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

EDITED BY
Michael D. Bordo, John H. Cochrane, and John B. Taylor

CHAPTER FOURTEEN

Inflation Blues: The Fortieth-Anniversary Revival?

Monika Piazzesi

In 1983, legendary blues musician B. B. King recorded "Inflation Blues," a song that mirrored Americans' struggle to pay the bills and their frustration with the government's inability to address the rising cost of living. This was just after inflation soared to more than 14% at the dawn of the decade, while unemployment peaked at about 11% during 1982. Now, forty years after its vinyl debut, King's "Inflation Blues" is threatening an encore.

At the Federal Open Market Committee (FOMC) meeting on March 16, 2022, the Federal Reserve Bank announced its decision to raise its target for the federal funds rate from essentially zero to 0.25%. As of this writing, the current inflation rate for personal consumption expenditures (PCE) is much higher than the federal funds rate, with the latest numbers (from February 2022) being 6.4% for PCE inflation and 5.4% for core inflation (excluding food and energy). By keeping the fed funds rate so low relative to inflation, the Fed drove the *real* short rate—the difference between the fed funds rate and core inflation—into negative territory. When the real rate, which measures the return on savings adjusted for inflation, is negative, the incentive to save is extremely low while borrowing and—in turn—investment are encouraged.

How low the Fed believes the real rate to be during coming years can be inferred from table 14.1, which contains data from the Summary of Economic Projections (SEP), also released by the Fed

on March 16, 2022. The SEP contains what FOMC meeting participants believe are the most likely outcomes for real gross domestic product (GDP) growth, the unemployment rate, and inflation for each year from 2022 to 2024 and over the longer run.

These projections imply that the Fed currently expects the real rate at the end of 2022 to be –2.2%, the projected difference between the fed funds rate, 1.9%, and core inflation, 4.1%. For the years 2023 and 2024, the Fed expects the real rate to be 0.2% and 0.5%, respectively. Over the longer run, the Fed estimates a 0.4% real rate.

The long-run real rate is of central importance for many questions we have about the economy. For example, whether or not households are saving enough for retirement depends on the real rate of return on their savings. Until a decade ago, the long-run real rate was around 2.50%. At that rate, household savings of $1,000 would more than double to nearly $2,100 in real terms over a period of three decades. If, however, the long-run real rate is only 0.4%, as the Fed now estimates (see table 14.1), $1,000 of savings will stay roughly unchanged in real terms after three decades. That is a big difference for households that are saving for retirement.

A January 13, 2021, speech by Richard H. Clarida, who stepped down as the Fed's vice chair in early 2022, explained that a long-term real rate of 0.5% is indeed what we now should expect in a normal environment with inflation at the 2% target and the economy growing at trend.[1]

There are many reasons for this big decline in the neutral real rate, or r-star, over the last decade in many industrialized countries.[2]

1. 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, https://www.federalreserve.gov/newsevents/speech/clarida20210113a.htm.

2. John C. Williams, "Three Questions on R-star," FRBSF Economic Letter, 2017-05, February 21, 2017, https://www.frbsf.org/economic-research/wp-content/uploads/sites/4/el2017-05.pdf.

TABLE 14.1. SEP Median Forecasts

Variable	2022	2023	2024	Longer Run
Real GDP growth	2.8	2.2	2.0	1.8
Unemployment rate	3.5	3.5	3.6	4.0
PCE inflation	4.3	2.7	2.3	2.0
Core PCE inflation	4.1	2.6	2.3	2.0
Federal funds rate	1.9	2.8	2.8	2.4

These advanced economies have experienced a dramatic slowdown in the trend of real GDP growth. Lower growth rates are associated with a reduced need for savings to fund investment and thus a lower r-star. The slowdown in growth can be attributed to an aging workforce and lower productivity growth.

THE FED IS SLOW TO FIGHT INFLATION PRESSURES

Fed officials spent weeks giving speeches preparing the public for a liftoff in interest rates after keeping rates at zero for such a long time. Financial markets expected the subsequent 0.25% increase in the fed funds rate and now expect further gradual increases into 2023.

But the Fed's announcement is puzzling. Negative real rates stimulate the economy because borrowing is cheap, which encourages investment. In the environment in which they began raising rates, the economy does not need any further stimulus. Quite to the contrary, the economy has been running hot with levels of inflation that were last seen during the Great Inflation of the 1970s.

