Transcript
FedTalk: Inflation 101
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Presentation

Moderator: Guhan Venkatu, Group Vice President, Research Department, Federal Reserve Bank of Cleveland
Panelists: Robert Rich, Senior Economic and Policy Advisor and Director of the Center for Inflation Research, Federal Reserve Bank of Cleveland
Opening remarks: Guhan Venkatu

Guhan Venkatu: Good afternoon and welcome to this edition of FedTalk, the Cleveland Fed speaker series designed to make the work of our researchers, analysts, and experts more available and accessible to the public we serve. My name is Guhan Venkatu. I'm a vice president here in our Research Department. I'm thrilled to be able to moderate today's program, which will focus on the very timely topic of inflation. In a moment, my esteemed colleague Robert Rich will walk us through the basics of inflation and inflation measurement, and then we will take your questions.

Dr. Rich is a senior economic and policy analyst here with the Bank and the director of our Center for Inflation Research. Before we begin today's program, a few housekeeping items.

In case the WebEx event fails for any reason, please use the dial-in info provided in the event invitation. Your microphone will be muted throughout this session to minimize distractions. To ask a question when we come to that point in the program, please click anywhere on the screen and a menu will appear at the bottom. Click on the chat bubble, the third from the right, to open a white panel which will appear to the right of your screen. Type your question into the open chat field, hit enter, and your question will be visible to me and all others viewing this event. I think those instructions may be the most complicated part of today's program. So without further ado, I'm going to turn the podium over to Rob. Dr. Rich, over to you.

Robert Rich: Thank you, Guhan. Let me begin by saying that I'd like to express my appreciation to the audience for the opportunity to discuss the topic of inflation today. For my presentation today, the usual disclaimer applies, which is that the views expressed herein are solely my own and do not necessarily reflect the official views of the Federal Reserve Bank of Cleveland or the Federal Reserve System. So my presentation today is going to consist of four parts. In the first part, I'm going to address the question of exactly what is inflation. Second part, how do we measure inflation. And for that, I'm going to focus on two of the more popular measures of consumer price inflation, those based on the consumer price index or the CPI and

the inflation measure based on the personal consumption expenditures or PCE price index. And I'll talk a little bit about how they compare with each other.

The third part of the presentation will then focus on the key factors influencing inflation. That is, what are the key determinants? Then, I'll end today's presentation by examining the Federal Reserve's dual mandate to see how inflation fits into the objectives.

So I think a good starting point is simply to go and begin with a definition of inflation. The question is, what is inflation? And I think a very conventional definition for it says that inflation is a sustained increase in the general price level of goods and services in an economy over time.

You'll see that in that definition, I've actually underlined two parts of it. One part is the idea of a general price level, and what this is really getting at is the idea that when we think about inflation, we should be thinking about the prices of many goods and services, not necessarily just a few items—rather, thinking about the broad number of goods and services that happen to be in the economy. The other word that I've underlined here is sustained. So the idea here for inflation is we're not just talking about one-time increases, but rather, we're talking about increases that are going to be recurrent and ongoing. So again, in thinking about inflation, we want to think about the idea that for inflation, we're thinking about a broad measure of goods and services in the economy, and whose prices are continuing to go on increasing over time, on a sustained basis.

This gets to the two sub-bullet points that I have here. The first is that inflation really should not be associated with the price of a single item moving higher. Now, while it may be very noticeable to us when something like gas or food or some other item goes up, again, the price of a single item going up is really not what we mean when we're thinking about inflation. Rather that second sub-bullet, [that] inflation be associated with the prices of many items moving higher, and again, continuing to rise, that's what we really mean when we're talking about inflation.

Let's now move on to the question of how do we measure inflation. The way we measure inflation really starts with government's statistical agencies. They're going to go out, they're going to gather information on the prices of goods and services, and then they're going to put them together and combine them to produce what's called a price index. What that price index does is it reports the cost of buying a market basket for a relevant group.

Now importantly, there are lots of different price indexes, and while we may be familiar with some more than others, it's important to understand that again, within the sector of the economy, there are lots of different price indices. So there are prices for items bought by households. I'll talk a little bit about that shortly. But there are also prices for items that are bought by firms. There are prices for goods, there are prices for services, and prices for imports and exports. These price indices can be constructed for a wide range of different types of prices that are in the

economy. Now the question is how do we actually measure inflation? Very importantly, a price index is not a measure of inflation.

Rather, inflation is measured as the growth or the percentage change in a price index over a particular time period of interest. Now that time period can vary. It could be as short as say, a month or it could be a quarter, or it could be a year, or perhaps even longer. Again, when we're talking about inflation, we're talking about some sort of growth or percentage change in a particular price index.

What I'd like to do now is focus on two of the more popular measures of consumer price inflation, and these may very well be measures that you're already familiar with. For households, there are two primary price indexes. The first is the consumer price index or CPI, and that's actually produced by the governmental agency, the Bureau of Labor Statistics.

There's also the personal consumption expenditures or PCE price index and that's produced by a different governmental agency, the Bureau of Economic Analysis. Now, what is it that both of these price indices are trying to do? Well, they're designed to measure the cost of spending on goods and services by households. These are in fact, measures of household inflation. As I had stated in the previous slide, CPI or PCE price inflation then would be calculated as the growth or the percentage change in the CPI or the PCE price index between two time periods of interest. What I like to do now is spend a little bit of time talking about the CPI and the PCE price index, comparing them and contrasting them.

