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Has the Market's Perception of the FOMC's Reaction Function Changed since the Onset of the COVID-19 Pandemic?

A monetary policy reaction function typically describes how a central bank's policy rate responds to changes in economic fundamentals, such as inflation and labor market conditions, and other factors. We use minute-by-minute data on two-year Treasury yields to study the market-expected monetary policy reaction function from 2004 to 2024. We find that financial markets expected monetary policy to react more aggressively to inflation news during 2022–2024 than in the pre-COVID-19-pandemic period. In addition, we find that the sensitivity of the two-year Treasury yield to economic news other than core inflation and labor market conditions has decreased over time. This time-varying sensitivity to changes in economic fundamentals may reflect an actual change in the FOMC's reaction function, or it may be associated with the fact that market participants became more attentive to inflation news after the pandemic recession period.

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Introduction

The Federal Open Market Committee (FOMC) adjusts the federal funds rate (FFR) in pursuit of its maximum employment and price stability objectives, but less clear is how the FOMC decides how to balance its two objectives when economic circumstances change over time. Economic theory usually posits that the central bank's reaction function should not change over time except in unusual circumstances, such as when the interest rate is constrained by the effective lower bound (ELB) (Walsh, 2017).¹ In practice, however, the FOMC may sometimes put more emphasis on one of its goals. Chair Jerome Powell recently emphasized this point, explaining that while the dual mandates of stable prices and maximum employment are weighed equally under the law, the inflation surge in the period following the pandemic recession of February to April 2020 necessitated a focus on price stability. As inflation moved closer to the desired level, the focus became more balanced.²

In this *Economic Commentary*, we investigate the financial market's perceptions of the FOMC's reaction function from 2004 to 2024. To this end, we measure the response of the two-year Treasury yield in a 30-minute window around the release of key economic data. We find that during all periods when the FFR was not constrained at its effective lower bound (ELB)—the point at which further reductions in the FFR no longer stimulate the economy—including 2004–2008, 2015–2020, and 2022–2024, the two-year Treasury yield was sensitive to unexpected changes in the core CPI (consumer price index)³ and labor market conditions (nonfarm payrolls and the unemployment rate). However, we find two main differences in 2022–2024 when compared to the earlier periods. First, an unexpected change in core CPI⁴ had a stronger effect on the two-year Treasury yield in 2022–2024 than in the past. Second, while the two-year Treasury yield was sensitive to economic news such as home sales and retail sales in the 2005–2008 period, this sensitivity was much more muted in the period following the pandemic recession.⁵

We propose two potential explanations for these findings. First, our results may reflect a change in the actual FOMC reaction function and may suggest that the FOMC is effective in communicating its goals. Another explanation for these time-varying sensitivities, however, is a change in market participants' attention. Financial market participants may have paid less attention to inflation news in the pre-pandemic era—since inflation was low and stable for a prolonged period—and paid more attention after 2021 because of the inflation surge.

Data and Methodology

A challenge in estimating a monetary policy reaction function is that economic fundamentals and interest rates react to each other. For instance, if the economy were hit by a shock that pushed inflation upward, the central bank might respond by raising the policy rate in order to help bring down the inflation rate. If quarterly data are used to estimate the size of the interest-rate response to the

initial rise in inflation, the estimate may be biased as a result of the simultaneous effect, given the lag, of a higher interest rate that decreases inflation.

