



# Economic Letter

## Impact of Macroeconomic Surprises Changed After Zero Lower Bound

by Christoffer Koch and Julieta Yung

**ABSTRACT:** Macroeconomic surprises involving employment and inflation—reflecting the Fed’s attempts to achieve its dual mandate to promote full employment and price stability—increased in importance during the zero-lower-bound period. Also, market participants were more attentive to housing market indicators and final GDP revisions.

The Federal Reserve’s Federal Open Market Committee meets eight times a year in Washington to set monetary policy. Regional Federal Reserve Banks and the staff of the Board of Governors produce economic forecasts for each of these meetings. Projections are updated based on macroeconomic data releases during the intermeeting period.

These periods usually feature one or two employment reports, vintage releases of gross domestic product (GDP), inflation data such as producer and consumer prices and other macroeconomic indicators that yield new information about the health of the U.S. economy. Thus, macroeconomic announcements play an important role in updating policymakers’ and the public’s assessment of the U.S. economy.

The conduct of monetary policy changed substantially in the aftermath of the global financial crisis. The Fed’s typical pre-2009 policy instrument was adjustment of the federal funds rate. After the downturn, policymakers set the federal funds rate at near zero—the zero lower bound (ZLB)—and the Fed’s monetary policy statements about the path of interest rates became more explicitly linked to the anticipated evolution of inflation and unemployment, known as forward guidance.<sup>1</sup>

The impact of macroeconomic surprises on asset prices changed during the ZLB—in terms of composition and importance—domestically and internationally.<sup>2</sup> Domestic financial markets put a greater focus on indicators depicting the housing sector, which had led to the recession and inhibited the recovery. Additionally, there was added interest in news directly related to the Fed’s dual mandate—to promote full employment and price stability—such as initial jobless claims and Consumer Price Index (CPI) inflation.

In light of this new environment, it is important to study how markets react to updates on the state of the economy. Interest rate futures provide a view of expected domestic conditions, while exchange rate futures offer a global perspective on the U.S. outlook. In each case, our analysis relies on a comparison of intraday asset prices following U.S. macroeconomic surprises.

The ZLB period was very different from the previous monetary policy regimes in terms of the nature of Fed policy communication and policy setting itself. It brought the introduction of unconventional quantitative tools to stimulate the economy. The tools included quantitative easing—increasing the money supply by purchasing Treasuries and mortgage-backed securities and the maturity-extension

program, with the Federal Reserve shifting its balance-sheet holdings of Treasuries to longer-term debt.

## Reacting to Disappointing News

The April 3, 2015, unemployment report illustrates a reaction to disappointing news. The statement, detailing March activity, reported that the economy added 126,000 jobs—sharply lower

than the 245,000 jobs expected in the Bloomberg expectations survey. Payroll figures are subject to sometimes substantial adjustment. The report included a revision of the previous two reporting months. With those changes, the actual overall negative surprise grew from 119,000 to 188,000 jobs.

This development led to an increase in Treasury note futures prices and, thus,

a decline in their implied interest rates, as well as a depreciation of the U.S. dollar within a very tight time interval around the announcement (*Charts 1 and 2*). Because the employment data release was likely the only new information coming out during this very short time period, these price responses illustrate the reaction of interest and exchange rates to employment report surprises.

## Macroeconomic Surprises

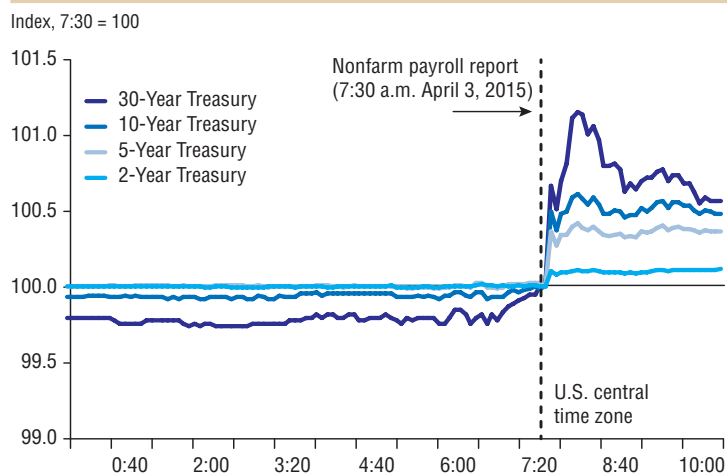
The impact of a macroeconomic surprise can be viewed in terms of the difference in an asset's price after an announcement and its expected value prior to the actual release of information. Although it is difficult to measure market expectations, they can be proxied by financial instruments that are set to be traded in the future and, thus, incorporate market expectations.