Both the CPI and the PCE price index generally provide similar inflation readings, and you'll see that in the next chart that I'm going to present. But there are, in fact, differences between them. I want to spend a little bit of time discussing what these differences happen to be. One difference between the CPI and the PCE price index is that the items—or what's referred to sometimes as the scope—and the related quantities—or what are sometimes referred to as the weights—that comprise the market basket for the CPI and the PCE price index are not identical. In fact, the PCE price index has a broader coverage, because it includes spending on goods and services made directly by or on behalf of households.

So let me just take a moment here to differentiate between them. The CPI price index is going to essentially measure spending on goods and services made directly by households, whereas the PCE price index is going to essentially include spending on goods and services made directly by or on behalf of households. So how can I differentiate between the two of these? Well, perhaps the best way to do that is to think about healthcare expenses. If you have a deductible or a copay, that's a direct out-of-pocket expense. That's something that would be in both the CPI and the

PCE price index. Any sort of third-party payment, for example, a payment for healthcare expense by Medicaid, Medicare, the VA, or any private insurance agency, that will go into the PCE price index but will not go into the CPI.

So that's one important area where they are going to differ and again, this gets to the idea that for the PCE price index, it's what you're consuming, irrespective of who's paying for it. Now, there are some other differences between the two indexes. The market basket for the PCE price index is updated more frequently, OK, and there are differences in the sources for the prices of some items, too. So again, these are the three major differences between these price indexes, the items, related quantities, the market basket being updated more frequently, and differences in the sources for the prices.

Now, one important implication of the market basket for the PCE price index being updated more frequently is it's going to be able to better capture substitution effects on the part of consumers. What does that mean? Well, as a consumer, if the price of an item goes up relative to other items, I'm going to tend to try to substitute away from that item toward the relatively cheaper items. In the CPI, because the market basket isn't updated as frequently, in spite of the price of this particular item going up relative to others, it's still going to maintain the same quantity. So it's going to tend to overstate really what the cost of spending is going to be; it's not going to be able to capture those substitution effects.

OK, so here's the first slide today. And what I put up here is a picture of CPI inflation and PCE inflation. These are being computed on a 12-month percentage change basis. This starts from 1970 through the present time period. The PCE inflation series is red, the CPI inflation series is in blue.

As you can see from this, in fact, all of these considerations lead to the fact that CPI inflation tends to be higher than PCE inflation. What's also noticeable—and I'll come back to this—is the very different behavior of inflation since the 1970s. So we can see looking at this picture, sort of the very high-inflation episode, the decade of the 1970s. Then we see the Volcker disinflation during the early part of the 1980s, and then, essentially, since the 1990s, we've seen a relatively stable…and sort of behavior of inflation in lower-inflation environment. I'll come back and talk a little bit more about this different behavior of inflation since the 1970s in a little bit. Also, in all these pictures, these gray bars denote NBER recessions, so these are just recession episodes that have taken place.

OK, now I want to turn to a discussion about some alternative measures of inflation that you may have heard of. In particular, I want to discuss and contrast the idea of total inflation versus what are referred to as underlying measures of inflation. This actually turns out to be extremely

important in the current environment, in terms of the discussion of what's going on with inflation. As a starting point to differentiate between these two measures, it's important to understand that general price movements in an economy will reflect a mixture of persistent and transitory changes. What's really important for policymakers, as well as everyone else, is to differentiate between these types of price movements for the conduct of monetary policy.

So what goes on here is, and you can see where this is sort of relating to the current environment, is that as a policymaker, if you're observing movements in inflation which you really want to get a sense of, is you understand that some of those movements may not be expected to recur and be persistent. What you'd like to be able to do is differentiate between those movements that are expected to essentially dissipate and then those movements that you expect are going to continue to be sustained. This is very much sort of part of what the discussion is going on today in terms of the inflation outlook. So let me first turn to discussion and give examples of what's meant by a transitory price change.

Essentially, a transitory price change is a change in the price of an item whose magnitude is not expected to recur. It could be a very large or a very small change, for example, in a particular item. So what are some examples of transitory price changes? Well, food prices that could be impacted by a drought or a bumper harvest that might cause a large swing in prices. Again, you wouldn't expect that change to be [on]going and sustained, going forward. Gas prices impacted by a pipeline shutdown. Again, might generate a short-term increase in gas prices, but again, wouldn't be expected to continue going into the future. We could also have commodity prices impacted by shipping disruptions. Again, these are just examples of what are meant by transitory price changes. However, any subcomponent of a price index can fall under the spell of unusual temporary factors.

So I've included some that are very pertinent for today. We know that there's been a very large … or there had been a very large increase in the price of lumber because of the pandemic. There's a shortage of computer chips that is also increasing the price of computer chips. We certainly know that the prices of used cars have gone up somewhat dramatically. But again, as I will try to argue, these large increases are not those that would necessarily be thought of as sort of going to be sustained going forward.

OK, so what exactly are measures of underlying inflation? What are they trying to do and what are some well-known measures that you might be familiar with? So as I hinted at in the previous slide, what these measures are trying to do really is to go in and essentially remove transitory price changes from inflation, and essentially produce a gauge of what's referred to sometimes as underlying or trend inflation. Another way of saying this is these measures are essentially trying to go in, they're trying to remove the noise from inflation readings to get at the signal, OK—that part of inflation that is expected to be sort of ongoing and persistent going forward. And very importantly, the design of these measures of underlying inflation, they're intended to signal

where inflation is heading. These measures of underlying inflation are a way of looking at a current inflation reading and looking at it and getting a sense of where inflation is heading. In other words, what part of current inflation we would expect to sort of persist and recur going forward.

