ECONOMIC ANALYSIS

Interpreting the Fedspeak: text analysis on FOMC statements

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- **Sentiments in FOMC statements can be used to analyze monetary policymaking**

- **The peak of the uncertain sentiment precedes the Great Recession, making it a potential indicator for the worst scenario**

- **Sentiments in the statements are significantly correlated with VIX and yield spread**

The evolution of Federal Reserve communications

Nowadays, expectation management is an essential part of monetary policymaking. This can be attributed to an evolution of ideas over the last thirty years on how the Federal Reserve should communicate with the general public. Before the 1990s, the mainstream idea among monetary authorities was that the policymaking process should be discreet and that policymakers should reveal as little information as possible to protect the public interest. As more and more empirical evidence showed that effective communication could play an important role in monetary policies, such views were increasingly challenged by economists and even by central bankers themselves.[1] Eventually, the mainstream opinion shifted tremendously, and central banking practices changed following this evolution of ideas. For instance, at the Federal Reserve's 2001 Jackson Hole conference, Michael Woodford told the audience of central banks that "affecting market expectations" may be even more important than deciding overnight interest rates for successful monetary policies.[2] The transparency of the monetary policymaking improved in the Greenspan era and even more so in the Bernanke and the Yellen eras.

On the other hand, although the Federal Reserve is much more transparent than 30 years ago and market participants have put tremendous efforts into interpreting its communications, projecting monetary policy still remains a major challenge. For example, after the Fed raised the interest rate in December 2015, the consensus among Fed watchers was that we would have four interest rate hikes in 2016, but now it is clear that we may only have one hike at most. Obviously the traditional way to interpret the Fed communications has its shortcomings.

The positive, the negative, and the uncertain

Text analysis techniques are one of the latest tools in the analytical arsenal used by market participants to analyze financial and economic documents. This methodology treats text materials (speeches, articles) as data and can be used to reveal their emotions and sentiments in a quantitative manner. In this brief, we quantitatively measure the sentiment of the FOMC statements with text analysis methods. The idea is straightforward: different words can imply different sentiments, and therefore the level of each sentiment can be estimated by deriving statistics of these words. For instance, by calculating the total share of positive words, such as "gains" and


1: Goodfriend (1986) provides an excellent discussion on the secrecy of the monetary policymaking.
2: Woodford, M., 2002. Monetary Policy in the Information Economy. *Technology and the New Economy*, p.187.

"rebound," in FOMC statements, we obtain an objective and quantitative measure of the positive sentiment of the statements and plot its trend over time.

In this brief, we measured three major sentiments: positive, negative, and uncertain.[3] Chart 1 shows the time trend of the positive sentiment. There are three notable patterns. First, before the Great Recession, there were several FOMC statements containing no positive words at all. This clearly shows the policymakers' concern over the economy. Second, the positive sentiment rose significantly during the Great Recession and peaked in June 2009, when the Great Recession ended. Although it may seem somewhat counterintuitive, the trend actually shows that the Federal Reserve tried to boost market confidence by using more and more positive words. Third, the level of positive sentiment has remained largely stable after the economy stepped out of the recession. Although the recovery has been consistently below expectations, our analysis shows that the Fed has sought to boost confidence by keeping positive sentiment stable.