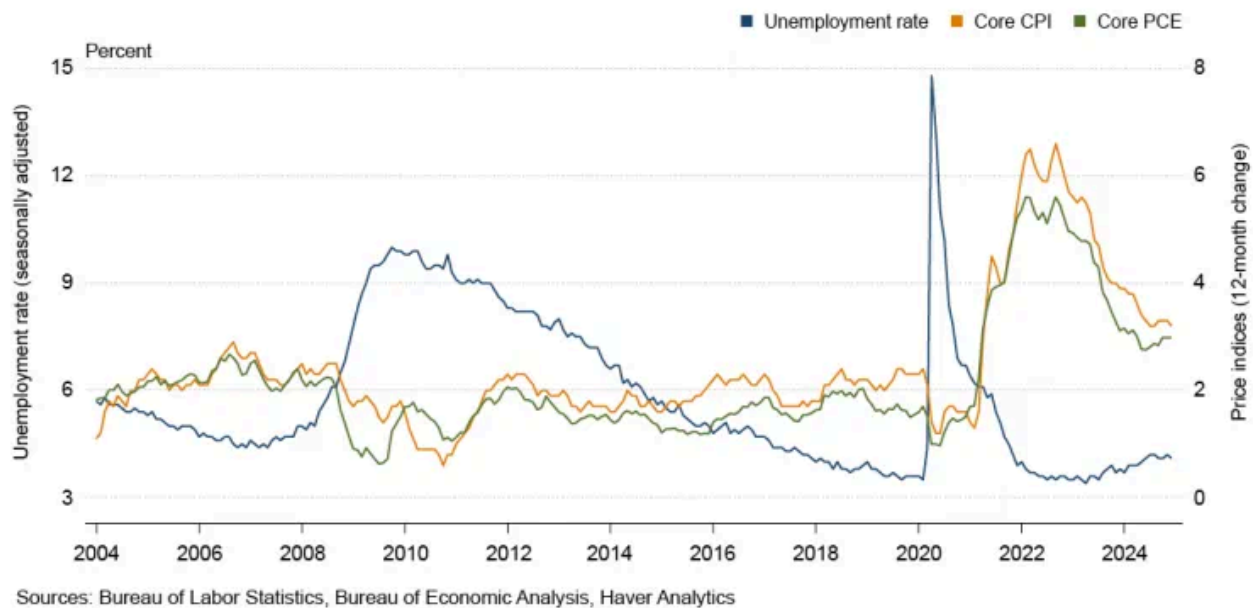
In this *Economic Commentary*, we solve this simultaneity problem by measuring the changes in expectations of economic variables and interest rates at a high frequency. High-frequency data are measured daily or even within minutes. This high-frequency identification method is commonly used in economic research to measure monetary policy shocks after FOMC meetings or other speeches given by the Federal Reserve Chair (see Nakamura and Steinsson, 2018; Swanson, 2023; Gordon and Lunsford, 2024). We measure the unexpected change (or “surprise component”) in economic conditions using the difference between the released and the projected values of key economic indicators. We consider core CPI, nonfarm payrolls, the unemployment rate, and other measures of economic activity such as new- and existing-home sales, business inventories, core retail sales, and the import price index. We obtain forecast values of these economic indicators from Action Economics, which gathers estimates each week from professional forecasters for a variety of economic indicators and continually updates the estimates leading up to the official release of actual data.⁶ The difference between the released value of the data and the median of individual forecasts can be regarded as an information “shock” only about the corresponding indicator and is independent of monetary policy decisions.

We use minute-by-minute data on the two-year Treasury yield to construct high-frequency changes in expected monetary policy when official data are released.⁷ Specifically, we construct the change in the two-year Treasury yield in a 30-minute window around the releases of each indicator, starting 15 minutes before the releases and ending 15 minutes after. We use the two-year Treasury yield instead of 30-day federal funds futures⁸ to account for both immediate and expected future changes to the policy rate in the medium term.⁹

Sample Periods

To understand how markets expect the FOMC to react when its decisions are not constrained by the ELB, we focus on the expected policy reaction function in non-ELB periods. Thus, we exclude the ELB periods following the 2008 Global Financial Crisis and the COVID-19 recession. Our non-ELB period comprises three subperiods, as shown in Figure 1.

Figure 1: Inflation Measures and Labor Market Conditions, 2004–2024



Period 1: June 2004–December 2008

In the beginning of this period, the US economy had recovered from the collapse of the dotcom bubble in the early 2000s. From early 2004 to early 2007, the unemployment rate steadily decreased from around 5.5 percent to 4.5 percent, and the 12-month change in the core personal consumption expenditures (PCE) price index was stable near the FOMC's 2 percent target. The period ended with the US subprime mortgage crisis that soon gave way to the Great Recession.

Period 2: December 2015–January 2020

After several years of keeping the policy rate at its ELB (at 0 percent to 0.25 percent), the FOMC lifted the FFR at its meeting on December 16, 2015. In this period, although the labor market showed strong signs of recovery, core PCE stayed below the Fed's target of 2 percent.