Now, as far as some of the measures that you might be familiar with, core inflation, which is the measure that excludes food and energy prices, is probably the most familiar measure. But there happen to be some other measures of underlying inflation that you might be familiar with. In fact, the Cleveland Fed produces two other well-known measures of underlying inflation. Something called the trimmed-mean CPI inflation and median CPI inflation. So what does the trimmed mean do? Well, the trimmed mean is going to go in, and it's going to actually remove some very small and large price changes—in fact, the lower 8 percent and upper 8 percent from the inflation readings. Then there's also the median, which is actually going to remove all the price changes except for the one in the middle.

Now, what is it exactly that differentiates the core—or the "ex-food and energy"—measure from these other measures, such as the trimmed mean and the median CPI? Very importantly, what differentiates them is where the source of the transitory movements in inflation are located. The core inflation, which throws out or excludes food and energy prices, assumes that the bulk of the transitory movements in inflation are associated with food and energy prices. So essentially, it views the source for transitory movements in inflation as being identified with particular items—food and energy. On the other hand, the measures of trimmed-mean CPI inflation and median CPI inflation have a different assumption as far as where the transitory movements in inflation happened to be. These measures view the very small and the very large changes in prices as being transitory; that is, those are the price changes that are not expected to persist and to be recurrent going forward.

So again, the difference between the ex-food and energy measure and the trimmed-mean and median CPI is where you assume the transitory movements in inflation are located. Core assumes they're associated with food and energy prices, whereas the trimmed-mean and the median CPI assumes that they're associated with the magnitudes, very small and very large changes.

How do we interpret what these measures of underlying inflation are saying? The first bullet point is sort of the way to think about this. If total inflation is above underlying inflation, then total inflation is expected to move lower toward underlying inflation. Why is that? If total inflation is above underlying inflation, and underlying inflation supposedly has removed the transitory movements in inflation, then what that's saying is that there are in fact ... there are price changes that are temporarily boosting inflation above underlying inflation, but [they] are not expected to last.

But if these price changes are not expected to last, they're going to dissipate, which means headline inflation then should move down toward the underlying measure of inflation. The same thing would then hold true if it turns out that headline inflation is below underlying inflation. That's just suggesting that there are current price changes that are transitory, that are currently pushing down headline inflation, but they're expected to dissipate and that will move ... they will dissipate, and so headline [will] move back up toward underlying inflation.

Now the last bullet point on this—I think it's an extremely important point. I do want to spend a little bit of time talking about it because I think it's somewhat overlooked, and it does potentially result in a bit of a misunderstanding. You probably have very often heard policymakers talking about either core inflation or trimmed-mean or median inflation. And talking about looking at these measures that exclude price changes. What's very important to understand about measures of underlying inflation is that they should be interpreted as a means to an end. And by that, what I'm trying to suggest is policymakers, when they focus on an inflation measure that excludes certain price changes, that doesn't imply a lack of concern or interest about the cost of these items.

When policymakers refer to measures of underlying inflation, and sort of look at measures that exclude prices, it's not that they don't care about them, but rather they're looking at these because they're giving them a better indication of where, in fact, overall inflation is going to be down the road. So again, it's that second part which is very important—a means to an end. I look at certain alternative measures of inflation because they serve as a better guide to me on where headline inflation is going to be down the road. Again, headline inflation is, in fact, the objective for most central banks.

So here, I put up my second slide, and what I wanted to do is now show the behavior of CPI inflation and core CPI inflation. In particular, what I'd like to do is draw your attention to the following. I want you to imagine putting a vertical line up around 1990. Then, look at the behavior of CPI inflation and core CPI inflation to the left of that line, and then core and CPI inflation to the right.

As we look at this, what I'm going to suggest to you is that there has been a noticeable change in the relationship between headline and core inflation that's taken place since around the 1990s. If you look on the left side of that line, what you'll notice is it looks like CPI inflation is moving up, and core CPI inflation is following it. Then as CPI inflation is moving down, core CPI inflation is following it down, again, from the time period the '70s to the early '90s. But then if you look at the time period after 1990, what you actually see is, while there still are these episodes where sort of headline inflation is moving up and down, you don't see core inflation tracking it as closely. What I'll do is come back in a few slides and provide an explanation, or at least offer of explanation as to why that is the case. The key takeaway from this should be that in

fact, core inflation has been less volatile since the 1990s, but more importantly, you don't see core and headline moving in tandem as much as you did, sort of in the episode from the 1970s to the beginning of the 1990s.

Returning back to these different inflation measures, underlying inflation measures, the key takeaways, while there are differences between them, they typically tend to move together. So what I have here—again on a 12-month percentage change—is core CPI inflation, trimmed-mean CPI inflation, median CPI inflation. Yes, there are some deviations with them over different episodes, but in general, these measures tend to move together.

OK, what I'd like to do now is turn to the third part of my presentation and talk about the determinants or the key factors influencing the inflation process. In terms of describing that, I'm going to describe them in terms of three main factors. Inflation is influenced by inflation expectations, excess demand or slack in resource utilization, and then supply shocks. One key point I'd like to make about this is that when we're discussing movements in inflation, regardless of whether it's in the past, present, or future, these factors need to be just considered in conjunction rather than in isolation. So oftentimes, people will only focus on a particular component or determinant here. In thinking about where inflation is heading, I would suggest that all three are important and you need to think about all three to think about where you think inflation either has been, where it currently is, or where it will be going forward.