Another way to infer what markets expect prior to a particular macroeconomic announcement is to directly ask investors what they anticipate before the data are published. To this end, a variety of data aggregators and news outlets survey market participants leading up to the release. Where significant, the difference between the survey response and the actual news report, or “surprise,” can be interpreted as an update on the state of the U.S. economy.<sup>3</sup>

The response of 10-year Treasury futures prices and currency futures using intraday data within a 15-minute symmetric window around the exact time of the release of macroeconomic news captures the market's reaction to the surprise. Although markets respond to a variety of news in a given day, considering the change in asset prices 15 minutes before and after data are made public helps narrow down the responses to specific announcements.

The analysis requires a regression of price changes in 10-year U.S. Treasury note futures and currency futures on macroeconomic surprises during two subsamples—before the ZLB (1996–2008) and during the ZLB (2009–16). Foreign-exchange futures are expressed in U.S. dollars so that an increase in the exchange rate indicates a depreciation of the U.S. dollar relative to a foreign currency. The surprises are normalized to

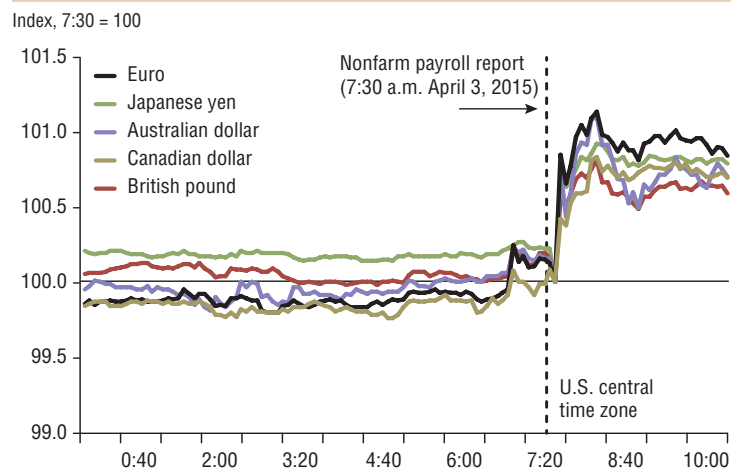
**Chart 1** Treasury Futures Rise After Employment Report Disappoints



NOTES: The dashed line indicates the exact time the unemployment report was released. Treasury futures prices immediately increased, indicating lower yields at different maturities, as disappointing news in the U.S. labor market was announced.

SOURCES: Tick Data; Bloomberg.

**Chart 2** U.S. Dollar Depreciates After Employment Report Disappoints



NOTES: The dashed line indicates the exact time the unemployment report was released. Currency futures prices immediately increased, indicating a depreciation of the U.S. dollar relative to other currencies as disappointing news in the U.S. labor market was announced.

SOURCES: Tick Data; Bloomberg.

have a unit standard deviation, and coefficients are in basis points to make the results comparable.

## What News Matters?

Chart 3 shows the impact of 21 macroeconomic surprises and how their characteristics changed when the federal funds rate reached the ZLB. The horizontal bars display the responses of 10-year Treasury futures prices to macroeconomic surprises. In general, positive surprises tend to decrease futures prices and, thus, most estimates are to the left of the vertical zero line.<sup>4</sup>

Meaningful changes related to the Fed's dual mandate appear at the ZLB. On the inflation side, CPI surprises have no significant impact on asset prices before 2009. In contrast, during the ZLB period, a hypothetical CPI release that comes in one standard deviation higher than anticipated lowers the 10-year futures price 4.7 basis points.