The current May 2022 inflation rate is sky high (from a US perspective, other countries are more used to these kinds of inflation rates) due to a combination of supply chain disruptions, pent-up household demand, wide-ranging government aid programs to support the economy during the COVID-19 pandemic as well as further large-scale asset purchases by the Fed. While economists

disagree about the relative importance of each of these factors, inflation is currently also high in many other industrialized countries that did not adopt the same policies as the United States. Russia's ongoing war against Ukraine has further increased energy prices and thereby added to inflation pressures worldwide.

In his 2021 speech, Clarida explained the type of policy rule he would propose for thinking about the liftoff in interest rates, given the new policy framework adopted by the Fed. A policy rule describes what the Fed should be doing and what kind of fed funds rate it should set given where the economy is.

That policy rule is a Taylor-type rule (named after my Stanford colleague John Taylor). The rule sets the fed funds rate to a neutral rate of 2.5% (the 2% inflation target plus a 0.5% real rate) but raises the fed funds rate if inflation is higher than 2%. Clarida recommended a 1.5 response coefficient to inflation deviations from the 2% target. The policy rule looks like this:

$$\textit{Recommended fed funds rate} = 2.5\% + 1.5 \times (\textit{inflation rate} - 2\%).$$

Since core inflation is, at this writing, currently 5.4%, the rule recommends a fed funds rate of 7.6%! It is obvious that we are far away from this goal even after the last FOMC meeting.

What should the Fed do? Clarida advocated that the Fed should not close the wide gap between its goal and the current fed funds rate in one giant step. Instead, he recommended that the Fed take a much more gradual approach. How gradual? The answer is an inertial Taylor rule, which says that the Fed should place a large 80% weight on where the economy is right now (before the Fed decision, that was a zero fed funds rate) and a modest weight of 20% on where the Fed should be (the 7.6% recommended fed funds rate, given the sky-high inflation rate).

The inertial Taylor rule says that in May 2022, the fed funds rate should already have been at 1.72% since the last FOMC meeting.

Given the inflation pressures, we should have thus seen a massive rate hike on March 16, 2022—seven times as high as the actual 0.25% decision.

The rule also helps to think about the Fed's plans going forward. The Fed's own estimate of 4.1% core inflation for the end of 2022 from table 14.1 implies a 5.65% interest rate target. Its 1.9% projection for the fed funds rate is much lower than that. These numbers reveal that the Fed thinks the economy will only be a third of the way toward its interest rate target by the end of the year. Moreover, the Fed expects inflation to drop by half over this year while projecting strong real growth: projected real GDP growth over the next years is higher than the 1.8% long-run projection in table 14.1.

These projections are highly optimistic. The Fed knows the economy is like a car driving downhill at a speed far above the speed limit. It also anticipates forces down the road that will further push the car to higher speeds. Moreover, the Fed is aware that its own actions will also further accelerate the car, while policy rules for the conduct of monetary policy would have called on the Fed to step on the brakes. But Fed officials are convinced that the car's high speed is only temporary—somehow the forces of nature will slow down the car and the car will roll to a stop right at the bottom of the hill.

To respond to strong real growth down the road, John Taylor's original policy rule puts a positive coefficient on deviations of output from trend, a variable called the output gap:

$$\textit{Taylor's recommended fed funds rate} = \textit{Clarida's recommended fed funds rate} + 0.5 \times \textit{output gap}.$$

The Fed's projections of real GDP growth in excess of 1.8% long-run growth in table 14.1 can serve as a proxy for the output gap. Since projected growth is high, the Taylor rule prescribes a higher fed funds rate than Clarida. To summarize, all these policy rules suggest that the Fed is not stepping on the brakes enough.

THE GREAT INFLATION OF THE 1970S

The last time the Fed fell behind the curve was in the 1970s. Back then, Fed leaders Arthur F. Burns and then G. William Miller after him, reacted slowly to the rise in inflation. Both chairmen thought it was important to promote economic growth even if it resulted in inflation. Moreover, they believed that inflation was caused by forces outside the Fed's control, such as high energy prices. Therefore, they did not tighten enough—driving real rates to negative territory, just like today.

In joint research with Stanford PhD students Matteo Leombroni and Ciaran Rogers and my Stanford colleague Martin Schneider, we studied the "Great Inflation" of the 1970s more closely.[3] Figure 14.1 plots key household sector positions over the postwar period. The yellow shaded areas are three episodes for which we have more detailed household-level data on portfolios: the late 1960s, the late 1970s, and the mid-1990s.