Let me now turn to the first component or determinant, inflation expectations. Economic decisions not only depend on past and current events, but also what is expected to happen in the future. So, this notion of forward-looking behavior being an important determinant for economic and financial decision-making is a very important development that's taking place. In particular, the idea here is simply that when I'm making decisions, I have very much a forward-looking aspect associated with that. Now, what's important about this, and we'll see this in a couple slides, is that actions based on expected inflation will influence current inflation. I suggest that this sort of reflects a self-fulfilling aspect.

Just as a simple example, suppose I suddenly for some reason think inflation is going to be 5 percent. But then everyone else suddenly thinks inflation is going to be 5 percent. Suppose we undertake actions thinking that inflation is going to be 5 percent. Then we will then, in fact, see inflation rising and perhaps moving closer toward 5 percent. That's this idea of a self-fulfilling aspect. In terms of the parts of expected inflation that are important, it's really long-run inflation expectations that are viewed as being the key determinant for movements in inflation. I've suggested here two aspects of that. Expected inflation over the long run is important for the setting of wage and price contracts and borrowing and lending decisions. So when we think about inflation expectations, we really want to think about movements in longer-term, or long-run inflation expectations as being important for influencing movements in inflation.

Now, I would like to go in and return to that previous slide I had, and what I've done here is I still have total CPI and core CPI. But what I've done now is essentially added a third series to the chart, and that third series is the 10-year CPI expectations taken by the Survey of Professional Forecasters, which is a survey conducted by the Federal Reserve Bank of Philadelphia. What I hope you can see from this is … in fact, I'm going to suggest that one of the reasons for that changed behavior and relationship between total CPI and core CPI inflation is in fact the behavior inflation expectations. So notice that, starting in the early 1970s, notice how long-term inflation expectations began to rise. But at the same time, notice then that as headline inflation was going up, core inflation seemed to follow it up also.

Then as we moved into the Volcker disinflation, and we observed long-run inflation expectations moving down, notice also that both headline and core tended to move down. Now let's think about the behavior of core and headline and 10-year CPI expectations in the post-90s period. Notice, first of all, how much more stable or steady long-term inflation expectations have been in the post-1990 period. Moreover, look at how the red line—core CPI inflation—has now also become much more steady; and then notice also, too, that while we now observe deviations of headline inflation from core, notice that in fact we don't see core moving up. So this goes to the very important point that very steady expectations, or what are sometimes referred to as anchored expectations, can really help stabilize inflation.

Yes, we do observe some deviations of headline inflation from core, but notice that with very steady inflation expectations, you now have headline almost moving around core; it's almost as if core is now acting as the stabilizing agent, which itself seems to be dependent upon the steady inflation expectations. So for that previous picture, notice now that if people expect inflation to be much lower, even if the economy gets hit with some sort of shock that causes inflation to go up or down relative to their expectations, if they don't expect that to continue, then in fact we observe then that core inflation tends to be very steady, and that headline inflation then tends to move back and cycle around that.

A second element now to explain the behavior of inflation are resource utilization conditions. I need to take a little bit of time to explain this. What's meant by resource utilization conditions is essentially a gauge of demand pressures relative to what I'll call full employment in the economy. Now full employment is a bit of a misnomer. Full employment does not mean an unemployment rate that's equal to zero. What I'm going to suggest, in fact, is that there are two types of unemployment that will be in existence in most any type of economy that will generate positive unemployment, in spite of the fact that it might be associated with full employment.

The first type of unemployment I want to turn to is what's called turnover unemployment. This has frictional causes associated with it. The basic story for turnover unemployment is simply the following. In the labor market, you have workers and firms that are trying to match, and you're trying to get the best possible match possible between workers and firms. That takes time. For

example, workers will not necessarily always take the first wage offer that they receive from a particular firm. Likewise, firms are not always going to necessarily make a wage offer to the first applicant that they happen to see. So this idea that it may take time to find a good match between workers and firms is what's meant by turnover unemployment. In fact, this type of unemployment actually has benefits to it. In an economy, you want the best matching between workers and firms, and if that takes time, then it's sort of worth it to have that time take place. So that will generate some positive level of unemployment as workers and firms try to get the best matches.

Now, there's a second type of unemployment, which is called mismatch unemployment. This is more problematic, and this has much more structural causes associated with it. This mismatch unemployment has to do with the mismatch of skills. OK. Where does this mismatch of skills originate from? OK, well, one reason or source for this mismatch of skills between workers and firms is simply the idea that there's a changing mix of sectors in the economy. You have some sectors of the economy that happen to be expanding. You have some sectors of the economy that happen to be declining. Labor in a declining industry cannot necessarily quickly transition into a sector or an industry that happens to be expanding because they don't have the right set of skills. So that type of mismatch will generate some unemployment.

Even if some workers have the skills that are desired, there can also be a locational consideration. That is to say, the workers with the skills that are needed simply aren't in the right location. So, mismatch unemployment is the second source, and it comes from the fact that there are these structural causes.

Now, turnover unemployment and mismatch unemployment essentially are associated with a concept called the natural rate of unemployment. That is to say, this is going to essentially be the level of unemployment that will exist given the amount of turnover and mismatch unemployment in the particular economy. And I'll explain why the natural rate of unemployment is important in just a moment. Natural unemployment is not observable. It has to be estimated using statistical models and it, in fact, can vary over time.

So the amount of turnover unemployment and mismatch unemployment in the economy can vary over time. Importantly, the types of factors or influences on it do not come from monetary policy. Fiscal policy, for example, can influence the natural rate of unemployment. There are other factors like education and schooling that can influence it, too, but monetary policy cannot necessarily impact the natural rate of unemployment.

