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

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Toward a Monetary Policy Strategy

CHAPTER ELEVEN

Is the Fed "Behind the Curve"? Two Interpretations

James Bullard

US inflation is exceptionally high, comparable to what was experienced in 1974 and 1983. Standard Taylor-type monetary policy rules, even if based on a minimum interpretation of the persistent component of inflation, still recommend substantial increases in the policy rate. This provides one possible definition of "behind the curve," and indicates the Fed is far behind.

However, all is not lost. Modern central banks are more credible than their 1970s counterparts and use forward guidance. Credible forward guidance means market interest rates have increased substantially in advance of tangible Fed action. This provides another definition of "behind the curve," and the Fed is not as far behind based on this definition.

CORE INFLATION IS COMPARABLE TO 1974 AND 1983

Core personal consumption expenditures (PCE) inflation from one year earlier was 5.2% in March 2022, which is the most recent reading as of this writing. There have been two other times since 1960 when this measure of inflation has been close to this level. One was 1974, and the other was 1983 (figure 11.1).

The 1974 Federal Open Market Committee (FOMC), which was looking at a core PCE inflation rate similar to today's, liked to talk

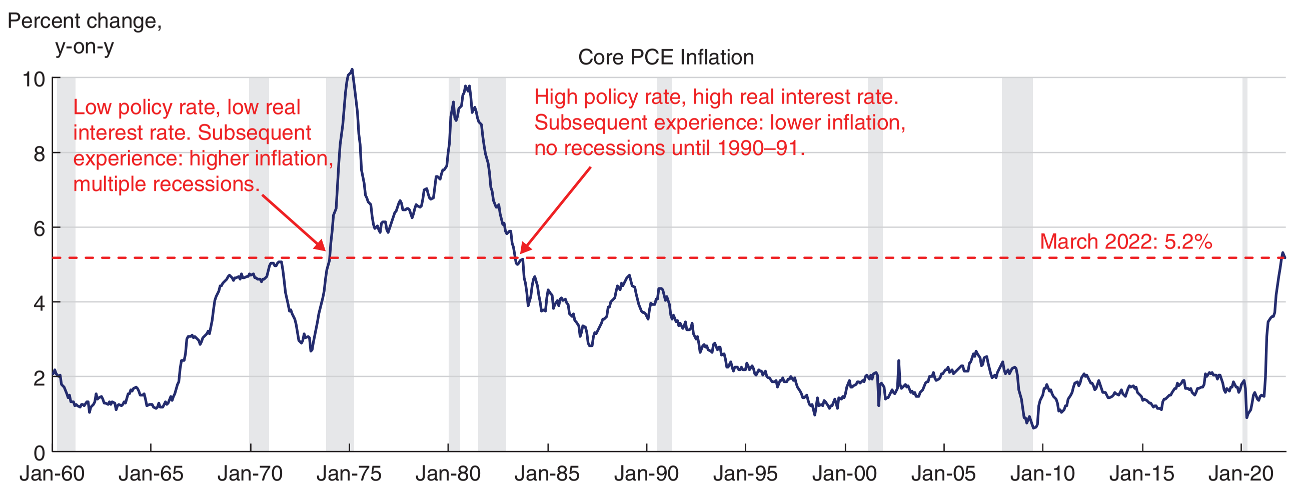

FIGURE 11.1. Core PCE Inflation Since 1960

Source: Bureau of Economic Analysis (BEA).

Note: The gray shaded areas indicate US recessions. Last observation: March 2022.

about nonmonetary factors affecting inflation. The FOMC kept the policy rate relatively low in the face of rising inflation. The associated ex post real interest rate was relatively low. The subsequent experience was that core PCE inflation was above 5.2% for nearly ten years. The real economy was also volatile with multiple recessions.

The 1983 FOMC, which was also looking at a core PCE inflation rate similar to today's, had a different approach to monetary policy and spoke more about monetary factors affecting inflation. The FOMC kept the policy rate relatively high in the face of declining inflation. The associated ex post real interest rate was relatively high. The subsequent experience was that core PCE inflation was below 5.2% for the next ten years. The real economy also stabilized with no recession until 1990–91.

The contrast between the 1974 and 1983 experiences convinced many that it was important to avoid getting "behind the curve" on inflation.

FIRST INTERPRETATION OF "BEHIND THE CURVE"

The Fed has a statutory mandate to provide stable prices for the US economy. Associated with this mandate is an inflation target of 2%, stated in terms of the headline PCE inflation rate, which was 6.6% in March 2022, measured from one year earlier (figure 11.2). Because of particularly large movements in recent food and energy prices, some may argue that the Fed should consider the core PCE inflation rate instead, which, as we have seen, is currently 5.2%. Still others might argue that the truly persistent factors driving inflation are better captured by the Dallas Fed trimmed mean inflation rate, which was 3.7% in March 2022, measured from one year earlier.[1]

1. For more on inflation persistence, see Almuzara and Sbordone (2022).

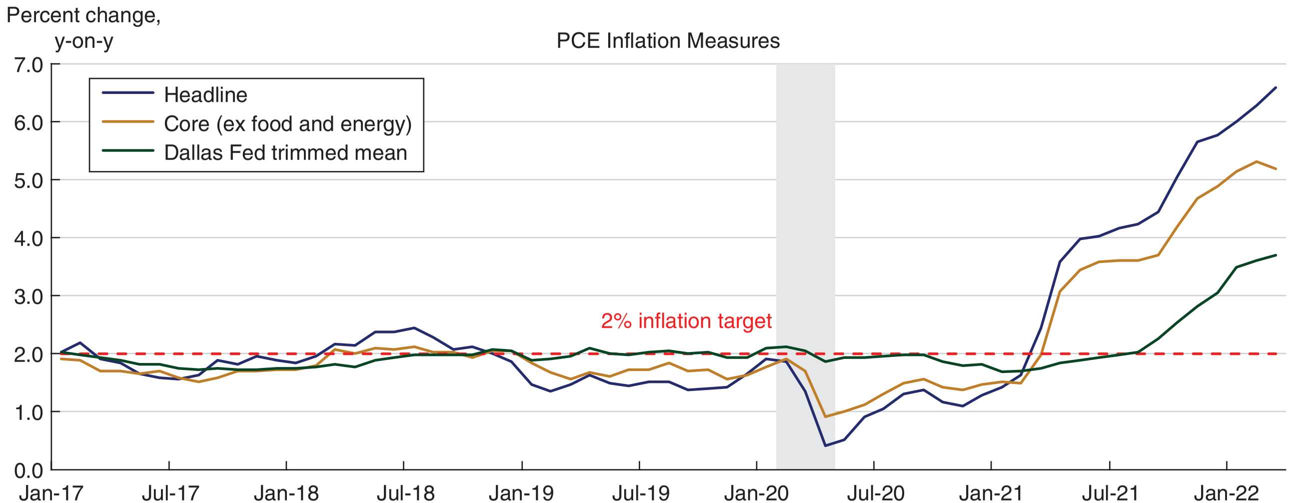

FIGURE 11.2. Inflation Is Well above Target

Sources: BEA and Federal Reserve Bank of Dallas.

Note: The gray shaded area indicates US recession. Last observation: March 2022.

In my definitions of "behind the curve," I will use the most generous (lowest) interpretation of the persistent component of current inflation, which is the 3.7% Dallas Fed trimmed mean value. This will help us define "behind the curve." The idea is to measure the degree to which the current level of the policy rate is less than some minimally reasonable level. We should keep in mind that this minimal definition excludes some inflation that is actually occurring, and that the Fed's inflation target is ultimately stated in terms of headline inflation.[2]

John Taylor (Stanford University) is famous for developing a "Taylor rule," which has been widely accepted in monetary policy discussions over the last thirty years (Taylor 1993, 1999). A Taylor-type policy rule with generous assumptions will give us a minimal recommended value for the policy rate given current macroeconomic conditions. We will then compare this minimal recommended rate to the actual policy rate to get a measure of the degree to which US monetary policy is "behind the curve."

In addition to an inflation measure, we need three ingredients in a non-inertial Taylor-type rule calculation:[3]

1. A value for the real interest rate (R^*); I will use an approximate pre-pandemic value of −50 basis points.[4]
2. A parameter value describing the reaction of the policy maker to deviations of inflation from target; I will use a relatively low value of 1.25.
3. A parameter value describing the reaction of the policy maker to deviations of output from potential; I will use zero when the output gap is positive, and one otherwise.[5]

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2. See Bullard (2011) for a critical analysis of the use of core inflation in monetary policy discussions.