Period 3: March 2022–December 2024

The most salient feature of the US economy in the aftermath of the COVID-19 recession was the rapid surge in inflation. From January 2021 to January 2022, the 12-month change in core CPI increased from slightly above 1 percent to above 6 percent. The FOMC lifted the FFR from zero in March 2022, and the FFR reached 5 1/4 percent to 5 1/2 percent in late 2023.

Results

We regress the 30-minute change in the two-year Treasury yield on the unexpected change of each of the economic indicators. Table 1 shows the regression results for all three periods.

Table 1: Regression results

	30-minute change of the two-year Treasury yield		
	2004–2008	2015–2020	2022–2024
Nonfarm payrolls surprise	0.830*** (0.181)	0.215*** (0.0685)	0.503*** (0.106)
Unemployment surprise	-0.159** (0.0710)	-0.0249 (0.0359)	-0.182** (0.0745)
Core CPI surprise	0.180*** (0.0647)	0.134*** (0.0337)	0.708*** (0.0976)
New-home sales surprise	0.139*** (0.0322)	0.0200 (0.0212)	0.0272 (0.131)
Existing-home sales surprise	0.0403*** (0.0124)	-0.00127 (0.00877)	-0.00507 (0.0229)
Business inventories surprise	0.00869 (0.00885)	0.00833 (0.0130)	0.0176 (0.0463)
Retail sales excluding auto surprise	0.0341*** (0.00892)	0.0244*** (0.00575)	0.0291* (0.0153)
Import price index surprise	0.00710* (0.00369)	-0.00116 (0.00321)	0.000733 (0.0165)
Observations	383	347	211
R-squared	0.378	0.211	0.435

Notes: Standard errors are in parentheses and are heteroskedasticity robust. Data on nonfarm payrolls are in thousands, and data on new-home sales and existing-home sales are in millions. Data on the unemployment rate, core CPI, business inventories, core retail sales, and the import price index are in percentage points.

*** p<0.01, ** p<0.05, * p<0.1

The first three rows show the estimated coefficients on nonfarm payroll surprises, unemployment rate surprises, and core CPI surprises. In all three non-ELB periods, the estimated coefficients on nonfarm payroll surprises and core CPI surprises are significant and positive, suggesting that the market expected the FOMC to raise the interest rate in the medium term when labor market conditions were better than expected or core inflation was higher than expected. For example, the estimated coefficient on core CPI surprises in the 2022–2024 period indicates that, on average, the two-year Treasury yield increased by 0.708 percentage points when core CPI was 1 percentage point higher than expected. The main difference among the three non-ELB periods is that the coefficient on the core CPI surprise in the 2022–2024 period is much higher (0.708) than the one estimated for the 2004–2008 period (0.180) and the one estimated for the 2015–2020 period (0.134). This difference indicates that the market believed the FOMC would respond more aggressively to an unexpected change in core inflation measures after the pandemic-recession era than in the past.

The rest of the table shows the estimated coefficient of the unexpected change in other economic indicators. In the 2004–2008 period, the two-year Treasury yield is sensitive to unexpected changes

in several of these indicators, including new-home sales, existing-home sales, core retail sales, and the import price index. For instance, the estimated coefficient on new-home sales suggests that during 2004–2008, the two-year Treasury yield increased by 0.139 percentage points on average when new-home sales were 1 million higher than expected for a given month. However, these sensitivities decrease over time. In 2022–2024, apart from core inflation and labor market conditions, the two-year Treasury yield is only slightly sensitive to core retail sales.¹⁰

Interpretation

What explains the varying sensitivity of the two-year Treasury yield to unexpected changes in key economic indicators over time? One possible explanation is that the FOMC changed its priorities after 2022, shifting to a more aggressive approach in responding to changes in core inflation than in previous periods. In turn, the market changed its perception of the monetary policy reaction function to align with the FOMC's own change in priorities.

Since the beginning of 2022, the FOMC has, indeed, put greater public emphasis on lowering inflation. For example, in the postmeeting press conference on May 4, 2022, Chair Jerome Powell said, “Our overarching focus is using our tools to bring inflation back down to our 2 percent goal.”¹¹ However, for the earlier periods, Tang (2017) finds that FOMC communications were skewed toward labor-related language in 2003–2007 and in the aftermath of the 2008 Global Financial Crisis until 2017. Tang (2017) argues that this change can be associated with interest rates exhibiting greater sensitivity to labor-related news than to other news in this period.