Now, how do we interpret all of this in terms of how resource utilization conditions impact inflation? When unemployment is above the natural rate, there is slack in the labor market and then there would be downward pressure on inflation. Likewise, if unemployment is below the natural rate, there's tightness in the labor market and upward pressure on inflation.

This is what's referred to then as the third type of unemployment, cyclical unemployment. So here's my graph, and what I plotted here is in the US, the unemployment rate, and then what I plotted in blue here is the CBO's [Congressional Budget Office] estimate of the natural rate of unemployment. Notice the natural rate of unemployment can vary over time, but it does so in a very slowly evolving process, because, again, those turnover unemployment and mismatch unemployment, it takes time to sort of work those out. What's important then to understand is in terms of the impact of the labor market or resource utilization of inflation, when I have the unemployment rate above the natural rate, this would be a condition of slack in the economy where I would, in fact, expect there to be downward pressure on inflation.

Likewise, if I'm in an episode where the unemployment rate is below the natural rate, then I would tend to think of that as being a condition of tight labor markets where there would be upward pressure on inflation. Now, what's important to understand again is the blue line is an estimate. So when you look at the unemployment rate, you sort of have to, in your mind, think about where the natural rate of unemployment is in order to gauge whether there's tight or slack labor market conditions. So it's important then to think about the red line relative to the blue line to make that determination.

OK, the third element that's important for thinking about the impact on inflation—the inflation process—are what are called supply shocks. These are basically trying to capture the impact of external factors on inflation that typically are going to enter through import and in food and energy prices. So inflation can also be influenced through sharp changes in business conditions. Again, these supply shocks, which typically are sort of external to the economy, can be adverse or beneficial. So even though you hear the word supply shock, not all supply shocks are necessarily bad; there can be beneficial supply shocks. But they typically are associated with external events and typically will impact inflation through import prices or food and energy prices. Certainly in the current environment, we can think of other sources for these supply shocks that are very close. For example, the current supply-chain disruptions and bottlenecks can also generate supply-side price pressures. So this is very much part of what is in the narrative right now in terms of what's going on with inflation. The idea right now that supply-chain disruptions and bottlenecks are generating inflationary pressures right now.

My final point and discussion for today is now I want to turn to essentially the question of policy and bring in the policymaking aspect on inflation. I'd like to start off by talking about the statutory basis for the conduct of monetary policy. For the US and almost any other country, the central bank has defined objectives established by the government. In the case of the Federal Reserve, these objectives were specified originally in the Federal Reserve Act of 1913. However, in 1977, these objectives were clarified by an amendment to the Federal Reserve Act.

In particular, to quote from that, the Federal Reserve was essentially mandated to effectively promote the goals of maximum employment, stable prices, and moderate long-term interest rates.

You see that I've underlined maximum employment and stable prices. So the aforementioned goals of maximum employment and stable prices are often called the dual mandate. Now, maximum employment and stable prices sounds very good, but one question is what do they mean and how should we think about these objectives? Before I try to define them, what's very important to understand is that within the dual mandate, the objectives of maximum employment and stable prices were in fact mandated to the Federal Reserve by the government. So our goals are not our own. They, in fact, have been mandated to us.

We are, however, independent in terms of how we try to achieve those particular goals. So maximum or sustainable employment, what does it mean? How should we think about it? What influences it? As I've suggested here, long-run employment and output are determined by factors like population growth, technological progress, preferences for saving, risk, and work effort. But in the long run, employment and output are not determined by monetary policy. In the short run, the economy goes through business cycles. Output and employment fluctuate above or below on these long-run levels. So think back to that picture of the unemployment rate cycling around the natural rate of unemployment. Those cyclings are associated with the business cycle. Monetary policy can help smooth these fluctuations and thus stabilize the economy.

So monetary policy can affect employment but in the short run. Let's turn to the objective of price stability. What do we mean when we talk about price stability? It's an environment in which inflation is so low and stable over time that it does not materially enter into the decisions of households and firms. So this is a definition of price stability that was given by Alan Greenspan. Now, importantly, prices act as the key mechanism for allocating resources efficiently through the economy. So price stability does not mean prices don't or shouldn't change. In fact, changing prices is very, very important because prices act as a signal for how you allocate resources in the economy. High inflation or deflation can then impair this mechanism.

OK, so price stability means we have a positive inflation rate. As we'll see shortly, we have a particular number of numerical value associated with it. In fact, that's going to be sort of thought of as being associated with price stability. In contrast to output and unemployment in the long run, the central bank has primary influence over the long-run behavior of the general price level.

OK, I'm now going to finish up by talking about a very important part of Fed policy that was associated with the longer-run goals and policy strategy statement. This was part of the Federal Open Market Committee's, or the FOMC's, emphasis on improved communication and enhanced transparency. This was initially released by the FOMC in January of 2012.

What was its purpose? It provided an updated interpretation of the dual mandate. It reiterated the commitment to objectives of maximum employment and price stability, but very importantly now, it assigned a particular numerical value and a particular price index that was going to be the goal of price stability. That was, that there was now stated an explicit goal of 2 percent PCE price inflation. This 2 percent came about as part of the 2012 longer-run goals and policy strategy statement issued by the FOMC. That statement, however, was very recently amended. In fact, in August of last year. The FOMC released an updated statement on August 27 of last year. And what was it that the statement was trying to do? The statement described how the FOMC was adopting new approaches to its inflation and employment objectives.