3. Adding inertia would not change the ultimate value of the policy rate but would suggest making a series of policy rate changes.

4. For more on this topic, see Bullard (2018).

5. This is a way to operationalize the "employment shortfalls" language in the FOMC's (2022) "Statement on Longer-Run Goals and Monetary Policy Strategy" in the context of a Taylor (1999) rule.

All the choices I have outlined can be interpreted as generous—that is, as tilting toward a lower recommended policy rate. The notion of "behind the curve," as I am defining it, is the position of the policy rate relative to this minimalist benchmark.

The minimalist rule can be stated as:

$$R_t = R^* + \pi^* + 1.25(\pi_t - \pi^*) + \min(ygap_t, 0),$$

where R_t is the recommended policy rate; $R^* = -0.5$; $\pi^* = 2.0$; and π_t is Dallas Fed trimmed mean inflation measured from one year earlier. The output gap, $ygap_t$, is constructed by applying Okun's law to deviations of the unemployment rate, u_t, from the median Summary of Economic Projections (SEP) longer-run value, u_t^{LR}:

$$ygap_t = -2\left(u_t - u_t^{LR}\right).$$

This rule is consistent with the pre-pandemic policy rate. In particular, this generous Taylor rule would have recommended a policy rate of about 1.5% in late 2019, a value close to the actual policy rate back then (1.55% in November and December 2019). More conventional and less generous Taylor-rule specifications would have recommended a much higher policy rate.

With these values in the minimalist policy rule, one concludes that the recommended policy rate is the following:

$$-0.5 + 2.0 + 1.25(3.7 - 2.0) + \min(0.8, 0) = 3.63\%.$$

The current value of the policy rate is 87.5 basis points.[6] One concludes that the current policy rate is below the minimalist recommendation by 275 basis points. This provides one definition of the idea that the Fed is "behind the curve." A higher value for R^* or a

6. This is the midpoint of the federal funds rate target range of 0.75% to 1% set by the FOMC on May 4.

broader definition of inflation would suggest considerably higher recommended policy rate values, and the Fed would be further behind the curve.

SECOND INTERPRETATION OF "BEHIND THE CURVE"

Modern central banks have considerably more credibility than they did in the 1970s, much of it stemming from an explicit commitment to inflation targeting. They also make more use of forward guidance. As a result, indications of future policy rate increases are incorporated into current financial market pricing, before policy actions are taken. This has been a key factor in current market pricing, as the 2-year Treasury yield and the 30-year mortgage rate have increased substantially and are above their pre-pandemic levels (figure 11.3).

Let's now return to the minimal Taylor-type rule calculation, which recommended a policy rate of 3.63%. In light of the forward guidance that has been given by the Fed since the fourth quarter of 2021, the 2-year Treasury yield may provide a better representation of where Fed policy is likely to be in the near future. The value of the 2-year Treasury yield as of May 5, 2022, was 2.71%, about 90 basis points shy of the rate recommended in the simple Taylor-type rule calculation. This suggests the Fed is not as far "behind the curve," although it would still have to raise the policy rate to ratify the forward guidance.

Recall that the recommended policy rate of 3.63% from the simple Taylor-type policy rule calculation involved some choices. In particular, a higher value for R^* or a broader definition of inflation would lead to the rule recommending a much higher value for the policy rate. For example, if one uses core PCE inflation instead of the Dallas Fed trimmed mean as the measure of the persistent component of inflation in the Taylor rule above, the recommended policy rate is represented by the blue line in figure 11.4. The shaded area between the two sets of recommended policy rates

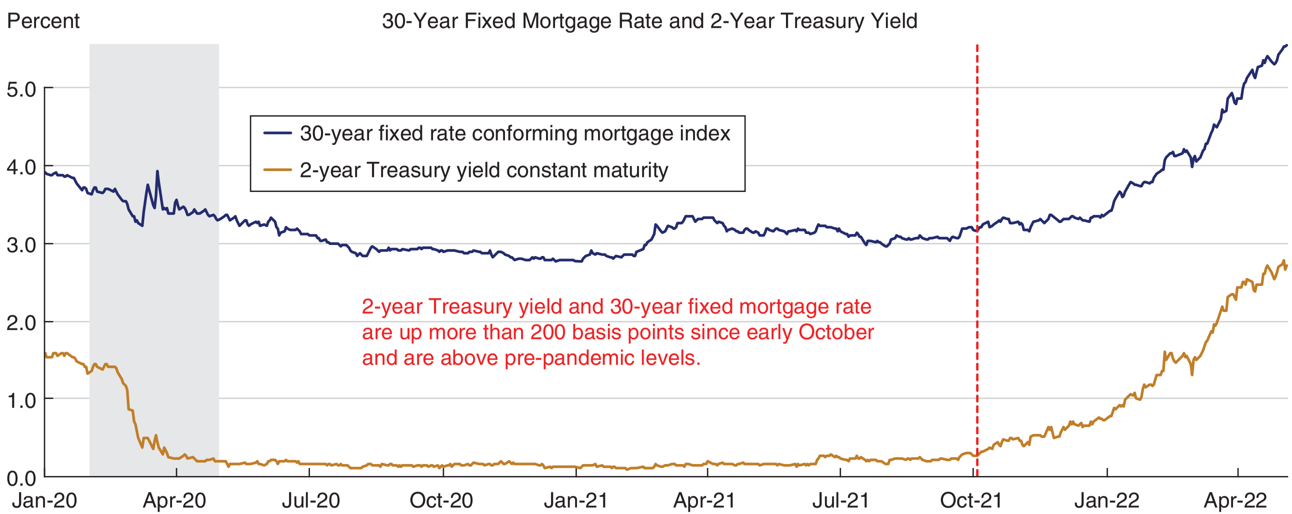

FIGURE 11.3. Market Pricing Based on Fed Credibility

Sources: Department of the Treasury and Optimal Blue, LLC, https://www2.optimalblue.com/obmmi.

Note: The gray shaded area indicates US recession. Last observation: May 5, 2022.

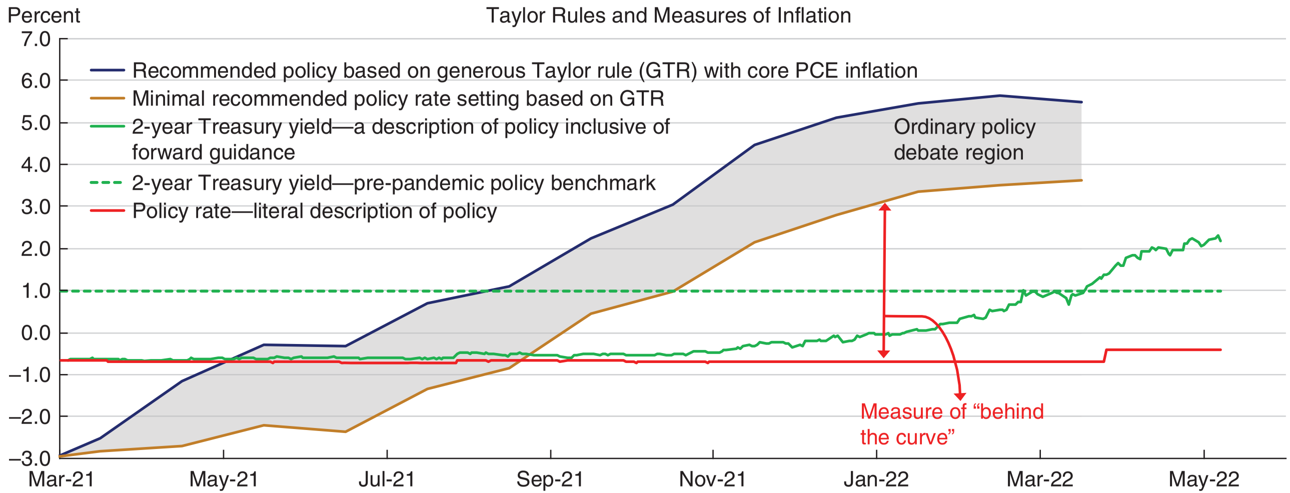

FIGURE 11.4. Defining “Behind the Curve”

Sources: BEA, Congressional Budget Office, Department of the Treasury, Federal Reserve Bank of New York, and Federal Reserve Bank of Dallas; author’s calculations.