Chart 1
The share of words with positive sentiment
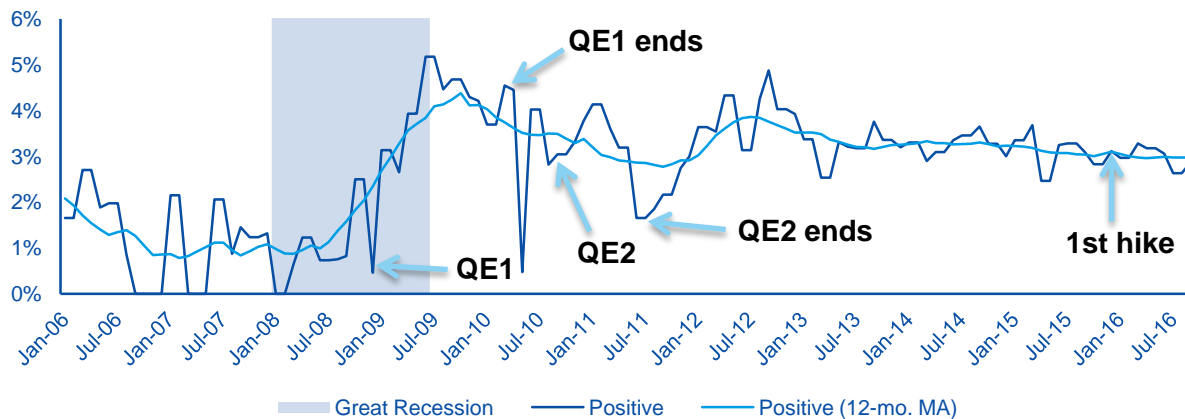
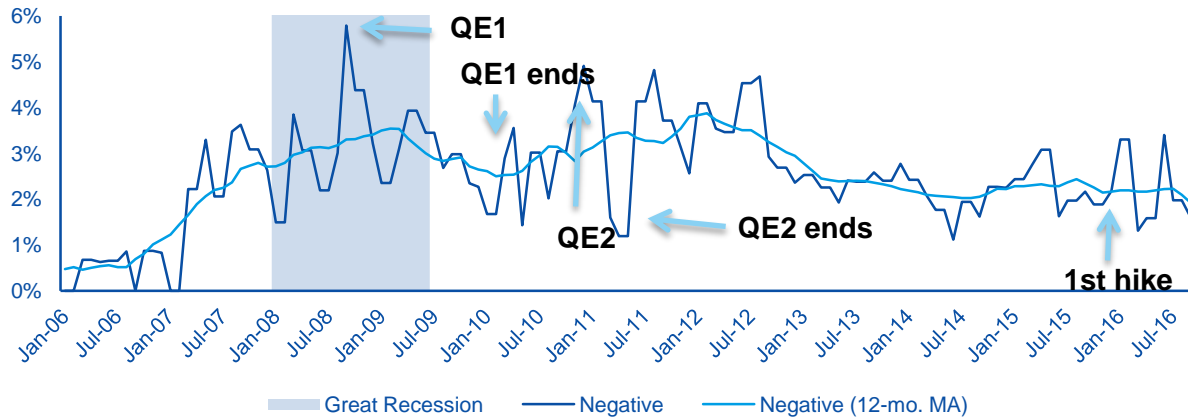Source: Federal Reserve, NBER and BBVA Research

The trend of the negative sentiment is also informative (Chart 2). It peaked in December 2008, when the first Quantitative Easing started. The intense usage of negative words during this time shows the Fed's determination in using unconventional methods to rescue the economy. And then, the negative sentiment gradually faded during the recovery, which reflects the improvement of economic conditions. Similar to the positive sentiment, the negative sentiment does not show a significant trend after the recession. The Fed has apparently been trying to achieve a delicate balance between the positive and negative sentiments, in order to avoid making undesirable impact on the financial market.

Although uncertainty is viewed in a negative light most of the time, the trend of the sentiment of uncertainty is different from that of the negative sentiment. As shown in Chart 3, the sentiment of uncertainty peaked in February 2007, 11 months prior to the start of the Great Recession and 20 months prior to the peak of the negative sentiment. This is consistent with the observation and speculation of asset bubbles before the

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3: I follow the methodology and dictionary in Loughran and McDonald (2011), who argue that the dictionary for research in finance and economics should be unique, as some words with negative sentiment in the conventional articles, such as "liability", may not have negative sentiment in financial and economic documents.
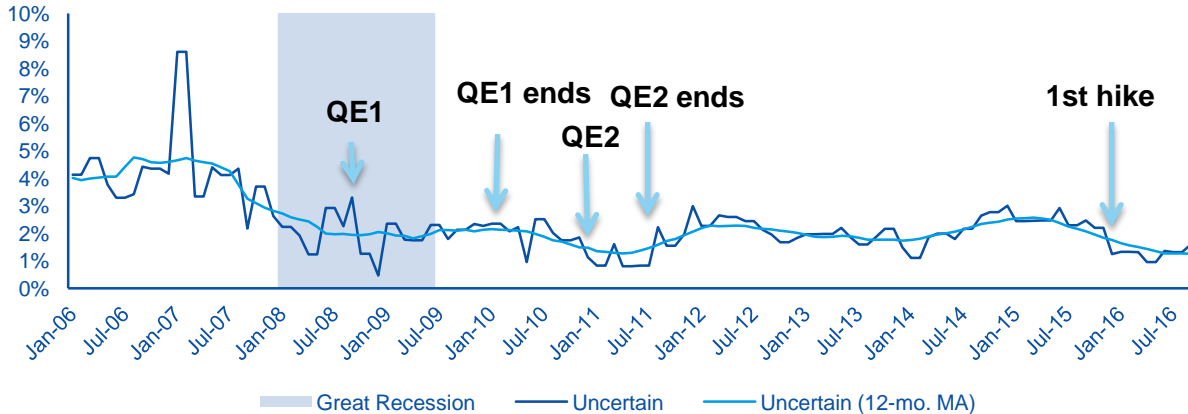
recession. Also, it brings to mind Murphy's Law: *Anything that can go wrong will go wrong*. The high level of uncertain sentiment (9%) hints that the lack of confidence was *leading* the actual bad news.