It was now shifting to something called a flexible average inflation targeting regime. So the goal now is to still achieve an inflation target of 2 percent, but to only do it on average over time. So the idea here is that if in fact headline inflation has been running below the 2 percent objective, as it had been doing most of the time since 2012, the FOMC was going to be willing to let inflation run above 2 percent to kind of make up for those misses. In terms of the impact, in terms of maximum employment, the FOMC stated that they will base their decisions on shortfalls but not necessarily deviations of employment from its maximum level. Essentially, what this was saying was that monetary policy will not respond to unemployment falling below the natural rate unless there is an increase in inflation to unwelcome levels.

So with that, I'm going to conclude my presentation but by doing so offer a bit of advertisement. If you're not aware of it, there's the Center for Inflation Research, which is here at the Federal Reserve Bank of Cleveland. It was launched in December of 2018, and it's focused on improving the understanding of inflation and its dynamics. Our goal is to enhance external communications, as well as to provide expanded research and data offerings. Our website that we have is actually targeted to the public, policymakers, and researchers. So please visit our website, the Center for Inflation Research. Please subscribe for updates. Here's the web link for that. And with that, I'm going to conclude my presentation. Thank you very much.

Q&A

Guhan Venkatu: Thank you, Rob, for that excellent presentation. We've got about 20 minutes left for questions. I'd encourage our audience to post them in the chat. I've got one to start with, actually. You mentioned the adoption of a numerical target or the fact that that's a relatively recent development. So I wanted to ask you, is there any magic to the 2 percent target that we and other central banks—I think there's news out of ECB on this relatively recently—is there any magic to that particular number? Could it be 3 percent, 4 percent, 5 percent? Why have we settled on that?

Robert Rich: So, Guhan, that's a great question, and let me then begin by explaining how that 2 percent was arrived at. So we didn't want that numerical target to be too low because if it was lower than, say, 2 percent and the economy got hit with a bad shock, that could potentially push the inflation rate down below zero, generate deflation, which is actually a decline in the price level, and deflation is an extremely problematic condition for the economy. Deflation has with it a lot of problems and can be a very difficult situation for the economy. So part of it was to sort of choose something that was sort of away from zero, OK, 2 percent. On the other hand, you're right, I mean, why not say 4 or 5 percent if, in fact, it turns out that could be stable. One drawback of a higher rate of inflation is that there's some narratives that suggest that higher rates of inflation are associated with higher uncertainty, OK? That higher uncertainty, it can sort of impact the economy, and uncertainty is not a good thing.

Even if we were to assume for the moment 4 percent, and it's perfectly predictable, there still would be a cost of inflation that would be born on the economy. Let me just outline what a few of those costs might be. There is something called menu costs. If you now have prices and inflation at 4 percent, there are going to be firms that are going to ... restaurants that have to sort of print menus and absorb resources to sort of, keep up with those higher prices—you can think of catalogs needing to be printed in some sense. So the whole idea that if you're 4 or 5 percent, you might have to expend more resources on literally just printing up and keeping track of those prices in some sense.

Another one is tax implications. The US—I'm sure most people know this—the US tax system is not indexed to inflation. So if you're now at 4 or 5 percent inflation, and you start moving into higher tax brackets, the government doesn't ask whether, in fact, you're earning higher income just to keep up with higher inflation. They just care about the fact of what your nominal income level happens to be. So higher rates of inflation are potentially going to push you into higher tax brackets. This was really a big problem in the '70s, where there was something called tax-bracket creep, I believe, was the phrase for that. So there was bracket creep.

But the last reason why a higher rate of inflation might be problematic is simply think about individuals who are on fixed pensions and don't really have an opportunity to have their income rise. A 4 or 5 percent rate of inflation can really reduce their real, their purchasing power in some sense.

So in some sense, the 2 percent—if I could draw an analogy—is a little bit like Goldilocks. Not too low, not too high, but thought to be just right, or again, it meets sort of that definition of price stability by Alan Greenspan. Again, it gives us some room and some flexibility, but again, keeps us away from zero and moving into deflation, but also not too high, where we sort of have an adverse set of these costs that I just mentioned.

Guhan Venkatu: Excellent. So can I ask you, too, about ... given that the CPI was released—I believe it was yesterday—and there, with the slide, as you can see on the screen right now there's information on the Center for Inflation Research page, on our median CPI, trimmed-mean CPI. So I was hoping you could talk a little bit more through this because one of the things that I saw in the news was a chart from the CEA, the Council of Economic Advisers, showing some of the kind of larger price movements and noting that say, used car prices and some say, I think, travel-related services things, kind of more related to the reopening, that those things are really kind of pushing up prices right now. So you want to caution us against…kind of...some of those movements, which you described as transitory. Can you help us…kind of walk us through that and how this sort of discussion that's taking place now-ish…the limited influence of estimators…can you talk through the trimmed mean and median… can you help us understand that?

Robert Rich: Yes, again, I'd be more than happy to because clearly, this issue right now is really at the center of policy discussions right now. I want to add to your question by also bringing in the idea of inflation expectations because I think that's also very important here. So it is exactly the case that if you do look at sort of the recent high inflation readings over the last three months, there's been a number of factors that sort of have underlined that high inflation reading. There are these base effects, which is just sort of statistical because so many prices fell so much at the beginning of the pandemic. Now, they are kind of rapidly rising, but in some sense they're just trying to catch up to where they were before. So that's part of it, but also because of the pandemic, there are a few items that have been really impacted and whose prices have really risen dramatically.