Note: Last observations: March 2022 and May 5, 2022.

is labeled the "ordinary policy debate region." The distance between the actual policy rate (red line) and a description of policy inclusive of forward guidance (2-year Treasury yield, solid green line in the figure) has been quite large recently. While the policy rate is lower than what it should be, both the actual policy rate and the measure incorporating forward guidance are moving in the right direction, toward the ordinary policy debate region. Therefore, the second interpretation probably still leaves the Fed behind the curve but by less than it appears based on the first interpretation.[7]

RISKS TO INFLATION EXPECTATIONS

One might argue that the current situation is more about waning Fed credibility with respect to its inflation target. According to the TIPS (Treasury Inflation-Protected Securities) markets, straight-read inflation expectations are rising (figure 11.5). The 5-year inflation compensation measure was 3.23% as of May 5, 2022.

In economic theory, expected inflation and actual inflation should be closely related. The current divergence between actual inflation readings and TIPS-based expected inflation will have to be resolved, possibly resulting in still higher inflation expectations.

CONCLUSION

Generously defined Taylor-type monetary policy rules, even if based on a minimum interpretation of the persistent component of inflation, still recommend substantial increases in the policy rate. By this first interpretation of "behind the curve," the Fed is far behind.

The first interpretation, however, does not take into account Fed credibility or its use of forward guidance. Credible forward

7. For additional analysis of Taylor-type rules and the role of Fed credibility in the current circumstance, see Papell and Prodan (2022). They conclude that the FOMC is currently about 100–125 basis points behind their rule recommendation.

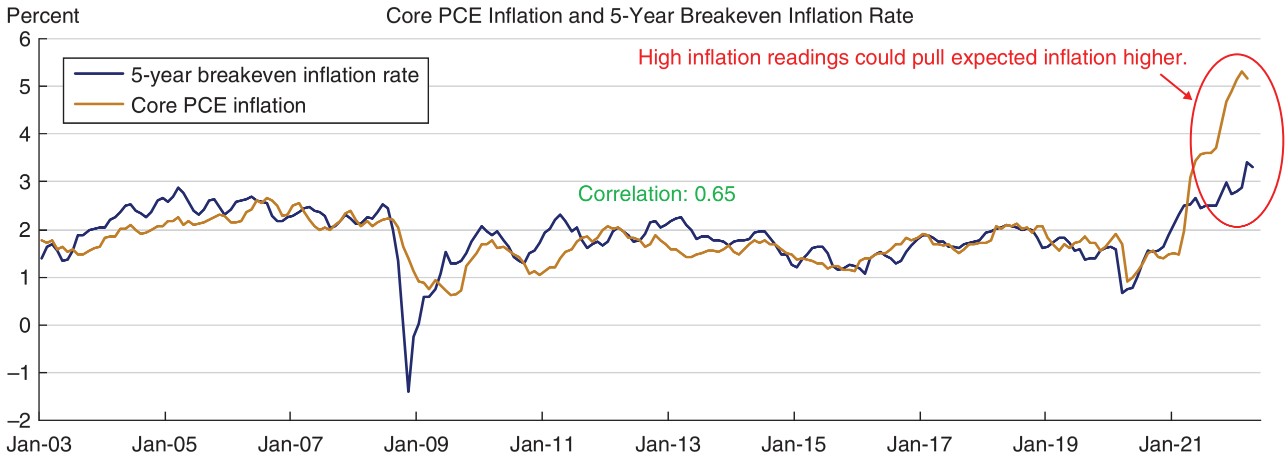

FIGURE 11.5. Actual and Expected Inflation

Sources: Federal Reserve Bank of St. Louis and BEA.

Note: Last observations: March 2022 and May 5, 2022.

guidance means market interest rates have increased substantially in advance of tangible Fed action. By this second definition of "behind the curve," the Fed is not as far behind, but it must now increase the policy rate to ratify the forward guidance previously given.

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CHAPTER TWELVE

Strategy and Execution in US Monetary Policy 2021–22

Randal Quarles

The title of today's conference is "How Monetary Policy Got Behind the Curve—and How to Get Back," and the title of this panel is "Toward a Monetary Policy Strategy." This framing of the discussion clearly presupposes that the Fed is currently on the wrong track, but that it may not be too late to redeem the day by shifting course. I think that judgment is premature, in part because I think the Fed's strategy is misunderstood.[1] Those who were calling for the Fed to act in early 2021 were overly early. And while with the benefit of hindsight, I think it is clear the Fed did move too slowly in late 2021 and early 2022 to raise interest rates (a misstep that I supported at the time), this was an error of execution, not of strategy—a tactical misjudgment in the fog of war—and what is more, it is an error the Fed can correct, and is correcting, effectively and with dispatch.

The Fed's current strategy is laid out in its "framework" document, the declaration adopted by the Federal Open Market Committee (FOMC) in August of 2020, entitled "Statement on Longer-Run Goals and Monetary Policy Strategy."[2] This framework is just a page long and has two principal operative rules. The first is easily quoted: "Following periods when inflation has been running persistently below 2%, appropriate monetary policy will likely aim

1. In fairness, much of that misunderstanding stems from the Fed's own communication about its strategy after its implementation.

2. https://www.federalreserve.gov/monetarypolicy/files/FOMC_LongerRunGoals.pdf.

to achieve inflation moderately above 2% for some time." The second is an opaquely worded paragraph that is generally understood by the Committee (even if not by many native speakers of English) to mean that when the Fed sees unemployment below the non-accelerating inflation rate of unemployment (NAIRU), it will not act preemptively to constrain inflation (as it might have in the past), but will wait to see actual evidence of inflation before taking action that could dampen the labor market.

The first of these operative rules has generally been called "flexible average inflation targeting," but upon close examination, the word "flexible" in that informal title is clearly doing a *lot* of work; so much work, in fact, that it's not clear that the rest of the title—"average inflation targeting"—is that useful a descriptor of what the Fed is committed to by this statement. The statement says "the Committee seeks to achieve inflation that averages 2% over time," but it quite calculatedly does not refer to any *period* of time, and I certainly did not view us as trying to—much less as *committed* to—actually average inflation at 2% over any specific period of time. But an average that is not linked to any defined denominator over which it is being averaged is an odd sort of "average" indeed.

My resistance to an actual average over a defined period of time was not because I wanted the Fed to be unconstrained in its discretion, but rather because I viewed (a) the uncertainties in our measurement of inflation, (b) the mysteries around how inflation expectations are set, and (c) the bluntness of our tools to affect both inflation and inflation expectations as not supporting the degree of discretionary fine-tuning that actually aiming at 2% average inflation over any specific period of time would imply. I believed the Committee's framework statement would give us the ability to follow a longer-term, less reactive policy stance, *without* overly fiddling in light of minor departures from the target.

There were, obviously, some members of the Committee who were concerned that personal consumption expenditures (PCE) inflation had been running at an average of 1.8% over a number of years, which they believed could result in inflation expectations becoming anchored at that level. They wanted to run inflation at 2.2% for an equal number of years, apparently in the belief that this would be useful in anchoring inflation expectations closer to our 2% target. In my view, this was endearingly poindexterish, but complete voodoo.

My position, by contrast, was—and is—that for all practical purposes it is impossible to *tell* 1.8% from 2.2%. Both are close enough for government work, and we should be indifferent between them. I was fine saying policy would "likely aim" for inflation moderately above 2% "for some time" after a prolonged shortfall, but without any commitment to *achieve* 2% (we would only "likely aim"), and without even any commitment to aim for it long enough to mathematically average inflation at any specified level, only "for some time." And the reason I was fine with this phrasing of the statement was that I—and others—viewed "moderately above" as equivalent to "moderately below," and the reasonable, rule-like measures needed to achieve either outcome would not be wildly different. Moreover, my reluctance to agree to any specific period or to the actual outcome of a 2% average over *any* period came from a concern that if reasonable, rule-like measures didn't succeed in raising inflation to a level needed to mathematically average 2% over a specific, measurable period, the progressively more heroic efforts needed to achieve that increase would be progressively unlikely to land at a fine-tuned number. Instead, they would be more likely to end up unanchoring expectations entirely.

Now, obviously I believe that the language in the first operative principle of the Fed's framework statement accommodates the policy views I've described above—indeed, it was carefully crafted to allow for that view, among others—or I wouldn't have agreed to it. And the need to accommodate the gap between my view (and others like it on the Committee) with those folks in their lab coats with the Van de Graaff generators and smoking test tubes trying to average precisely 2% accounts for the Merovingian supineness of the language in the statement.

