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The effect of weather on the monthly jobs report

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The monthly national jobs report produced by the U.S. Bureau of Labor Statistics is one of the most closely watched principal economic indicators. The report is usually published on the first Friday of the month and contains data on the number of jobs gained or lost in the previous month. The employment estimates are based on survey data collected from a sample of about 145,000 nonagricultural business establishments and government agencies representing nearly 700,000 individual U.S. worksites. The news in the monthly report has an immediate impact on the financial markets: a strong report often leads to an increase in the market indexes, and a weak report has the opposite effect.

In addition, because the weather affects employment, especially in certain industries such as construction and mining and logging, the weather during the survey reference week affects the monthly jobs report and the financial markets' response to the report. Thus, for example, if major snowstorms occur throughout the nation during the reference week (the week that includes the 12th day of the month), the weather effect will tend to be negative, with employment somewhat lower than it otherwise would have been. Similarly, if the weather is unseasonably warm and sunny during the reference week, that will tend to have a positive effect on employment. However, despite the well-documented effect of the weather on the monthly jobs report and the subsequent financial market response, policymakers, financial analysts, and other market watchers have not developed a systematic method for predicting the weather effect on nonfarm payroll employment. In a recent article titled "Clearing the fog: the predictive power of weather for employment reports and their asset price responses" (*American Economic Review: Insights*, December 2019), Federal Reserve Bank of San Francisco economist Daniel J. Wilson develops a methodology for doing just that.

Wilson collects and analyzes historical national "real-time" weather data during the survey reference week to measure the weather's effect on the monthly employment report. He develops a model that incorporates this information to predict the weather's effect on national payroll employment each month from 1990 to 2016. Wilson begins by creating a county-level panel model of monthly employment growth as a function of temperature, precipitation, and snowfall for each month during the study period. He then uses the panel model to estimate the weather's effects on monthly employment changes for all U.S. counties. Next, he aggregates these effects to estimate their impact on national employment. Although the weather effects explain only part of the variation in the monthly employment estimates, they are closely associated with the "surprise" element of the employment reports. Wilson measures this element by comparing the actual data with predictions from market surveys conducted before the data were released. Using regression analysis, he finds statistically significant effects of the weather on employment that explain about 15 percent of the difference between the actual and predicted monthly employment changes.

Wilson argues that these “nowcasts” have major predictive power and can be used by policymakers and financial analysts to gauge the overall strength of the economy. In other words, regarding the monthly employment report, the more accurately the weather effects can be measured and separated from other effects, the better the analysis of the employment data. At the same time, however, understanding the vast geographic distribution of county weather data and how they correlate with the geographic distribution of employment remains a difficult task. Wilson’s findings suggest that financial markets do not fully account for the effect of weather on the monthly jobs report. Yet, his model and the methods he uses in his analysis improve the ability of people to understand these important economic data.