Figure 14.1 shows that during the 1970s, the yellow shaded area in the middle, household net worth as a fraction of GDP fell by 25%, before recovering again to its late 1960s value. Our research attributes the drop in net worth to two key developments. First, baby boomers entered into asset markets. The average asset market participant thus became younger. Second, inflation eroded the value of bond portfolios, which are nominal assets, and made households poorer. Being young and poor lowers the propensity to save and thus diminishes net worth. The other lines in the figure are the three main components of net worth: housing, equity, and net nominal assets (the difference between any holdings of bonds and household debt).

3. Matteo Leombroni, Monika Piazzesi, Ciaran Rogers, and Martin Schneider, "Inflation and the Price of Real Assets," Department of Economics, Stanford University, January 2020, https://web.stanford.edu/~piazzesi/inflationAP.pdf.

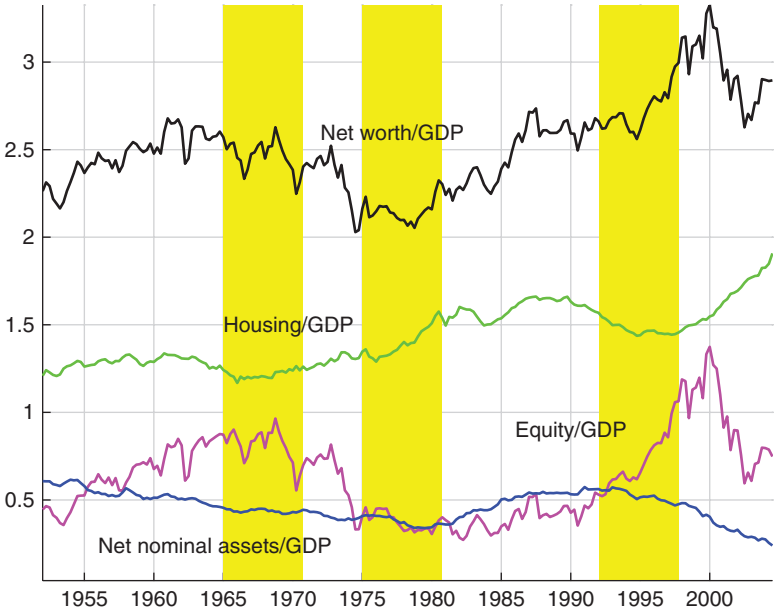

FIGURE 14.1. Household Net Worth in the United States as a Fraction of GDP
Source: Financial Accounts, Board of Governors of the Federal Reserve System.

Figure 14.2 shows portfolio weights in panel (a), in particular a 20 percentage point shift away from equity and into real estate during the late 1970s. This portfolio adjustment was associated with large moves by asset prices in opposite directions. Panel (b) shows that—relative to their fundamentals—house prices rose while equity prices fell. For housing, the line in panel (b) is the ratio of house prices to rents. For equity, the line is the ratio of equity values to dividends.

Our research points to several reasons that high inflation made housing such an attractive asset during the 1970s. First, the US tax code favors housing during high inflation: Mortgage interest deductibility is a bigger subsidy when mortgage rates are high. Moreover, capital gains on housing are largely tax sheltered. Finally, dividends on owner-occupied housing—the implicit rental value of