This may seem like a criticism of the framework. I don't mean it to be—quite the contrary. The framework emphasizes flexibility around 2% as a target at any point in time and does not actually tie the Fed to mathematically averaging 2% over any specific period, which actually leaves a greater ability to follow a more strategic, consistent policy than a commitment to actual averaging would. And it leaves significant latitude about the data to prioritize and the analytical tools with which to interrogate those data—including strict monetary policy rules, which the Fed can use as a benchmark or could even adopt—in operating within that framework. One can view this as a strength.

But the problem most people have seen with the Fed's current monetary policy framework is not with the first element we have been discussing—the "flexible average inflation targeting"—but with the second element: don't constrain employment until you actually see inflation, which I have called the "Israel Putnam principle": "Don't fire until you see the whites of their eyes."[3] Some are taking our current inflationary episode as an obvious refutation of at least that part of the Fed's framework.

I disagree, and I say that as one of the most consistent hawks on the FOMC during my time there. I used to take a perhaps unseemly pride that in any iteration of the FOMC's Summary of Economic Projections, or "dot plot," my dot was always right at the tippy top. But let's look closely at the data from one year ago, at the time when some say—indeed, said at the time—the Fed should begin to act. Inflation had begun to move materially above the 2% target—3.5% in March, 3.9% in April, hitting 5% in June. Yet, when one looked closely at the line item goods in the inflation basket, those numbers were being driven by one thing: used car prices. New car production

3. Israel Putnam was the General at Bunker Hill during the Revolutionary War generally credited with having given the "whites of their eyes" order.

had slowed to a crawl, principally because today's cars are basically rolling computers, and the COVID-19 constraint-induced shortage of computer chips was a strangling restraint on new car supply. As a consequence, if you wanted a car in the spring of 2021, you had to buy a used one. That sudden shift of relative demand between new and used cars resulted in a 25% increase in the price of used cars over two months, and that single factor drove the headline 5% annualized inflation rate at the beginning of June.[4] When one looked at all the other goods in the basket, there really wasn't any other element that was rising dramatically—there just wasn't any signal of widespread and non-supply-chain-driven inflation. Now, with the benefit of hindsight, we can say, "It was coming," but it was perfectly reasonable not to act at that point.

I do think, however, that we had enough data to realize this was broad-based, overstimulated-demand-driven inflation by mid-September 2021. Rich Clarida went through a number of those data points in his opening remarks this morning, others have cited some of them. I will focus here on the throughput figures for the main US ports in September. Over the summer, one common refrain was that bottlenecks at the ports—presumably resulting from the difficulty in clearing blockages created by COVID-related personnel shortages—were impeding the supply of goods into the United States, inevitably feeding inflation in the goods prices. A perfectly reasonably hypothesis. But by September, the figures we had for the amount of goods making it through the main US ports were actually running at, or above, pre-COVID levels. And the projected throughput by the end of the year was not just at pre-COVID levels, it was approaching record numbers for the amount of goods ever cleared through the ports in a single year. The bottlenecks were not resulting in a shortage of

4. It is a topic for a different panel to consider how often, and how much, the headline figures that drive the thinking of the public and even policy makers about inflation, are affected by anomalies in a single eccentric item in the inflation basket—cell phone pricing in the spring of 2017 and used car prices in the spring of 2021 being two prominent recent examples.

goods relative to pre-COVID supply—they were a result of demand at such levels that even record throughput could not satisfy it.

We on the FOMC did not, however, act in September. It is clear now that this was a mistake. But it was not a mistake dictated by the Fed's framework. Israel Putnam said, "Don't fire until you see the whites of their eyes," not "Don't fire until the redcoats march over you." Given the inflation rates over the summer of 2021, which had become comprehensive across the inflation basket by September, a 5-year backward-looking average of PCE inflation would have been running at well over 2%, and we obviously were seeing current inflation much higher than that. Thus, given the data we had in September, a proper understanding of the Fed's framework would not simply have *allowed* the Fed to move in September, it would have *required* it. And had the Fed pivoted last September and moved with the dispatch it is now showing, is there anyone who thinks the Fed would not be on top of inflation by next September?

This mistake is somewhat similar in character to the Archegos Capital Management kerfuffle from early 2021. Contrary to popular belief, the banks exposed to Archegos didn't actually have particularly weak risk management frameworks or poorly negotiated contracts with Archegos. For the most part, they had all the protections you would want, founded on a sophisticated understanding of that risk. And, for that reason, most of the US banks with Archegos exposure got out without loss. But those foreign banks that did lose, lost money because they didn't *follow* their frameworks. They improvised, and ad-libbed, and took limited initial steps, and ended up with their tails in a wringer.

In my view, the Fed's delay in the fall of 2021 resulted not from the Israel Putnam principle, but from a good faith misapplication of another, separate general principle of Fed practice, which is the sequencing of balance sheet and interest rate policy. The Fed, as a general matter, believes that balance sheet and interest rate policy should work in tandem: the Fed should not be providing accommodation through one tool while withdrawing it with another—in the oft-used analogy, that would be "stepping on the gas pedal and the brake at the same time." Given the accommodative consequences of the asset purchase program the Fed had begun in the spring of 2020—even though the purpose of the program had been to ensure market functioning rather than provide policy easing—the Fed believed it should taper those asset purchases to a stop before beginning to raise interest rates. And, given the potential for market disruptions if the tapering happened too abruptly, it would take several months before the purchases had slowed to zero.

Perfectly reasonable, but in hindsight I believe that was an important error in the Fed's policy in late 2021 and early 2022. This is somewhat similar to the general rule among pilots that you should coordinate the use of the plane's rudder and its ailerons. One of the first things you are taught as a young pilot is to avoid "cross-controlling" an airplane: pushing the rudder in one direction while applying the ailerons in the opposite direction. Most often, cross-controlling is inefficient, sometimes dangerous, and doing it is a mistake. There are, however, a few times when there is good reason to do exactly that—most typically when you find you are too high on final approach and need to steepen your descent into a short landing strip. It is called "slipping" the airplane; when done inadvertently, it is the sign of a rookie—when done intentionally and for the right reasons, it is a tool of a skillful pilot. I think with hindsight it is now clear that the Fed should have begun "slipping" monetary policy in the fall of 2021—raising interest rates in September or November even while the tapering of asset purchases was incomplete. The inefficiency of "cross-controlling" monetary policy for a relatively brief period would not have had materially bad effects, and the benefits of responding to a widespread demand-driven inflation with prompt interest rate increases would have been obvious.

In the end, though, I think this mistake will be remedied with dispatch. The interest rate increases that the Fed has begun, if continued as outlined, will be quite effective. In an environment where economic actors and market participants have been conditioned for almost fifteen years to expect extremely low interest rates, even modest nominal rate increases will result in quite high percentage increases in debt service, and the effect on the economy should be both swifter and more powerful than in many prior cases of the Fed's response to inflation. I think it will be clear by the fall that inflation is heading into the pen, and by the first part of next year it should be effectively corralled. There are lessons to be learned from this episode, certainly. But I think it is premature to conclude that one of those lessons is that either of the two operative principles of the monetary policy framework adopted by the Fed in August 2020 was a mistake or has become outmoded.

CHAPTER THIRTEEN

Reflections on Monetary Policy in 2021

Christopher J. Waller

I want to thank the organizers of the 2022 Monetary Policy Conference for inviting me to speak here today and add my response to the focus of discussion, "How did the Fed get so far behind the curve?" To do that, I am going to relate how my view of the economy changed over the course of 2021 and how that evolving view shaped my policy position.

When thinking about this question, there are three points that need to be considered. First, the Fed was not alone in underestimating the strength of inflation that revealed itself in late 2021. Second, to determine whether the Fed was behind the curve, one must take a position on the evolving health of the labor market during 2021. Finally, setting policy in real time can create what appear to be policy errors after the fact, due to data revisions.

Let me start by reminding everyone of two immutable facts about setting monetary policy in the United States. First, we have a dual mandate from the Congress: maximum employment and price stability. Whether you believe this is the appropriate mandate or not, it is the law of the land, and it is our job to pursue both objectives.

Second, policy is set by a large committee of up to twelve voting members, with a total of nineteen participants in our discussions. This structure brings a wide range of views to the table and a diverse set of opinions on how to interpret incoming economic data and how best to respond. We need to reconcile those views and reach a consensus that we believe will move the economy toward our mandate. This process can lead to more gradual changes in policy as members have to compromise to reach a consensus.

