



Subscribe



Fortune.com

Get customer service on your time. 

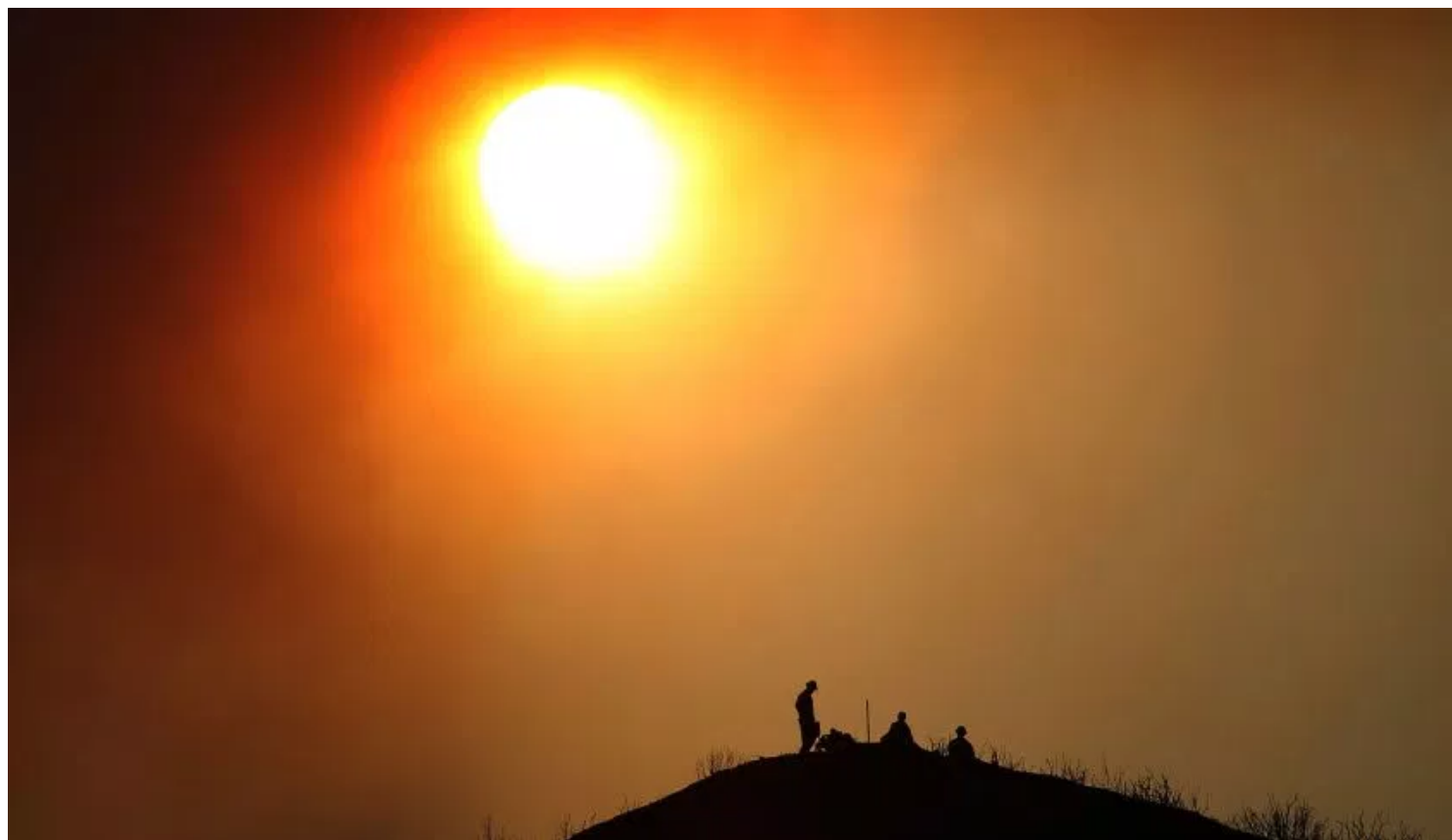
 **TD Ameritrade**

[GO ▶](#)

HEALTH ECONOMY

Science shows how climate change could make the world poorer

by Erik Sherman @eriksherman OCTOBER 21, 2015, 1:00 PM EDT



Photograph by David McNew—Getty Images

New research shows even small increases in average temperatures, linked to climate change, could cause a big hit to the GDP

Climate Change, Could Cause a Big Hit to the GDP.

Climate change is a powerful force. Various studies have linked it to **civil wars, faster rising food prices, water-supply challenges, and more violent storms**, among other things.

Now you can add one more item: a hit to our economic productivity.

In an **article in the journal Nature**, researchers at Stanford University and the University of California, Berkeley found that there's a "Goldilocks" temperature of about 13 degrees Celsius (55 degrees Fahrenheit) when per capita GDP growth is at a maximum. Decrease or increase the temperature and there's a significant negative impact on economic growth. Hello global warming, goodbye prosperity.

"People have long been worried that the effects on people in poor countries would be really negative and we confirmed that," said co-author Marshall Burke, an assistant professor in Stanford's department of earth system science. "One of the main findings is that rich countries are not isolated. Climate change could reshape the global economy. Rich countries are part of the story and could be impacted in important ways."

The researchers used economic data from the World Bank for 166 countries between 1960 and 2010 to see how GDP tracked temperature changes. The overall relationship and peak productivity temperature were fairly constant over time and across countries, true of both agricultural and non-agricultural sectors, and applicable to both rich and poor countries. The researchers were able to establish a relationship between changes in temperature and in GDP by comparing the results of warm, cool, and average years in each country.

"It just so happens that some of the largest economies around the world have average temperatures around 13 degrees Celsius [or 55 degrees Fahrenheit]," said Burke. That includes the U.S., much of Europe, Japan, and China. "It's the optimal temperature where humans are really good at producing stuff."

A big drop in productivity

However, as average temperature in a given country rises, GDP falls. For example, if next year in the U.S. the average temperature was 4 degrees Celsius, or 7 degrees Fahrenheit, higher than normal, you could expect to have lost one full percentage point of GDP growth.

It would be unrealistic to expect such a sharp leap overnight, but an average 4 degree increase by 2100 could be possible, along with 85 years of varying but accumulating productivity loss.

"We find the global impact on per capita GDP in the world would be 23% poorer relative to a world without climate change," Burke said. And 77% of countries would be poorer in per capita terms.

Looking at the macroeconomic results in the light of many studies that show how temperature affects human activity, the researchers found multiple factors that could help account for the loss of productivity, including the following:

Human health is often worse under hotter temperatures. There are more heart attacks in countries like the U.S. and more

deaths by disease — dengue and malaria, for example — in developing countries.

Labor productivity drops as temperatures climb.

Evidence shows that people make more mistakes and do worse on tests in hotter weather.

Human conflict rises with temperatures and that disrupts economic activity.

One main point of the research is to help identify a hard cost for not taking action to stem climate change, if that is even possible at this point.

“What’s going to be the impact if we don’t do anything different?” Burke said. “We calculate the benefits of mitigating climate change. Those benefits are really big and much bigger than what we thought before. Do the benefits exceed the costs? Our paper does not touch that issue, but it’s almost sure that’s true. These are really large negative impacts of climate change and we very likely have mitigation options that are much cheaper than from not taking them.”



Comments

Licensing

AROUND THE WEB

Sponsored Links by



HP Unveils Their Vision of Composable Infrastructure

(HP Next)



Get Free Solar Panels From The Government

(A Dollar Wiser)



New CA Solar Incentives?

(USSolarResource)



California Sets New Solar Energy Record

(Clean Energy CA - PG&E)