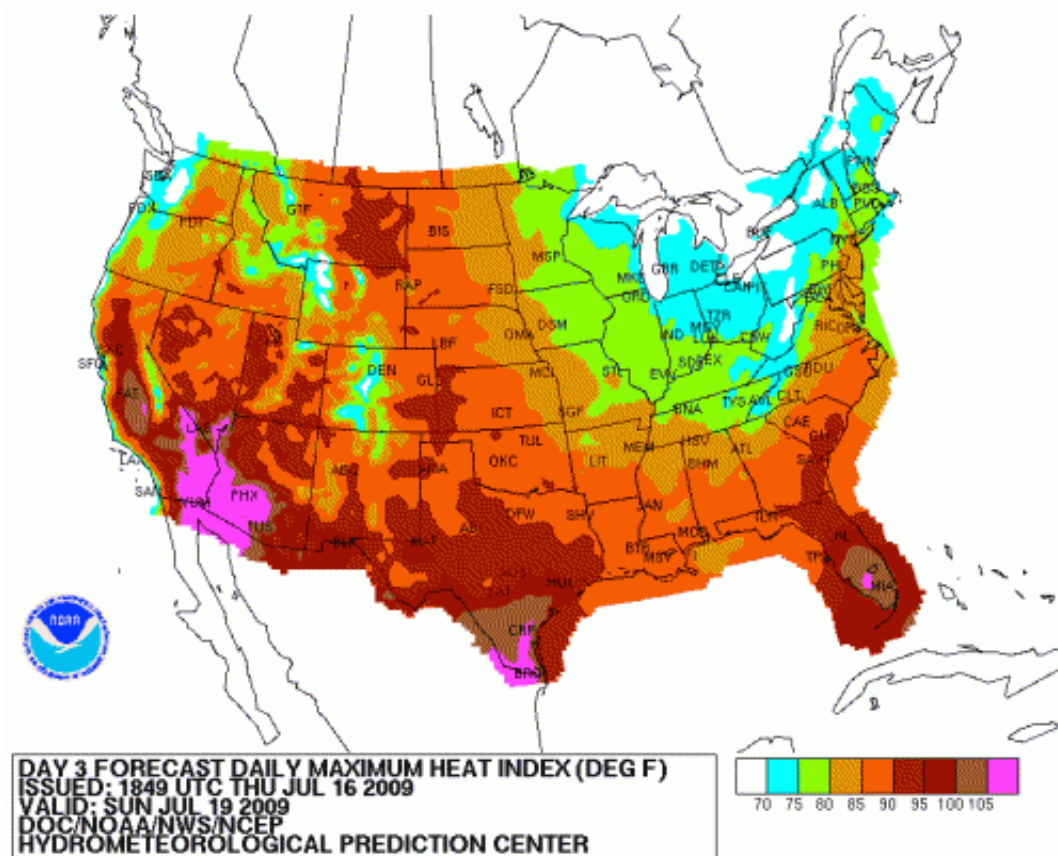


Weather data scrutiny spurs government efficiency

April 16 2013



When the National Weather Service data indicates the temperature reached 75 degrees on a given day, can you believe it?

Researchers from the University of Michigan found that the government agency's data became more accurate in the 24 cities where the Chicago Mercantile Exchange began selling weather derivative contracts.

The contracts offer industries dependent on [good weather](#), such as farming and retail, a hedge against weather-related [financial risk](#). The [financial markets](#) began offering them in 1999 and base the settlements on daily temperature data measured by the [weather service's weather stations](#) at airports.

Amiyatosh Purnanandam, a finance professor at U-M's Ross School of Business, and Daniel Weagley, a [doctoral candidate](#) at Ross, studied the weather service data both before and after the contracts went on the market in the cities where they were sold along with cities where they were not offered.

NWS stations report [weather data](#) based on the readings of weather stations typically located at the city's main airport. Since these readings are taken in a field setting, sometime they are erroneous due to calibration error, poor maintenance, or external interferences. After some time delay, the agency issues corrected or cleaned temperature value after correcting for these errors in the raw data.

Several private agencies also carefully look at this data to come up with the cleaned temperature value. The researchers computed the difference between raw and cleaned temperature values and considered the difference as the measurement error.

They compared the measurement error rate of a weather station before and after the introduction of the derivative contract. After the introduction of weather derivatives, the station's error rate comes down by about 10 percent.

The errors often come from equipment malfunction, improper installation of the equipment or improper calibration and maintenance of the station.

"These stations have lower incidence of inaccurate data after their recorded temperature numbers become reference points for billions of dollars of financial contracts in an open market," Purnanandam said.

More than \$3 trillion of the U.S. economy is estimated to be associated with weather-sensitive industries such as energy, construction, food processing, retail and transportation.

"Our results are some of the first pieces of evidence that financial markets can produce better real outcomes even in the absence of any explicit incentive and monitoring mechanism in place," Purnanandam said.

So why does the weather service performance improve without explicit incentives?

Purnanandam and Weagley found two reasons: the possibility of reputation loss and the avoidance of future disputes and lawsuits.

As the weather-service-reported-temperature numbers become reference points for the settlement of a large volume of financial contracts, discrepancies in these numbers are more likely to create reputation damages for the agency.

"The resulting visibility and market scrutiny works as a disciplining device for the weather service by motivating them to minimize measurement errors," Weagley said.

Unlike corporate managers whose incentives are either directly or

indirectly tied to the firm's stock performance, there is no monetary incentive for the [weather](#) service.

It's proof, the researchers say, that the financial markets change behavior.

"The financial market is impacting the way these agencies are working and making decisions in the field," Purnanandam said.

More information: Study: [Can Markets Discipline Government Agencies? Evidence from the Weather Derivatives Market](#)

Provided by University of Michigan

Citation: Weather data scrutiny spurs government efficiency (2013, April 16) retrieved 25 April 2024 from <https://phys.org/news/2013-04-weather-scrutiny-spurs-efficiency.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--