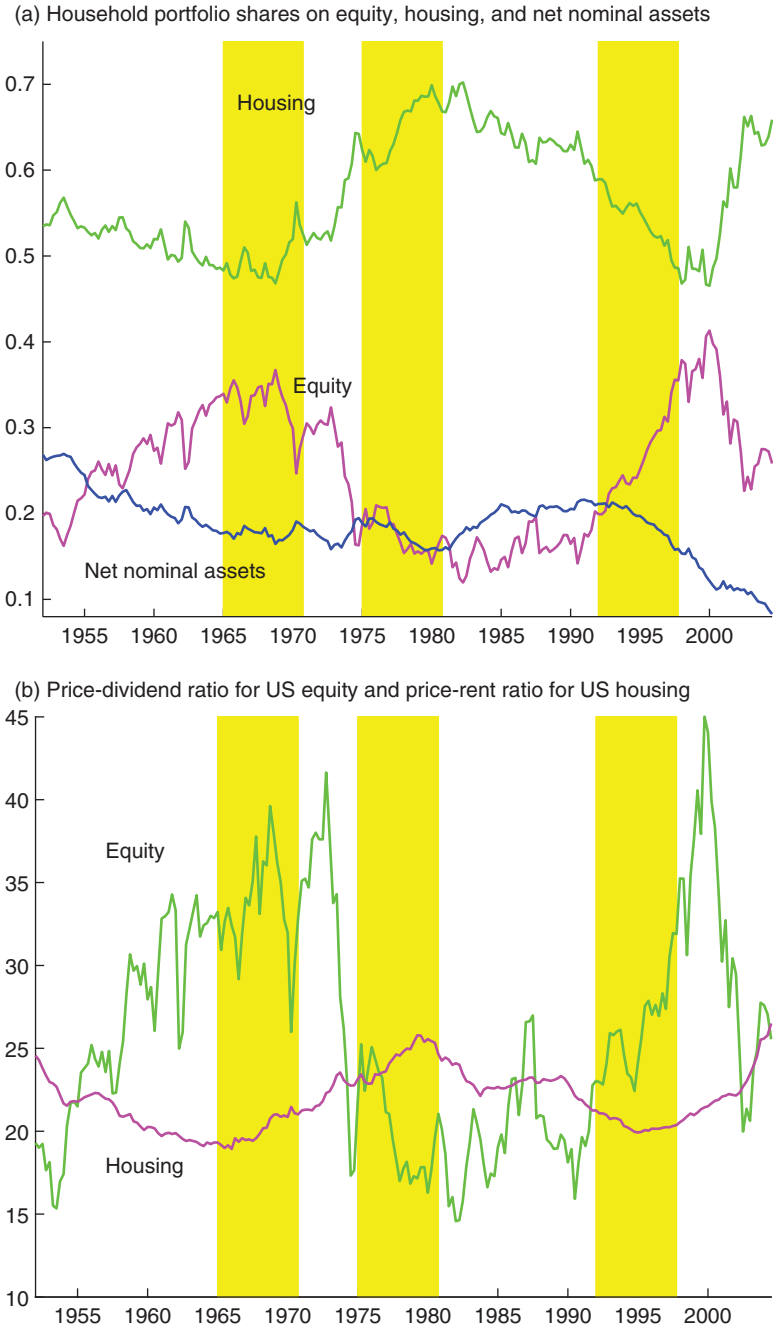

FIGURE 14.2. Household Portfolios and Ratios of Asset Prices to Fundamental Values

Source: Financial Accounts, Board of Governors of the Federal Reserve System.

an owner-occupied house—are not taxed. All these features of the tax code matter more in times of high inflation because mortgage rates, capital gains on housing, and rents are higher.

A second reason behind the portfolio shift toward housing was strong disagreement about inflation among households. Based on data from the Michigan Surveys of Consumers, we document that younger households had much higher inflation expectations than older households. While the median 5-year inflation forecast was 6.3%, households aged below thirty-five years were forecasting 10% inflation, while households aged sixty-five years and above were forecasting 5% inflation. Since most house purchases are made by younger households, the average home purchase in the 1970s involved a buyer who believed that real borrowing costs are low. Therefore, those buyers were willing to pay more for housing.

Additionally, an important contributing factor to the massive shift out of equity was high uncertainty during the 1970s. With high energy prices and the Fed not keeping inflation under control, there was much uncertainty about whether businesses would be viable. This uncertainty, together with a tax code that favors housing when inflation is high, can quantitatively account for the shift of household portfolios away from equity toward housing.

BACK TO THE 1970S?

Are we in a time machine on our way back to the 1970s? A quick glance at rising ratios of house prices to rents seems to suggest that the answer to this question may be yes. However, uncertainty in the United States is relatively low at the moment. The public still trusts the Fed to rein in inflation. As a consequence, the ratio of equity values to dividends managed to stay high despite the currently high inflation. That is different from the 1970s.

The big question in the coming weeks will be whether the Fed will lose its reputation as an inflation fighter, especially if there are signs

that inflation pressures may be more persistent. Right now, short-run inflation expectations are elevated, but the public believes the Fed will take us back to 2% inflation over the longer run.

We can see this trust, for example, in break-even inflation, defined as the spread between the interest rate on Treasury bonds and the interest rate on TIPS (which are government bonds that are protected against inflation). Break-even inflation over the next five years is 3.41% and 2.83% over the next ten years, quite low compared with the high inflation rate we are currently witnessing. If inflation expectations over the longer run increase, Treasury bond investors would demand to get paid a higher nominal interest rate by the US government relative to the interest rate on TIPS as a compensation for the lower expected real value of the associated bond payments.