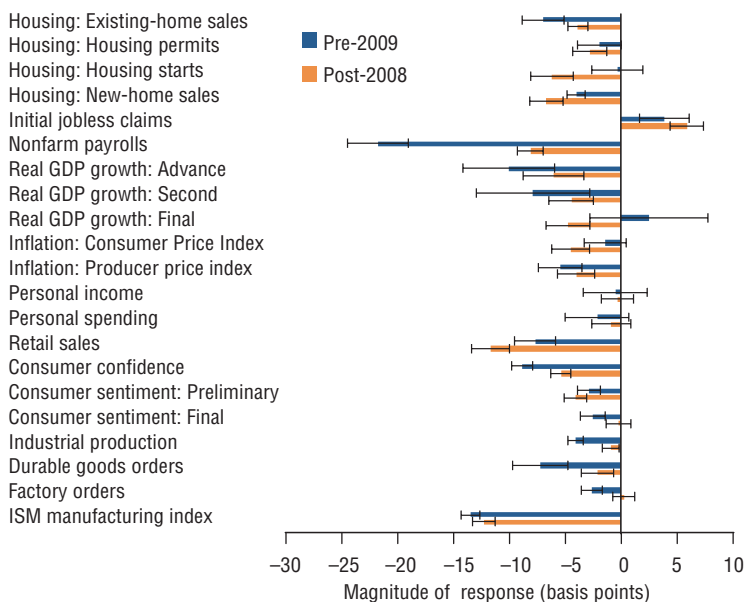
On the employment side, initial jobless claims appear to become more important; at the same time, standard signals of labor market activity are less definitive. To be sure, it is unclear whether headline figures such as the unemployment rate and nonfarm payroll growth are able to sufficiently depict labor market imbalances.

Indeed, the Fed dropped its reference to the unemployment rate in later forward-guidance monetary policy statements. The weaker impact from nonfarm payroll surprises and the simultaneously released unemployment rate may be a result of uncertainties regarding the significance of secular demographics on labor force participation rates.<sup>5</sup> The severity of the economic downturn induced unprecedented movement in measures of underemployment that are more encompassing than the headline unemployment rate. This also affected headline unemployment's potential signaling value.

The informational content of the final readings of previous-quarter U.S. GDP appears larger in the ZLB era. Positive final-revision surprises of quarterly GDP contain enough new information to move Treasury futures prices down (and 10-year rates up) but only during the post-2008 period. Conversely, the effect of surprises

## Chart 3

### 10-Year Treasury Futures Respond to U.S. Macroeconomic News



NOTES: Horizontal bars display the responses of 10-year Treasury futures prices to normalized macroeconomic surprises, with the black spikes indicating a one-standard-error confidence band for each estimated response before (blue) and during (orange) the zero lower bound. Positive surprises tend to decrease future prices and, thus, most estimates appear to the left of the vertical zero line. ISM is the Institute for Supply Management.

SOURCE: Authors' calculations.

related to manufacturing activity such as durable goods orders, factory orders and industrial production weakens.

This could reflect ongoing structural change but is more likely related to the financial-crisis-related realization that macroeconomic vulnerabilities were associated with households' balance sheets and the financial system. Reflecting these changes, some housing releases became more important during the ZLB.

New- and existing-home sales retain their relevance in both periods. However, during the ZLB, all four housing indicators—including housing starts and the more-leading indicator, housing permits—depressed Treasury futures prices, implying higher future yields. The housing bust triggered the near-collapse of the financial system in the recession and constrained aggregate spending during the recovery, refocusing investors' attention on these housing-related indicators.

## International Focus

Exchange rate futures tend to be relatively less sensitive to U.S. macroeconomic news (*Chart 4*).<sup>6</sup> Interestingly,

the euro is much more sensitive to U.S. macroeconomic surprises before than after the ZLB. This may reflect a shift in the business cycle following the global financial crisis. While the recovery in the U.S. was well underway, the euro area remained on its path to recovery; news from across the Atlantic might have been of second-order importance during the U.S. recovery.