Chart 2
The share of words with negative sentiment

Source: Federal Reserve, NBER and BBVA Research

Chart 3
The share of words with uncertain sentiment

Source: Federal Reserve, NBER and BBVA Research

The co-movement of sentiments and financial variables also shows several interesting patterns. First, we find that the positive and the negative sentiments are positively correlated (Table 1). Again, this may imply that the Federal Reserve avoids being overly positive or negative and tries to deliver its message in a delicate manner. Therefore, we also calculate the difference between the positive and negative word shares and call it "net positive sentiment." As Table 1 and Chart 4 show, the positive sentiment also has a significant positive correlation (0.61) with the yield spread of the U.S. Treasury bonds, which is a popular indicator of the health of the U.S. economy. Second, the negative sentiment shows a close relationship with the VIX index (Chart 5). The negative sentiment has a correlation coefficient of 0.46 with VIX, suggesting that the stock market can be very sensitive to the negative sentiment in FOMC statements.

Table 1
Correlation coefficients of sentiments, yield spread, and VIX (*p-values* in parenthesis)

|	Positive	Negative	Uncertain	Net Positive	Yield Spread	VIX
Positive	1	0.24 (0.01)	-0.34 (0.00)	0.67 (0.00)	0.61 (0.00)	-0.02 (0.78)
Negative		1	-0.45 (0.00)	-0.56 (0.00)	0.45 (0.00)	0.46 (0.00)
Uncertain			1	0.06 (0.49)	-0.68 (0.00)	-0.28 (0.00)
Net Positive				1	0.178 (0.05)	-0.37 (0.00)

Source: Federal Reserve, FRED and BBVA Research

Chart 4
Positive sentiment and TB yield spread
%
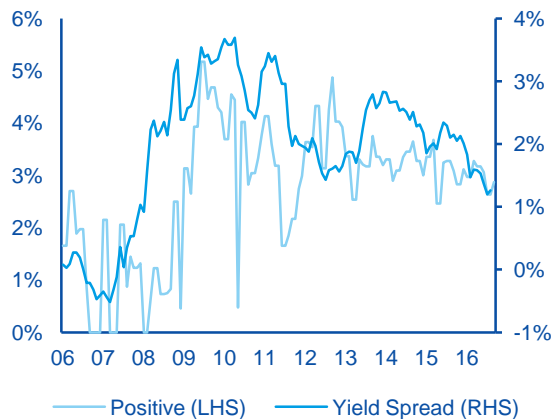
Source: Federal Reserve, FRED and BBVA Research

Chart 5
Negative sentiment and VIX
%, index
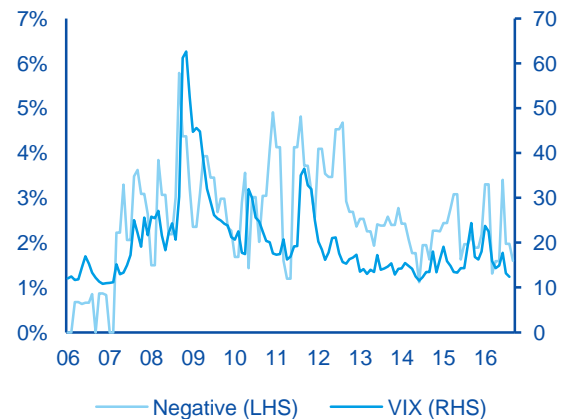
Source: Federal Reserve, FRED and BBVA Research

Bottom Line

We use text analysis techniques to explore the sentiments in FOMC statements. We show that the positive sentiment peaked when the U.S. economy went out of the recession, and that the negative sentiment peaked when the Fed initiated the first QE. Also, the sentiment of uncertainty peaked before the Great Recession, suggesting that it can be used as a potential leading indicator for the worst scenario. Finally, we show that sentiments are closely related to some key financial indicators, such as VIX and yield spread of treasury bonds. In future briefs, we will use text analysis techniques to explore the sentiments in other articles and speeches made by policymakers, as well as their correlation with financial variables.

References

Goodfriend, M., 1986. Monetary mystique: Secrecy and Central Banking. *Journal of Monetary Economics*, 17(1), pp.63-92.

Loughran, T. and McDonald, B., 2011. When Is a Liability not a Liability? Textual Analysis, Dictionaries, and 10-Ks. *The Journal of Finance*, 66(1), pp.35-65.

Woodford, M., 2002. Monetary Policy in the Information Economy. *Technology and the New Economy*, p.187.