Fighting inflation is not a pleasant task. When former Fed chair Paul Volcker raised interest rates to lower inflation, car dealers sent him coffins containing the keys of unsold cars and farmers protested in front of Federal Reserve Bank buildings.

Many Southern European countries before the introduction of the Euro did not have a top central banker with a reputation like Paul Volcker. As a consequence, inflation in these countries always fluctuated between very high and sky high—an important argument for the creation of the Euro and for the location of the European Central Bank in Frankfurt, Germany. The more time passes and inflation stays as high as it is currently, the more Fed Chair Jerome Powell risks to lose his own reputation to be tough on inflation.

Once that reputation is gone, our time machine will complete its journey and arrive in the 1970s. And that will have us all singing the blues. Let's hope for the best.

GENERAL DISCUSSION

JAMES BULLARD: Thanks, Monika. This is great. I have two questions. Would the Taylor rule that you want to use fit Fed policy in 2017, 2018, 2019? I think it would have prescribed super-high interest rates back then. We seem to get pretty good outcomes there, so I'm not sure we want to take that particular version of the Taylor rule. In fact, I showed a different Taylor rule earlier.

The other question is on the shares. It seems like you have a closed-economy model. They switch between equities, housing, and other assets. Is that really the way to think of it? US equities are the value of the US corporate sector globally, and I'm not sure you'd get a repeat of the seventies—given the much more open economy today, with free capital flows across borders and so on. So it's not so clear to me that I would come to quite the same conclusion that you did here. Also, on the housing side, if people really think that housing is a great hedge against inflation, you've got real estate investment trusts and other things that can enable even foreign investors to invest in the US housing sector.

MONIKA PIAZZESI: Yes, thank you. The question about the Taylor rule is well taken. If you take other Taylor rules, other types of policy rules, you'll get results that may look closer to what nominal rates are now. The way I'm thinking about this is that the Fed was sort of going through a period in which it basically was working off a reputation that was built up over many decades. And I would think that interest rates have been low for a while now, maybe too low. And now that we're having this inflation, if the Fed doesn't respond strongly now, the Fed is revealing its type of being a central bank that does not strongly fight inflation. And the question about, are we going to see this shift out of equity into housing again? An interesting fact is if you look at international plots—I didn't talk about this, but the shift out of equity into housing is not just in the US but internationally. In the seventies, this was

a global phenomenon. If you look at all industrialized countries, they all had a housing boom. If you compute—I have a different paper that looks at this for all industrialized countries, and all these stock prices collapsed while housing increased massively. There was a housing boom in all European countries, for example. Everybody who experienced an oil price shock in the seventies and then had a lot of inflation was experiencing this phenomenon. Back then, all economies were pretty much closed. A good question is, how would this play out now? But I would think at least that the mechanism that housing hedges inflation because rents will always increase with inflation—the rental value of these houses will always increase with inflation. That is a protection that just housing gives you and not equity.

KRISHNA GUHA: Thanks. Krishna Guha. So two questions if I may. So first of all, I very strongly agree with your proposal here that we need a stabilizing Taylor principle, if you like, in the face of these inflation shocks. The question is whether that Taylor principle should be applied only to the point—today's federal funds rate—or to the path. So since the beginning of this year, the 10-year breakeven that you described has moved up 50 basis points. The 10-year yield has moved up 100 basis points. So arguably, the Fed's communications around the path of policy, combined with the market's expectations formation, is actually performing the function of a stabilizing Taylor-type principle. And so my question is, would you concur with that, and if not, why not?

Second thing has to do with the equities in a period of high inflation. So there's a Modigliani paper, I'm trying to remember which one it is. Modigliani-Cohn maybe?

PIAZZESI: Cohn, yes.

GUHA: Yeah, which essentially argues that the weakness in equities during the period of high inflation was a nominal illusion, and that the recovery of equity value in the later eighties and in the nineties,

was essentially catch-up to what always had been the fair-value pricing of the equities. So do you agree with that or not?

PIAZZESI: Great question. Should we be looking at the path? I tend to think that we should look at many different policy rules. As Jim was saying, we need to consider a variety of rules, and then study what these policy rules would prescribe for policy and whether incorporating the path will matter. That is very interesting. The fact that in a period with high growth, real interest rates are negative and nominal interest rates are still close to zero while inflation is so high, that tells me that right now, we're not using the right policy rule. Of the many, I feel this is not the right one.

