense that it has talked about the cost of forward guidance if it's not credible, if it's not time consistent. But there's another dimension to forward guidance: if there's guidance that a committee feels bound to honor, that can complicate sequencing or timing of policy. It's not a deep point, but it's not an irrelevant point.

SUMMERS: I think it's one of those clever ideas that has been taken far too far. What I'm going to say now is an overstatement, but not that much of an overstatement. Forward guidance is goofy. The market doesn't believe you, so it doesn't have much effect. You believe yourself, so it constrains you down the road. So you get constraints down the road without substantial ex ante benefits. And so, except in quite extraordinary circumstances, it is not likely to be a good idea.

I think the two most successful bits of financial communication in the last twenty-five years, last thirty years, were Mario Draghi's statement that he would do whatever it takes, which produced a seismic and immediate and effective interaction in the direction that he wanted; and Bob Rubin's ending of the cacophony surrounding the dollar exchange rate at a time when that was a much more salient issue than it is today, by saying a strong dollar is in our national interest. "What's your definition, Secretary Rubin, of a strong dollar?" "A strong dollar is in our national interest." "How would you know if the dollar became weak?" "A strong dollar is in our national interest." "Are you concerned about a weak yen?" "A strong dollar is in our national interest." And that's in a sense repeated, and the unwillingness to say anything else about the topic—if he had said, "Well, the context in which we favor a strong dollar is that we have been studying this recent study on pass-through impacts, and in the context of our current analysis of pass-through impacts, and we're going to give forward guidance

based on a review of a variety of different officials' view as to what the ideal level of the dollar would be for the next nine months"—it would have been far less effective.

So I think the message is, I think if there's any disagreement on this panel, and I think it's a small one because I think we're in broad agreement, it's the primacy of rules versus the primacy of resoluteness. And I believe that what's necessary is the primacy of resoluteness. And I think rules can be a contributor to that. But as we saw with the various rules that were adopted during the flexible average inflation targeting enthusiasm, rules can also be a bit problematic. And I think we need to be aware that rules are only as good as the parameters that enter into them, and the parameters are hard to estimate and all of that. But I think, in a way, this is a case where you kind of need a yardstick, not a micrometer, to perceive that there have been significant errors in the recent past.