Back in September and December 2020, respectively, the Federal Open Market Committee (FOMC) provided guidance for lifting the federal funds rate off the zero lower bound (ZLB) and for tapering asset purchases. We said we would "aim to achieve inflation moderately above 2% for some time" to ensure that it averages 2% over time and that inflation expectations stay anchored. We also said that the Fed would keep buying $120 billion per month in securities until "substantial further progress" was made toward our dual-mandate objectives. It is important to stress that views varied among FOMC participants regarding what would constitute "some time" and "substantial further progress." The metrics for achieving these outcomes also varied across participants.

A few months later, in March 2021, I made my first submission for the Summary of Economic Projections (SEP) as an FOMC member. My projection had inflation above 2% for 2021 and 2022, with unemployment close to my long-run estimate by the second half of 2022. Given this projection, which I believed was consistent with the guidance from December, I penciled in lifting off the ZLB in 2022, with the second half of the year in mind. To lift off from the ZLB in the second half of 2022, I believed tapering of asset purchases would have to start in the second half of 2021 and conclude by the third quarter of 2022.

This projection was based on my judgment that the economy would heal much faster than many expected. This was not 2009, and expectations of a slow, grinding recovery were inaccurate, in my view. In April 2021, I said the economy was "ready to rip," and it did.[1] I chose to look at the unemployment rate and job creation as the labor market indicators I would use to assess whether we had

1. Jeff Cox, "Fed's Waller Says the Economy Is 'Ready to Rip' But Policy Should Stay Put," CNBC, April 16, 2021.

made “substantial further progress.” My projection was also based on the belief that the jump in inflation that occurred in March 2021 would be more persistent than many expected.

There was a range of views on the Committee. Eleven of my colleagues did not have a rate hike penciled in until after 2023. With regard to future inflation, thirteen participants projected inflation in 2022 would be at or below our 2% target. In the March 2021 SEP, no Committee member expected inflation to be more than 3% for 2021. As I argued in a speech last December, this view was consistent with private-sector economic forecasts.[2]

When inflation broke loose in March 2021, even though I had expected it to run above 2% in 2021 and 2022, I never thought it would reach the very high levels we have seen in recent months. Indeed, I expected it would eventually fade, due to the nature of the shocks. All the suspected drivers of this surge in inflation appeared to be temporary: the onetime stimulus from fiscal policy, supply chain shocks that previous experience indicated would ease soon, and a surge in demand for goods. In addition, we had very accommodative monetary policy that I believed would end in 2022. The issue in my mind was whether these factors would start fading away in 2021 or in 2022.

Over the summer of 2021, the labor market and other data related to economic activity came in as I expected, and so I argued publicly that we were rapidly approaching “substantial further progress” on the employment leg of our mandate. In the June SEP, seven participants had liftoff in 2022 and only five participants projected liftoff after 2023. Also, unlike the March SEP, every Committee participant now expected inflation to be more than 3% in 2021 and just five believed inflation would be at 2% or below in 2022. In addition,

2. Christopher J. Waller, “A Hopeless and Imperative Endeavor: Lessons from the Pandemic for Economic Forecasters,” speech delivered at the Forecasters Club of New York, New York, December 17, 2021, https://www.federalreserve.gov/newsevents/speech/waller20211217a.htm.

at that point the vast majority of participants saw risks associated with inflation weighted to the upside. The June 2021 minutes also describe the vigorous discussion about tapering asset purchases. Numerous participants agreed the new data indicated that tapering should begin sooner than anticipated.[3] Thus, in June, after observing high inflation for only three months, the Committee was moving in a hawkish direction and was considering tapering sooner and pulling liftoff forward.

At the July FOMC meeting, the minutes show that most participants believed "substantial further progress" had been made on inflation but not employment.[4] Tapering was not viewed as imminent by most participants. Again, individual participants had different metrics for evaluating the health of the labor market, and this approach influenced how each thought about policy. So, in my view, one cannot address the question of "how did the Fed get so far behind the curve?" without taking a stand on the health of the labor market as we moved through 2021.

Based on incoming data over the summer, my position was that we would soon achieve the substantial further progress needed to start tapering asset purchases—in particular, our purchases of agency mortgage-backed securities—and that we needed to "go early and go fast" on tapering our asset purchases to position ourselves for rate hikes in 2022 should we need to tighten policy.[5] I also argued that, if the July and August job reports came in around the forecasted values of 800 thousand to one million job gains per month, we should commence tapering our asset purchases at the September 2021 FOMC meeting. The July report was indeed more

3. Board of Governors of the Federal Reserve System, "Minutes of the Federal Open Market Committee, June 15–16, 2021," press release, https://www.federalreserve.gov/newsevents/pressreleases/monetary20210707a.htm.

4. Board of Governors of the Federal Reserve System, "Minutes of the Federal Open Market Committee, July 27–28, 2021," press release, https://www.federalreserve.gov/newsevents/pressreleases/monetary20210818a.htm.

5. Ann Saphir, "Fed's Waller: 'Go Early and Go Fast' on Taper," *Reuters*, August 2, 2021.

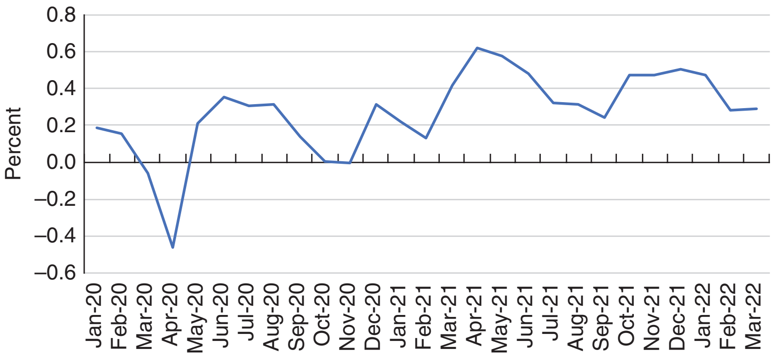

FIGURE 13.1. Monthly Change in PCE Prices ex. Food and Energy
Source: Bureau of Economic Analysis, US Department of Commerce.

than one million new jobs, but then the August report shocked us by reporting only 235 thousand new jobs when the consensus forecast was for 750 thousand. I considered this a punch in the gut and relevant to a decision on when to start tapering.[6] Nevertheless, the September FOMC statement noted the economy had made progress toward the Committee's goals and that, if progress continued, it would soon be time to taper.[7]

Up until October, monthly core personal consumption expenditures (PCE) inflation was actually slowing. As shown in figure 13.1, it went from 0.62% in April to 0.24% for the month of September. The September jobs report was another shock, with only 194 thousand jobs created. So, up until the first week of October 2021, the story of high inflation being temporary was holding up, and the labor market improvements had slowed but were continuing. Based on the

6. Of course, as we all know, the employment data was revised upward substantially, but that was not known to policy makers at the time, and it is important to explicitly make that point now—the data points were choppy and did not lend themselves to a clear picture of the outlook.

7. Board of Governors of the Federal Reserve System, "Federal Reserve Issues FOMC Statement," press release, September 22, 2021, https://www.federalreserve.gov/newsevents/pressreleases/monetary20210922a.htm.

incoming data, the FOMC announced the start of tapering at its early November meeting.[8]

It was the October and November consumer price index (CPI) reports that showed that the deceleration of inflation from April to September was short lived and year-over-year inflation had topped 6%. It became clear that the high inflation realizations were not as temporary as originally thought. The October jobs report showed a significant rebound with 531 thousand jobs created and big upward revisions to the previous two months.

It was at this point—with a clearer picture of inflation and revised labor market data in hand—that the FOMC pivoted. In its December meeting, the Committee accelerated tapering, and the SEP showed that each individual participant projected an earlier liftoff in 2022 with a median projection of three rate hikes in 2022. These forecasts and forward guidance had a significant effect on raising market interest rates, even though we did nothing with our primary policy tool, the federal funds rate, in December 2021. It is worth noting that markets had the same view of likely policy—federal funds rate futures in November and December called for three hikes in 2022, indicating an economic outlook that was similar to the Committee's.

