## The Asymmetric Effects of Uncertainty on Employment

By Andrew Foerster

When uncertainty about the future increases, economic activity tends to decrease as firms delay hiring and consumers defer purchases. When a bout of uncertainty subsides, however, firms may only cautiously increase the pace of hiring and investment. As a result, short-lived spikes in uncertainty, such as those experienced during the current recovery, may have persistent effects on employment growth, thus lowering the total level of employment.

The U.S. economy's recovery from the financial crisis has been sluggish by historical standards. One often-cited explanation for this tepid recovery is that elevated uncertainty about the future has been a drag on economic activity. In May 2010, the European sovereign debt crisis caused financial markets to question the survival of the euro area and how the crisis would be resolved. Similarly, in August 2011, the U.S. debt ceiling crisis cast doubts on the U.S. government's commitment to repay its debts, causing financial turmoil. In June 2013, uncertainty about the Federal Reserve's plans for ongoing asset purchases after a speech by then-chairman Ben Bernanke resulted in a brief period of heightened financial market volatility popularly called the "taper tantrum." A large increase in uncertainty during each of these episodes may have slowed the recovery.

Chart 1: The VIX
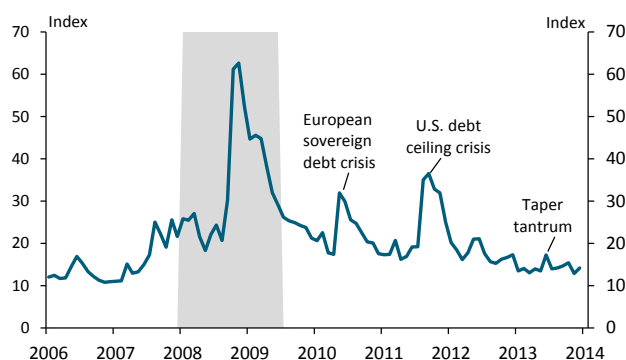
Note: Gray bars represent NBER-defined recessions.
Source: Chicago Board Options Exchange.

One useful measure of uncertainty is the Chicago Board Options Exchange Market Volatility Index, commonly referred to as the VIX. The VIX uses options prices for the Standard & Poor's 500 (S&P 500) to determine the volatility of stock market prices. As shown in Chart 1, the VIX increased markedly during the European sovereign debt crisis and the debt ceiling crisis, and to a lesser extent during the taper tantrum. In each case, the VIX declined quickly after the episodes had passed.

The combination of sluggish growth and high stock market volatility—as captured by VIX spikes during the three episodes of uncertainty—suggests that uncertainty may have slowed growth. Using a statistical model to relate employment growth to changes in uncertainty, this Bulletin finds asymmetry in the response of employment growth to changes in the VIX. Large decreases in uncertainty and small changes in either direction seem to have little or no effect on employment. Large increases in uncertainty, however, produce statistically significant declines in employment growth. As a result, sharp increases in the VIX that are reversed quickly—such as those that occurred during the recovery—may have persistent, negative effects on employment growth.

Chart 2 uses regression results from the statistical model to show how employment growth responds if the VIX increases by 2 standard deviations and decreases by the same amount the following period. The symmetric regressions imply little change in employment growth. The asymmetric regression, in contrast,

shows a larger, more persistent decline. The VIX increase in the initial period produces a marked decline in employment growth in the following period. When the VIX subsequently decreases, however, employment growth does not rebound. Instead, employment growth only gradually returns to its original level, suggesting spikes in uncertainty have long-lasting effects on employment recovery.

A counterfactual VIX—one that eliminates certain spikes and partially smooths out any large increases or decreases—can help quantify uncertainty's effects on employment. In the counterfactual exercise, the three substantial increases in the VIX during the recovery are replaced with half their values. Results indicate that employment growth would have been higher during the recovery were it not for those three episodes of heightened uncertainty.

Chart 2: Response in employment growth to a one-period VIX spike

Chart 3: The employment cost of uncertainty

Source: Author's calculations.
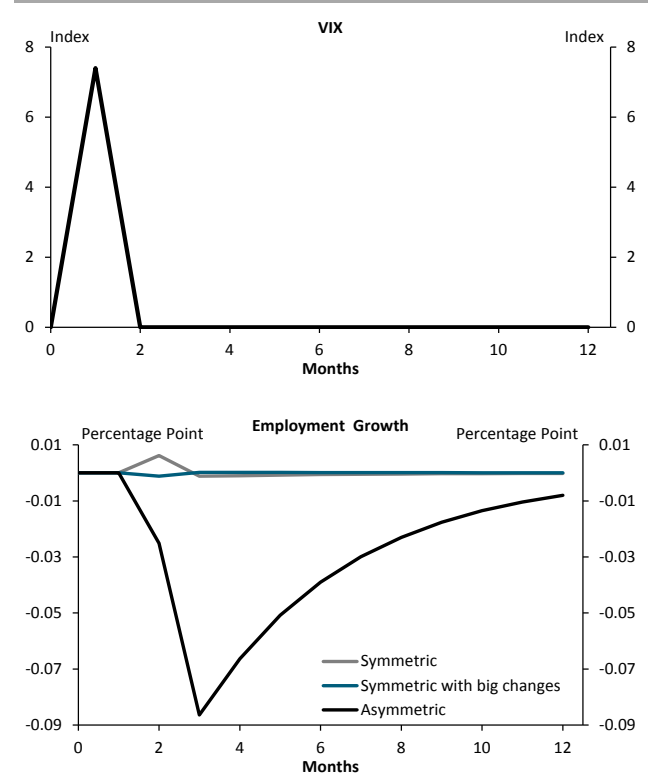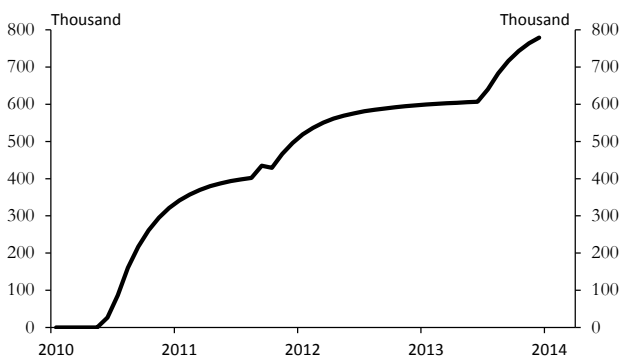
Sources: Bureau of Labor Statistics, Chicago Board Options Exchange, author's calculations.

Lower employment growth leads to increasingly large employment losses over time. Chart 3 translates the differences in employment growth between the counterfactual scenario and actual outcomes to level terms, plotting the cumulative cost of these uncertainty spikes in terms of aggregate employment. The results suggest that under the counterfactual VIX, 400,000 more people would have been employed following the European sovereign debt crisis, 600,000 more after the U.S. debt ceiling crisis, and 800,000 more by the end of 2013. This cumulative deficit at the end of 2013 is equivalent to approximately 16,000 fewer job gains per month from 2010 to 2013 because of these three uncertainty episodes.