So for example, you cited used car prices, and there's also home furnishings, and there's new car prices. The point of this is, as a policymaker, OK, those large price changes have taken place, those large price changes that are going into the current inflation readings. But what I need to know as a policymaker—especially since if I change policy, I know the effects of my change probably won't be felt for another year—I need to ask myself, how much of that high inflation reading do I expect to be around a year from now? If for some reason, I was convinced that those high inflation readings were going to persist, then yes, maybe I would think about changing policy to, in fact, undertake something that would cause the inflation rate to slow. But if I don't think that those inflation readings are going to be recurrent and persistent going forward, then I would not necessarily want to change policy because those changes are going to sort of dissipate.

So what's going on right now is, we are seeing a large amount of that rise in inflation being generated by only a few items. In other words, we're not seeing it broad based, in some sense. Those weighted ... the median and the trimmed mean are exactly the kind of measures that are trying to tell us, "Look, don't let the really small price changes and the really large price changes impact where you think inflation is going to be. You want to really focus on those changes that are sort of in the middle of that price-change distribution." That's why, for example, when we see this…we see that when you do take out those really large and small price changes that, for

example, the median and the trimmed mean have been significantly lower than headline, which again is ... the interpretation for that is we're not expecting these high inflation readings to persist going forward. If we're not, then that very well then may help influence how we want to think about policy.

Now, one last thing I'll mention quickly is, I think we all recognize that in some sense these transitory factors have been lasting a little bit longer and have been a little larger than we were expecting. I think that it still is reasonable to believe that those factors are in fact going to dissipate as long as inflation expectations remain stable and steady. So that's why I wanted to bring in that other aspect, which is, if we were to suddenly start seeing inflation expectations rising, then that would perhaps put us on notice that for whatever reason, people or individuals do not anticipate that those changes may in fact, be temporary. And we know that inflation expectations kind of act as this vehicle to essentially cause overall prices to start sort of moving up, much like that picture I showed, sort of what happened during the '70s.

Guhan Venkatu: So that's a very nice place to end because I wanted to tie that back to the targeting that you talked about, which again, is a relatively recent development. So we haven't had a numerical target. You mentioned the reforms in the late 1970s. It's only fairly recently that we've actually articulated a numerical target for inflation. So can you talk about that in the context of expectations?

Robert Rich: Sure. So part of the original ... the statement back in 2012—and let me just kind of go back to this one right here where it was specified as 2 percent—was ... it was recognized, and I think this is a very important development. I think there is now a much greater recognition and understanding of how important expectations happen to be for the inflation process. So in terms of trying to get to this to ... in terms of trying to get to 2 percent, I think it was recognized that really, by trying to get inflation down toward a level that would be consistent, we needed to explicitly state that. So the whole idea of putting 2 percent was to essentially help guide expectations toward that 2 percent to, in fact, then have overall inflation moving toward that. So that 2 percent level was sort of used to sort of ... for two reasons. I mean, one was to, in fact, help guide expectations toward that, hopefully, then moving inflation down to that particular level.

But also by stating the 2 percent level, what we could see is, if we saw expectations deviating from that, we knew that there would potentially be something going on, whether it was a lack of credibility or some sort of concern on the part of individuals in the economy. So that statement for 2 percent was to try to, I think, move away from the vagaries associated with just price stability. Because like I said, it's one of those things that sounds nice, but operationally you need to have something a little bit more to help people. The 2 percent was decided and by explicitly stating it, the idea was to move expectations down. They eventually did. And if you actually then look at sort of headline inflation, you can see it sort of moving down toward that 2 percent goal.

So I think it was all part of a recognition that to meet that particular objective, we need to be a little more explicit in terms of our communication.

Guhan Venkatu: So to maybe ... we talked about this a bit, I mean, to help me and others understand this, is it fair to think of this in terms of sort of ... I think the point that you're making in part is about the importance of communication. So articulating a target helps to do that, in part. There's also, of course, the press conferences that happen after a meeting, various other types of communications, and I think, again, that's all kind of a matter of recognizing the importance of trying to help households kind of understand where the inflation trend is headed and to anchor expectations. I wanted to offer an analogy, and I was wondering whether you could tell us whether you think this is reasonable. Is it similar to say, what you hear on earnings calls where companies are trying to provide guidance about where they think earnings are going, to kind of get their investors away from thinking about quarterly changes in profits, because that sort of volatility might be bad for them, particularly if they think over the longer horizon, because of various sorts of, again, transitory factors, they're really going to get to the profitability target that they sort of had in mind.

Robert Rich: No, I think that's a really good analogy. So I guess the way I would think about it is the following, and we could very much think about the current environment and applying that analogy. So if I'm thinking about a stock price, let me just think about the fact that in my mind, I have some time path for, let's say, dividends, in some sense, right? If I'm on an earnings call, and they suddenly say to me, "Well, look, we're going to have a couple quarters of bad earnings, but we don't anticipate further out that this is going to be ongoing, in some sense." Then what I might do is, I might adjust them for a couple quarters what I think earnings are going to be. But if I ask myself, what's going to be the overall impact on the stock price? It really is going to have a very minimal effect on that because the bulk of those sorts of future expectations haven't really changed in some sense.

I think the analogy here with inflation expectations is somewhat similar, right? What you really want to do is you want to undertake communication. So even if people should change their short-term expectations about what inflation is going to be, you really want to make sure that those expectations over the medium term and longer term are staying where they were, so in fact, everything will be well-anchored and you'll see very little movement in inflation expectations. You might see a little bit of a downward movement, but the bulk of it is going to stay there. The more worrisome condition or the more worrisome scenario, right, in your earnings call is "I don't believe what the firm is saying." I not only change what I think dividends are going to be over the short term, I change them over the medium term and the long term. I observe then that whole stock price is moving down significantly. The same would be true in the case of inflation expectations. If I suddenly have—whether it's businesses or consumers or professional forecasters—revising that entire time path of their expectations, that's a very worrisome sign, right? It's moving away from 2 percent, whether it's being revised up or being revised down. So

that's where, again, the importance then of thinking about expectations, keeping them anchored and steady, but more importantly, observing any deviation of those expectations from that stated goal. Those are all very important sort of considerations to think about, I think.