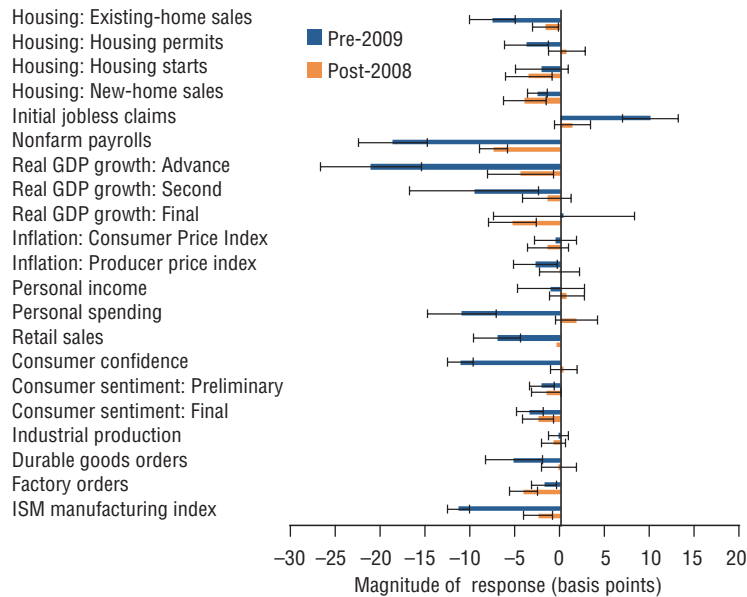
This was not necessarily the case for other foreign currencies. In fact, there is more sensitivity to U.S. surprises in Japan's and Canada's currency responses post-2008. The effects of two "flash" survey indicators, the Conference Board's Consumer Confidence Index and the Institute for Supply Management's manufacturing index, are softer domestically and internationally after 2008 and, interestingly, depreciate the dollar against the currencies of commodity exporters Canada and Australia. Retail sales exhibit similar behavior.

## Understanding Financial Markets

Intraday asset price responses to macroeconomic surprises tell us how markets interpret the unexpected

## Chart 4

### Dollar/Euro Futures Less Sensitive to U.S. News Post-2008



NOTES: Horizontal bars display the responses of U.S. dollar/euro futures prices to normalized macroeconomic surprises, with the black spikes indicating a one-standard-error confidence band for each estimated response before (blue) and during (orange) the zero lower bound (ZLB). During the ZLB, responses are more muted, reflecting lower sensitivity to U.S. news. ISM is the Institute for Supply Management.

SOURCE: Authors' calculations.

informational content embedded in macroeconomic data releases. This analysis provides a snapshot of what the markets believe to be the current state of the economy and where it is heading relative to other economies. Changes in those responses hint at where markets and policymakers perceive risks to the current economic outlook.

Asset prices' responses suggest a greater focus on the housing market in line with the vulnerabilities that led to

the recession and inhibited the recovery. They also show stronger responses to weekly initial jobless claims and to CPI inflation readings, consistent with the Fed policy mandate and policymakers' continuing commitment to attain monetary policy objectives.

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## Notes

<sup>1</sup> Motivated by the increased importance of macroeconomic news for the more forward-looking central bank communication at the ZLB, "Measuring the Effect of the Zero Lower Bound on Medium- and Longer-Term Interest Rates," by Eric T. Swanson and John C. Williams, *American Economic Review*, vol. 104, no. 10, 2014, pp. 3,154–85, estimated the time-varying sensitivity of domestic yields along the yield curve to establish the extent to which policy was effectively constrained by the ZLB.

<sup>2</sup> A taxonomy accounting for heterogeneity in macroeconomic news effects on asset prices can be found in "Is the Intrinsic Value of Macroeconomic News Announcements Related to Their Asset Price Impact?" by Thomas Gilbert, Chiara Scotti, George Strasser and Clara Vega, European Central Bank, Working Paper no. 1882, February 2016.

<sup>3</sup> Previous research has shown that these survey-based market expectations are similar to forecasts derived from financial instruments built on the underlying macroeconomic news releases. See "Macroeconomic Derivatives: An Initial Analysis of Market-Based Macro Forecasts, Uncertainty, and Risk," by Refet Gürkaynak and Justin Wolfers, in *NBER International Seminar on Macroeconomics 2005*, Jeffrey Frankel and Christopher Pissarides ed., pp. 11–50.

<sup>4</sup> "Positive surprises" describe higher than expected values. This is opposite for weekly initial claims for unemployment. The interpretation of inflation surprises is more ambiguous because higher-than-expected inflation could be considered good or bad depending on the inflation's level relative to the target.

<sup>5</sup> "Key Secular Trends and Implications for Monetary Policy," speech by Robert S. Kaplan, Federal Reserve Bank of Dallas, Aug. 2, 2016, [www.dallasfed.org/news/speeches/kaplan/2016/rsk160802.aspx](http://www.dallasfed.org/news/speeches/kaplan/2016/rsk160802.aspx).

<sup>6</sup> These results are in line with the literature that has previously found that the link between macroeconomic news and bond markets is simpler and stronger than with foreign exchange markets.



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