So, given this description of how policy evolved over 2021, did the Fed fall far behind the curve? First, I want to emphasize that forecasting is hard for everyone, especially in a pandemic. In terms of missing on inflation, policy makers' projections looked very much like most of the public's. For example, as shown in table 13.1, the median SEP forecast for 2021 Q4/Q4 PCE inflation was very similar to the consensus from the Blue Chip Economic Indicators, which is a compilation of private sector forecasts published by Wolters Kluwer. In short, nearly everyone was behind the curve when it came to forecasting the magnitude and persistence of inflation.

8. Board of Governors of the Federal Reserve System, "Federal Reserve Issues FOMC Statement," press release, November 3, 2021, https://www.federalreserve.gov/newsevents/pressreleases/monetary20211103a.htm.

TABLE 13.1. Comparison of 2021 Q4/Q4 PCE Price Inflation Forecasts (%)

Month	SEP Median	Blue Chip Consensus
March	2.4	2.3
June	3.4	3.2
September	4.2	4.3
December	5.3	5.2

Source: Federal Reserve Board, Summary of Economic Projections and Blue Chip Economic Indicators (Wolters Kluwer).

Second, as I mentioned, you cannot answer this question without taking a stand on the employment leg of our mandate. There was a clear difference in views on this and on what indicators should be looked at to determine whether we had met the "substantial further progress" criteria we laid out in our December 2020 guidance. Some of us concluded the labor market was healing fast and we pushed for earlier and faster withdrawal of accommodation. For others, data suggested the labor market was not healing that fast and it was not optimal to withdraw policy accommodation soon. Many of our critics tend to focus only on the inflation aspect of our mandate and ignore the employment leg of our mandate. But we cannot. So, what may appear as a policy error to some was viewed as appropriate policy by others based on their views regarding the health of the labor market.

Third, one must account for setting policy in real time. The Committee was getting mixed signals from the labor market data in August and September. Two consecutive weak job reports did not square with a rapidly falling unemployment rate. Later that fall, and then with the Labor Department's 2021 revisions, we found payrolls were quite steady over the course of the year. As shown in table 13.2, revisions to changes in payroll employment since late last summer have been quite substantial. From the original reports to the current estimate, the change in payroll employment has been revised up nearly 1.5 million. As the revisions came in, a

TABLE 13.2. Change in Nonfarm Payroll Employment: Initial Report and Current Estimate (Thousands)

Month	Initial Report	Current Estimate	Revision
August	235	517	282
September	194	424	230
October	531	677	146
November	210	647	437
December	199	588	389
Total	1369	2853	1484

Source: Bureau of Labor Statistics, US Department of Labor.

consensus grew that the labor market was much stronger than we originally thought. If we knew then what we know now, I believe the Committee would have accelerated tapering and raised rates sooner. But no one knew, and that's the nature of making monetary policy in real time.

Finally, if one believes we were behind the curve in 2021, how far behind were we? In a world of forward guidance, one simply cannot look at the policy rate to judge the stance of policy. Even though we did not actually move the policy rate in 2021, we used forward guidance to start raising market rates beginning with the September 2021 statement, which indicated tapering was coming soon. The 2-year Treasury yield, which I view as a good market indicator of our policy stance, went from approximately 25 basis points in late September 2021 to 75 basis points by late December. That is the equivalent, in my mind, of two 25 basis point policy rate hikes for impacting the financial markets. When looked at this way, how far behind the curve could we have possibly been if, using forward guidance, one views rate hikes effectively beginning in September 2021?

GENERAL DISCUSSION

JOSHUA RAUH (INTRODUCTION): In this panel, three current or former Federal Reserve officials will talk about the future of monetary policy strategy. One common theme in their remarks will be the question as to whether the speed and scope of the Federal Reserve's actions to contain inflation have been adequate in the recent period.

We will first hear from Jim Bullard, president of the Federal Reserve Bank of St. Louis, who will pose the question, "Is the Fed behind the curve?" He will give us a mixed answer. Standard Taylor-type policy rules are clearly recommending substantial increases in the policy rate above where it is today, although it depends to some extent on the inflation measure used. Furthermore, central banks use forward guidance, and Mr. Bullard will in his remarks shed light on the role that credible forward guidance has already played in increasing market interest rates.

Randy Quarles, former member of the Federal Reserve Board of Governors, will take a step back and ask the question, "If we're moving toward a monetary policy strategy, what are we moving away from?" The Fed adopted a new statement on longer-run goals and monetary policy strategy in August of 2020. One of the principles therein is generally referred to as "flexible average inflation targeting." This approach targets average inflation over a period of time but does not bind the Fed mathematically to average 2% over any specific period. The second main principle in the Fed's August 2020 statement might be best described as "Don't constrain employment until we actually see inflation." Mr. Quarles will assess the contention that the August 2020 framework was in some way a mistake, concluding that in fact it is premature to draw that conclusion.

Christopher Waller, a current member of the Federal Reserve Board of Governors, will pick up on the discussion of whether the Fed has been behind the curve by focusing on the timing with which information, both about inflation and the health of the labor market, has come to light. When the first real departure of inflation from expectations occurred in March 2021, policy seems to have been guided by the expectation that it would eventually fade due to the nature of the shocks that were perceived as generating it. As of June 2021, the Committee was moving in a hawkish direction. The August 2021 jobs report then showed shockingly weak numbers. Yet progressive revisions in future months revealed that in fact the labor market had been quite a bit stronger, and that payroll growth had been quite steady over the course of the year.

All of this discussion is of course taking place in the context of a very substantial run-up in CPI inflation. I suspect the assembled group here will raise questions for our esteemed panel of central bankers as to how inflation could have deviated so substantially from the Fed's forecast, and whether there are further changes to the framework that might be implemented for the future. I convey our appreciation to the panel for engaging with us in this discussion.

* * *

DAVID PAPELL: David Papell, University of Houston. I want to relate the discussion this afternoon to the discussion in the first panel this morning by John Taylor and Rich Clarida, and particularly with Rich's graph that he showed from my paper with Ruxandra Prodan. We looked at prescriptions from six different policy rules: Taylor and balanced approach versions of original, shortfalls, and what we call consistent rules. The initial prescriptions are all bunched together. With the inertial rules, the liftoff would either be the second or third quarter of 2021 and, with the noninertial rules, the liftoff would be about one quarter earlier. Up to March 2021 everything is similar. Then, with the non-inertial rules, you see prescriptions like what John Taylor put on his graph. By March 2022, Taylor rule prescriptions are between 5 and 6%. Now that's a policy path that was out of the question. It would have required, depending on the rule, two federal funds rate increases of 100 or 200 basis points each over consecutive quarters or one rate increase of 300 basis points. It's not a path that the Fed could follow. The inertial rules were a path that the Fed could have followed by starting rate increases in the second or third quarter of 2021. By March 2022, the Fed was behind the curve by about 100 to 125 basis points based on the inertial rules. This had nothing to do with flexible average inflation targeting or by responding to shortfalls instead of deviations from maximum employment. It was not following the policy rules that led to being behind the curve. Last Wednesday, the Fed raised rates by 50 basis points. If the Fed increases the federal funds rate by 50 basis points in the next four to five meetings, they could get back to being on the curve. So it's not an impossibility. It's not that they have to get to 5 or 6%. It's definitely within the realm of what could be done.

JAMES BULLARD: I might just make one comment. The kind of calculations that I showed and that David just talked about are sensitive to this inertia issue. If you're going to put a lot of inertia in your rule, very low interest rates are going to look very good for a long time. So I regard the inertia parameter as kind of an ad hoc adjustment parameter. Inertial rules are popular because they fit the data pretty well pre-pandemic. And then we say, "Well, that was pretty good policy during that period." So we like that inertia parameter. But then you get this really big shock. And so what I was trying to calculate is, Where would we like to be? Then we can think about how fast we want to get there. And that's kind of a judgment call. And I would say the inertia parameter is encapsulating that judgment call about how fast to get there. But I still want to know: If I just had my druthers, if I could snap my fingers, where would I like to be right now given this data? The rest of the rule I think tells you that.

MICKEY LEVY: A quick comment and a quicker question. Jim, in your estimate of how far behind the Fed is, you suggested that only 90 basis points of further rate increases are needed. But that's 90 basis points above the 2-year note yield that reflects the fed funds futures curve that is pricing in numerous Fed rate hikes and now yields 2.75%. Accordingly, you must add to your estimate of a 90-basis-point shortfall all of the rate increases currently priced into the futures market. This raises your estimate of the fed funds rate to 3.75%.