Guhan Venkatu: So we've got a lot of questions about the experience of the 1970s. And I guess I was wondering, given what you've just been articulating there, how we should think about that episode, given again, what you've just told us?

Robert Rich: Right. That's a great question, and I think that there certainly is a narrative out there that is trying to suggest that somehow, we've returned to the 1970s—hopefully, without the bad music, but I'll put that aside for the moment. I would suggest that what's going on right now is markedly different, I think, than what happened in the 1970s. I'll offer a couple of reasons for that. The first is, I think, from the slide that I showed before, maybe I will just go back and perhaps draw upon this. What I think we now recognize is we have a much greater appreciation of the role of expectations. I think that the lesson learned from the 1970s is, in fact, that when expectations start to become unanchored, you need to move quickly, and you need to basically recognize what the consequence of that is. I think today, drawing upon the experience of the 1970s puts us in a better position.

I think there's a couple of other differences, too. I think in the 1970s, you tended to have stronger labor unions, you had more COLA clauses that were in the economy. All of those could help propagate shocks in some sense, and I think they also contributed on top of the movement of inflation expectations, to sort of seeing these increases recurring and persisting going forward. I think that's very different.

I think the other key difference, too, is I think as policymakers, we've recognized the importance of being much more open in our communications than we were previously in the 1970s. I mean, I think we understand that a well-functioning economy and monetary policy needs to have, as part of it, a communication on the part of policymakers. They want to tell individuals what's going on. They want to share their viewpoints with that. So if I think if you take all together the idea that you've got policy being much more open and communicative, a greater recognition of the role of expectations, and then, in some of those propagation mechanisms like labor unions and COLA clauses, that puts us in a very different environment than we were in the 1970s.

Guhan Venkatu: Excellent. So not a fan of prog rock or disco, is that right, Rob?

Robert Rich: Prog rock, yes. Disco no. Thanks, Guhan for ... I want to be sure that everybody, I'm sure they're happy about that.

Guhan Venkatu: Good to know. Good to know. So I think we've got a couple minutes left. One of the questions in the chat is about the threshold for large price increases—I would assume small, too—that would make us think of those as transitory.

Robert Rich: So I'm sorry. Could you restate the question then?

Guhan Venkatu: Yeah, so you talk again about the trimmed mean, and I think the question here is, what are the thresholds in terms of large or small price increases that we might want to eliminate from the distribution?

Robert Rich: Right. OK. Thank you for clarifying that. In the case of the trimmed-mean CPI inflation, it's a symmetrical trim. It sort of removes the lower 8 percent, and it removes the higher 8 percent. I think that that was based upon some statistical analysis that was done. So you're trimming off…those are the parts. Now, the Dallas Fed has a trimmed mean for PCE inflation, and they have a much, much larger, or stronger trim associated with it. I believe it's something like 24 percent and 31 percent, which if you think about it, is sort of moving you much closer toward that median measure that we happen to be. The Dallas Fed, from what I understand, has made its judgment based essentially on forecasting performance. In other words, they've gone and…tried to go in and sort of retrospectively think about, "Well, what should we have trimmed or how should we think about this trimming for forecast performance?"

So there are differences in the amount of trimming. Our CPI inflation is not trimmed nearly as much as the Dallas Fed's measure in terms of that. But again, the idea is you do want to remove the sort of smaller and larger price changes with the idea that those are not the ones that you expect to be recurring or staying in sort of their current magnitude.

Guhan Venkatu: Excellent. I think we've got time maybe for one last question. We've got a minute left by my clock. So you talked about kind of the recent change to the strategy of the FOMC, or the modification at least. And this pairs on a question that came in through the chat. So what would you attribute the kind of lower ... at least the inflation expectations remaining below, a little bit lower ... I guess inflation performance remaining a little bit low over the last say, expansion.

Robert Rich: So that is a great question, and I think that there still is a lot of work that's being done to try to understand why it was ... if I understand the question, why it was since 2012 that for whatever reason, there was a consistent missing of the 2 percent objective? I mean, why was it the PCE inflation fell below? What I could simply offer very quickly then is one possible explanation was that because 2 percent was viewed as a ceiling, in some sense, that was the maximum value you could get that you would let inflation run. But in case you happen to be in a recession, inflation was going to fall below that. But if you took the average, then you would be averaging something less than 2 percent. And maybe it was, in fact, the inflation expectations

being slightly lower than 2 percent because the 2 percent was viewed as a ceiling, as being a contributing factor to that.

That, I think, in fact, is part of the reason for the adoption of the flexible average inflation targeting regime. They want to take away that idea of 2 percent being the ceiling in some sense, and that by allowing or letting people know that you'll let inflation run above 2 percent to make up for sort of previous shortfalls, maybe that will then boost overall expectations to 2 percent. In other words, you're giving them some room to kind of make up for that and to let inflation run higher.

Guhan Venkatu: Very good. Thank you very much for an excellent presentation and discussion. I want to thank everybody who joined us during the live stream as well and thank you for offering your questions. I believe this program will be available on our website for those who want to watch it after the fact and find out more about Rob's thinking on disco and prog rock, et cetera. Thank you all for joining us. Have a wonderful afternoon.

Robert Rich: Thank you.