It's a great question to ask, what's the reason why equity is declining in times of high inflation. Modigliani-Cohn say that investors confuse nominal and real rates in times of high inflation. Therefore, they discount future dividends with high nominal rates, while they should be discounting future dividends with real rates, which are much lower in times of high inflation. I don't think that confusion is really needed to explain low equity valuations in the 1970s. Having said that, I believe that right now consumers are likely to be confused about nominal and real rates, because we have been in such a low-inflation environment for a long time. US households have lost their ability to process inflation. Because if you look at households in Argentina, they're very smart about how they're going about computing nominal and real rates, that's second nature to them. While in the US, households are not used to that anymore. Sometimes I'm having a hard time explaining the real rate to undergraduate students. They ask me, Why is it so important to look at real rates? So while people learn the difference between nominal and real when there is inflation, right now, after a long time of low inflation, they may no longer know the difference. Arvind?

ARVIND KRISHNAMURTHY: Monika, your housing point is both provocative and timely. And I'm going to ask you to comment on a couple of things.

We learned from the last crisis that the structure of the mortgage market, liquidity constraints, payment-to-income matter for housing market equilibrium. So, if I apply that lesson to the world currently, with market mortgage rates rising from 2.5 to 5.5 or 6%, that implies a substantial increase in mortgage payments, with income not catching up until inflation happens over time. So how does that fit with your observation regarding housing prices in the seventies? And, you mentioned international evidence. We have different mortgage markets and contracts in different countries. Does that help to understand what happened to housing markets in the '70s across different countries?

PIAZZESI: That's a great question. The US housing market is special in the sense that there are so many different ways in which the US government is subsidizing housing. There is the mortgage-interest tax deductibility, that's a bigger subsidy when the nominal interest rate is higher, even in real terms. If you're a US household, and you're thinking about buying a house, the high nominal interest rate is actually not that bad, because you get to deduct it from your taxes. The other feature that plays into this sort of thing is that housing is a nice asset during times of high inflation because capital gains on housing are basically tax sheltered. There's a high limit on when you actually start paying capital gains taxes when you sell your house, and that is also present in many other countries. While the tax subsidy for mortgages is not there for all countries, the tax advantage of capital gains on housing is there in many countries. And the fact that your rental equivalent as an owner is not taxed, that you're consuming the dividend on housing—you live in your house—and that is not taxed. That is another reason why in high inflation times housing is attractive as an asset. In other words, the tax

code in many different countries makes housing more attractive in a period of high inflation.

AXEL MERK: Hi, I'm Axel. You mentioned confidence in the Fed, and I'd like to float a question at you how you measure that. And as food for thought, we talk about the 10-year breakeven rate, and I'm all but certain that nobody in this room knows what the inflation rate is going to be over the next ten years. And to me the breakeven rate is just that, it's a measure of how confident the market is to be able to contain inflation. But how does one disentangle that from the rate path that's already been announced versus the confidence? Because at the core, if we have a problem in the market, and we trust the Fed to take care of it, well, all will be fine. But if, as you point out, the market loses confidence, it's not. So how do you draw that distinction?

PIAZZESI: That's a great question. So here, basically, if you look at this graph, this is the breakeven inflation rate up until the start of TIPS trading. TIPS haven't been around and liquid for so long, which is why this is a relatively short data sample, it starts in 2004. This is from the St. Louis Fed database. If you look at it and 2%, it's not very often that breakeven inflation goes very high. What makes me worry is that breakeven inflation has recently been increasing and right now is at almost 3% for a longer horizon. That's where I see a loss in confidence. If everything was totally under control, if the Fed was completely in charge and households would trust the Fed, I think we should be seeing a 3% breakeven inflation plus or minus some small fluctuations, but basically 2%. Here, we're seeing a lot more.

DAVID PAPELL: David Papell, University of Houston. I'm not convinced that you should be apologetic for using Rich Clarida's rule for just before COVID. I'm looking on my phone at the *Monetary Policy Report* for 2021, and Rich's rule, which is basically the balanced approach shortfalls rule, inertial and noninertial makes no difference here, is about equal to the federal

funds rate by the beginning of 2019 and stays that way through 2019. And even in 2017 and 2018, it's closer to the federal funds rate than the Taylor rule or the balanced approach rule. So I don't think you should be apologizing for it.

PIAZZESI: I don't want to look like I'm apologizing. I'm using Richard's rule because I think it's terrific, and I'm also applauding him as a policy maker who helps us actually think about this phenomenon. The fact that policy makers explain to the public what kind of rule we should be looking at, I think it tells you everything about the US.