My simple question is, with core PCE inflation of 5.2%, far above the Fed's 2% longer-run average target, do you think the Fed would accept a rise in the unemployment rate to 5 or 5.5% in order to get inflation down to 2%?

BULLARD: I think this is a question for Randy. But I'll answer your first question. It's totally true. If you're going to go to the 2-year Treasury yield as a metric, then you have to take into account that it's general equilibrium. Market participants are trying to game out what the Fed's going to do, and that's affecting the pricing. So when you say you're 90 basis points behind on the 2-year, you're not quite hawkish enough to get into that normal policy debate region. So you'd have to be a little bit more hawkish. Now some of that might be part of the market doesn't really believe us; they think we're going to stall out at some point or something. So I think as we push ahead here, we'll get more credibility, and we will be able to get into that region. But you're totally right that you can't just say, "Okay, well, two more hikes will get us there," because it isn't at all clear that that will do it.

RANDAL QUARLES: So, I will answer your question. I think that the answer is, yes. There are . . . I mean, there are many, many folks in this room who have been part of the institution of the Fed. I will . . . I will give a very, very short anecdote. I will constrain myself because this anecdote can become quite long, but I will give a very short anecdote that demonstrates why I think that they will stay the course because they're very committed to fighting inflation. I commuted from Salt Lake to the Fed. Well, I was going there because my family had not wanted to move back to Washington. And so, as a consequence, I didn't have any family in Washington, and I worked 'til late in the night. The building was not used to having a governor there at 10 at night. And I was unaware that there was a panic button underneath my desk that I kept hitting with my knee.

So the first night that happened, I hit the panic button with my knee, and a SWAT team comes running down the hallway and bursting into my office. And I have no idea what's going on. And they explained to me the panic button. Now you would think that once would have been enough. But no. So I did that regularly, and eventually they stopped responding.

But one night there was a new guard, a young man, who was not aware that I would hit the panic button with my knee, and so he came running down alone at 10 o'clock at night to see what terrorist was attacking the corner office. And so he got there, and I explained I do this all the time. I'm so sorry. But he was also something of an art critic, so he was interested in the art on the walls. And the Fed gives you some art. It's nothing from the Smithsonian, they get art from their collection. Nothing cost more than about $2,000. One of the things I had on my wall was a memento mori painting by Arthur Burns. Some of you may not know that Arthur Burns painted. George W. Bush is a much better painter than Arthur Burns. But I kept it to remind me. And so as he's asking about the various art, I explained, now this was by Arthur Burns. And I begin to explain to the young security guard who Arthur Burns was and why that painting is on my wall. And he says, "Oh my God, that's the guy who let inflation get out of control."

So the point is that this is an institution that from top to bottom knows that the one great sin that will be remembered by everyone 50 years later is if you let inflation get out of control. My young security guard did not remember what the unemployment rate was in 1971. He knew that Arthur Burns let inflation get out of control. And that will drive the commitment of the Committee to ensure that they get on top of this.

TYLER GOODSPEED: Two quick questions. First, what was the specific thinking behind the continuation of the purchase of mortgage-backed securities in 2021? And second, insofar as 2021 might have been a type-one error, in retrospect, do any of you think that 2018 was a type-two error?

BULLARD: On mortgage-backed securities [MBSs], I did argue publicly that we might consider just ending that part of the purchase program in the fall of 2021, on the grounds that the housing market was booming and that the purchases had been taken on at the height of the pandemic, thinking that the pandemic was going to cause problems in the housing market. But actually, the housing market went the other way and did very well. So it was mystifying, to me anyway, that by the time we got to Labor Day 2021 we were still doing this. Now, the counterargument was that MBSs and Treasuries are close substitutes and we weren't ready to announce the tapering decision: If you taper, why were you tapering one and not the other? And this kind of thing. But still, in retrospect, I would support my original idea. It didn't carry the day, but I think it would have been wise. We've really got a hot housing market here, and housing prices are up substantially. You've got an increased demand for housing, and you can't build enough houses. You're really pricing a lot of people out of the market. So I do think, in retrospect, it would have been better to get out sooner.

JOHN GUNN: I have really enjoyed the day, but one item has not come up. And it's—you're an appropriate panel to ask—and that is there's a huge change: In 2000, 80% of the global economy was in the developed world. By today, somewhere between 61 and 65% is in the developed world. The developing world is growing very rapidly. To some people—there's one academic paper anyway, I have no idea whether it's correct or not—that makes the point that the Chinese export boom to the United States that filled the shelves of Target and Walmart took 1 to 2% off the inflation rate. Now, we're in a situation where, due to technological innovation, meeting the 7 billion people in the developing world, they're moving rapidly at a growth rate that will be probably at least double that of the developed world. What do you, when you're thinking about—we're only 25% of the global economy, the United States—when you're thinking about what you're doing in Washington, do you factor in some subjective—I admit there's probably not too many numbers—but do you factor in some subjective items of what's happening in the rest of the world?

CHRISTOPHER WALLER: Well, I'd say that the typical way that we tend to look at the impact on the rest of the world on the US economy is through imports and exports and how trade flows affect GDP and our mandate. That's it. We don't set monetary policy for different countries; we don't try to fix their problems with interest rates. Whatever they do, however, it impacts us through GDP and inflation, that's how we responded.

JOHN COCHRANE: This is great. And thank you all. I want to ask a hard question: Let's get away from how fast the Fed raised interest rates or not and why. Inflation is 8%. That is a significant institutional failure. Now maybe it was nobody's fault. But when you target 2 and it comes out 8, that is a significant failure. If this were an army, you have an after-action report, a court martial, an inquest, and we'd figure out what went wrong.

So I'm curious. I see three conceptual questions that I want to know your view on. First, inflation forecasts: How could you get the forecast so wrong? Yes, most of the surveyed professional forecasters got it wrong too. But Larry Summers sat down with the back of his envelope, thought, 5 bucks of stimulus, multiply by 1.5, look at any plausible GDP gap, wow, here comes inflation.

If your inflation forecasts can be off by 8 percentage points, we need to figure out, Are the inflation forecasts really that impossible? If so, what are we doing making projections and asking and acting on projections? Maybe you need to change your procedures to forget about the projections if they're going to be that inaccurate. Either forming them or how you use them, it seems to me that a soul-searching and indeed a formal what-went-wrong effort ought to happen.

Second, anchoring. We hear lovely speeches about anchoring, but we just saw expectations are taking off. I've been wondering for ten years, is this an anchor or is this a sail, and it happens to be a calm day? I think we found out the answer to that question. And I've been wondering, Anchored by what? Anchored by more speeches about how there's anchoring? Sometimes the Fed will say, "Well, we have the tools," and never really tell us what the tools are.

Now, the only anchoring that makes sense to me is the reputation gained in 1980. People believe the Fed will do what it takes. If this means 20% interest rates, horrendous unemployment, and two back-to-back recessions, the Fed will do it. I never hear that out of the Fed. Deterrence only works if people know what the "tools" are and that you're ready to use them! I would think that some soul-searching on what anchoring is, how to better anchor, and how to make clear the steadfastness of that commitment would be something useful.

Third, r-star, which Ricardo brought up. There is a sense that the Fed was fighting the last war, as generals always do, but forgot about the war before that one, the war against inflation. But maybe not. To what extent do you believe that we are heading back toward a world of perpetual low real interest rates, the zero bound, that the Maginot line against deflation needs to be ready to go again two years from now? Ricardo's point is, I think, "Wait a minute, the marginal product of capital isn't that low." There was something special about government bonds in a noninflationary environment that may disappear. Low real rates, low r-star is not necessarily coming back. So as you think about the future, I would think that this conceptual mindset that we're going to be fighting deflation forever, which is what I really see was really quite well put together in the current monetary strategy, needs questioning.

In summary, forecasts, expectations, anchoring, and are we going back to zero?

BULLARD: On inflation forecasts, I have a very simple idea. We used econometric models estimated off the last two decades or so of data to forecast inflation. During that period, inflation was close to 2% pretty much the whole time. You got coefficients that were close to zero on most of the variables, except for the constant. In fact, probably the constant did the best, most of the work, in projecting inflation. Then you tried to use that model when you got a gigantic pandemic shock; it wasn't the right model to use. I think that's the simple explanation.

That kind of view is going to push all of the inflation movements into the noise term in the model. You're going to come back and say, "Well, my model doesn't fit this new data. So it must be all in the noise term. So it must be going to go away, it must be temporary." That's exactly what we got as advice. And I think it's turning out to not be correct now.