Another possible explanation, however, is that financial market participants have “rational inattention.” Rational inattention models (see, for instance, Sims, 2003) suggest that the cost of acquiring information makes it optimal to be relatively inattentive to changes in inflation when inflation is low and stable. Hence, financial market participants may not have been very attentive to inflation related news between 2004 and 2020, when inflation was low and varied little from month to month. However, a salient feature of the aftermath of the COVID-19 pandemic was the rapid surge in inflation. Braitsch and Mitchell (2022) use the Consumers and COVID-19 survey¹² and find that their measure of consumers’ attentiveness climbs alongside the rise in US inflation. When financial market participants pay more attention to inflation news, their expectations of future interest rates are more sensitive to an unexpected change in inflation.

Both explanations may play a role in accounting for the change in the market’s perceived monetary policy reaction function. It is also possible that the two mechanisms interact with each other. That is, the market may have become more attentive to inflation news after 2022 because the FOMC made its policy rate more sensitive to inflation surprises and less sensitive to other economic indicators (such as core retail sales and new-home sales).

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Endnotes

1. For optimal monetary policy at the ELB, see Eggertsson and Woodford (2003). [Return to 1](#)
2. In the postmeeting press conference on July 31, 2024, Chair Jerome Powell said that “we weigh those two things [maximum employment and stable prices] equally under the law. When we were far away from our inflation mandate, we had to focus on that. Now we’re back, back to a closer to even focus, so we’ll be looking at labor market conditions and asking whether we’re getting what we’re seeing.” Transcript available at federalreserve.gov/mediacenter/files/fomcpresconf20240731.pdf [↗](#). [Return to 2](#)
3. Although the FOMC’s inflation target is the annual change in the price index for personal consumption expenditures (PCE), we measure inflation using the CPI instead of PCE. This is because CPI is published before PCE and thus contains the bigger surprise. In addition, we focus on core inflation rather than headline inflation because core inflation provides a clearer picture of underlying inflation pressures. [Return to 3](#)
4. The unexpected change in core CPI measures the difference between the indicator’s released value and its projected value based on the forecasts described below. [Return to 4](#)
5. Bauer et al. (2024, 2025) also document an increased response to inflation surprises and nonfarm payroll surprises after the Fed’s liftoff from the ELB in March 2022, but they do not study the responses to other releases of economic data such as core retail sales and home sales. [Return to 5](#)
6. Action Economics, LLC. [Return to 6](#)
7. We are grateful to Michael Fleming at the Federal Reserve Bank of New York for helping us access this data. Yields are for on-the-run two-year Treasury notes from the GovPX database and the BrokerTec electronic trading platform. Retrieval of data from BrokerTec first requires reconstruction of the limit order book for each security and day. Yields are calculated by first computing the midpoint of the bid/ask quotes and then calculating the yield of that midpoint. Minute-by-minute data are constructed from the last bid-ask midpoint from each minute interval. Adrian et al. (2023) provide additional details on GovPX and BrokerTec. [Return to 7](#)
8. Thirty-day federal funds futures and options are the most widely used tools for hedging short-term interest rate risk. Contracts are based on the federal funds rate, and changes in the price of these contracts reflect expected changes in near-term monetary policy. [Return to 8](#)
9. Economists often use longer-maturity rates, such as one- or two-year Treasury yields, to measure the expected future path of the policy rate in the medium term. For example, Swanson and Williams (2014) show that one- and two-year Treasury yields still reacted to Fed communications even when the short-term FFR was at the ELB during the 2008–2010 period. Healy and Jia (2024) show that economic releases have a stronger effect on the two-year Treasury yield than on the expected FFR at the next FOMC meeting. [Return to 9](#)
10. The estimated coefficient is significantly different from zero at only a 10 percent confidence level. [Return to 10](#)
11. The transcript is available at federalreserve.gov/mediacenter/files/FOMCpresconf20220504.pdf [↗](#). [Return to 11](#)
12. The Federal Reserve Bank of Cleveland administered this survey to catalog real-time responses on how consumers were dealing with COVID-19 and their perceptions of how COVID-19 was likely to impact the economy. [Return to 12](#)

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