I think there's schizophrenia at this conference about the forward-looking versus backward-looking issue. That kind of comment sounds like: "We should just rely on hard tangible data that we actually have on inflation and react to that, because it's not going to be that easy to forecast." Indeed, the forecast may lead you badly astray if it turns out to be wrong and it's not that good. But on other occasions, people say, "You shouldn't wait till you see the whites of inflation's eyes. You should always be anticipating. You should always be acting a little bit ahead of time." This seemed to be the lesson that came out of the Volcker and Greenspan era. I think there's schizophrenia here. I'm not sure where everybody really comes down. Surely it's got to be some kind of combination or judgment about what's actually happening on the ground. You have to put heavy weight on what I actually have in hand. What's actually the data that I have? But then you also have to be thinking, What's a reasonable model of what's happening? Some judgment about what's happening and might happen in the future. And then make good calls. I think because we have a big Committee, we get a lot of input from a lot of different angles. And most of the time we do make good calls. Not this time, though.

On r-star, I think r-star's low for the foreseeable future unless you get a productivity boom coming out of this, which I wouldn't rule out. I think the pandemic did force us to use a lot of technology that we weren't used to using and probably spawned new ideas that may improve productivity going forward, and you might get higher growth rates. The demographics don't look that good going forward. Then you've got the issue of safe assets' scarcity. I don't think that's going to change. So the only thing I could think that can change on r-star is that productivity could move to the higher-productivity growth regime. That would be interesting and it would push up r-star a little bit, but the jury's out as to whether that's really great.

QUARLES: On your comment about expectations, anchoring, I would only say that I agree with you. The view that expectations have been so well anchored for so long, I've always been a little skeptical of that. Because if you walked out on the street before 2021 and asked anyone, "What is the level of inflation?" they would have had no idea what to say. If you had told them, you know, "How do you feel about inflation being 1.5%? How do you feel about inflation being 5%?" They wouldn't have given you an answer, because they had no clue as to what it was supposed to be. People in general—the folks in this room obviously think about that a lot—but for the people who actually drive the economy, the whole success of monetary policy was that they did not think about it. So in what sense were their expectations anchored anywhere? And indeed, the risk was, and perhaps we are beginning to see it, that as soon as you made them think about it, that the expectations would move off in an unpredictable direction. So that has long been a concern of mine. And I do worry that we're beginning to see that inflation expectations that we have always believed were so well anchored for so long were really, just, no one was thinking about them.

NICK TIMIRAOS: Nick Timiraos of the *Wall Street Journal*. I have two questions. One for Jim and Chris. One of the conclusions that came out of the framework review, and it seemed as if the Committee had already kind of absorbed this before you actually concluded the review, was because of the policy asymmetry of the lower bound, you should go big, go fast when you get there. And you certainly did that on QE and on forward guidance. And I wonder now if there's any buyer's remorse that might make you gun-shy, in the next downturn, about either the sequencing you had around that you have to take or before you raise rates, and also the magnitudes, the promises that you make with forward guidance. And then for Randy, I wonder to what extent did uncertainty over who was going to chair the Committee in the third quarter last year factor at all into the delay that you saw in getting to the pivot?

WALLER: So, I would say, looking at the strategy, one of the things that—and recall that I wasn't on the FOMC when the decision was made—that question is whether we should have stopped asset purchases in 2020 after it was clear the worst part of the pandemic appeared to be over, or did we feel that we needed that tool to help the economy recover in 2021? That's a question of whether we should have just stopped asset purchases in late 2020 and used forward guidance. Or should we have started tapering earlier as we saw the data coming in? That was my own personal preference, that we should have started much earlier in tapering to set us up for rate hikes later, and I argued that we needed to have the policy space. Maybe the economy wouldn't have recovered quite as well, but we needed the policy space as a risk management tool going forward. So I think tapering is the thing that really kind of got us in this bind. We couldn't lift off until we got it over with. It was a large amount of purchases. And we didn't start fast enough, and we didn't go fast enough at first. So that would be the way I think about lessons learned.

ANDREW LEVIN: I'm Andrew Levin from Dartmouth College. This has been a really great day. Thanks to John Taylor and John Cochrane and Mike Bordo for organizing it, and thanks to the panelists for participating. Rather than trying to second-guess what happened in 2021, I'd like to ask you about risk management going forward. According to the New York Fed's latest household survey, consumers now expect inflation over the next 12 months to be around 8 or 9%. That's their point forecast. And there's at least a possibility that they could be right. So it seems like the Fed would just be following a "hope for the best" approach by raising the funds rate to a level that's consistent with inflation declining all the way to around 3%. I'm much more concerned about the institutional risk that could materialize if we get to the end of the year and inflation is still running at high single digits. If the funds rate is only at 3.5%, and the real interest rate (adjusted for inflation) is –5%, then that would be a really big problem. Are you comfortable with facing that sort of institutional risk?

WALLER: That ain't gonna happen. I'll tell you that right now. What else you want me to say?

BULLARD: What I've said is, I want to get to a 3.5% policy rate expeditiously. Then at that point, we could see where we are and we could analyze issues like the ones you're talking about, e.g., whether inflation expectations are still going the wrong way. At that point, we'd be 100 basis points above what the Committee is saying the neutral benchmark is. Another idea I have is the front-loading idea—i.e., to get the policy rate to neutral and, for me, above neutral now—because that's what the optimal impulse response would be. You'd go up quite aways pretty rapidly, then you'd come back down from the higher level. We saw some of the impulse responses that Volker Wieland put up, for instance. That would be the pattern that you'd be looking for: some kind of increase now that would be enough to control the shock, then you come down from that point to the neutral rate. As opposed to what the Committee has been saying for a long time, that you're going to edge up to the neutral rate and stay there, I think my impulse response is a better idea of what we need to do here. But this is evolving day to day. The data has to come in, and we'll see how inflation and inflation expectations evolve going forward.

WILLIAM NELSON: Bill Nelson, from the Bank Policy Institute, and let me also add my thanks for a fantastic event today. So I have a kind of a practical question similar to Nick's question. So the Charlie Evans threshold-based forward guidance that was discussed earlier was two triggers, either of which would free up the Fed to tighten. So the language was: We're gonna remain at zero at least until unemployment falls below 6.5 or projected inflation rises above 2.5%. I might not have those numbers exactly right. But it was language that both extended the market's and the public's expectation for how long rates would be at zero but also was very robust to off the baseline path events, because it freed up the Committee if things went awry in either dimension, whereas the forward guidance that was used for the target range and for the balance sheet in 2020, both required double triggers. We will stay at zero until both the inflation rate is up to 2 and we're at maximum full employment. There were a few wiggle-room words, but not as many as in the threshold guidance, not as many escape hatches as Charlie's language. And the balance sheet guidance was the same, we will keep buying until we've made substantial progress on both legs. And that's language that is not robust to developments that are off the equilibrium path but stronger in many ways, although a bit less precise. Anyway, having had experience now with both types of qualitative . . . I mean, forward guidance that uses actual data, do you have any reflections on which you recommend the Committee use in the future?

BULLARD: Yeah, first of all, I'd agree with Chris's earlier comment that lifting this playbook on tapering—talk about tapering, taper, wait, then raise interest rates—from the Yellen era and trying to apply that to the post-pandemic economy was an error because it just did not fit. When Chair Yellen did it, it worked, and it made perfect sense because inflation was below target pretty much the entire time. But here we had a very different situation evolving, and we eventually had to chuck the whole playbook and eventually raised rates in March of this year. It was way sooner than what was previously thought of. I think that's a key thing.

The other thing to understand about the genesis of the flexible average inflation targeting and the idea that you weren't going to react until you actually saw some inflation is that we were tightening in the Yellen era with inflation below target. Why was that? Because we believed in the Phillips curve (I'm not that big of a believer in the Phillips curve) and we thought there was inflation ahead and, therefore, we were going to tighten preemptively. It wasn't that successful I think. It had stops and starts—we had

2015 and 2016. So we had problems with that approach. The attitude of the Committee was: We're not going to do that again.

But I also feel like the framework—I know there's a lot of talk about the framework here, so maybe I'll just leave you with this thought—is all about the effective lower bound. How to meet the challenges around the effective lower bound, how to make sure you're going to average 2 percent inflation considering the effective lower bound. So what I want to do is get you to draw a little diagram. When inflation is low, flexible average inflation targeting. When inflation is high, see Paul Volcker.