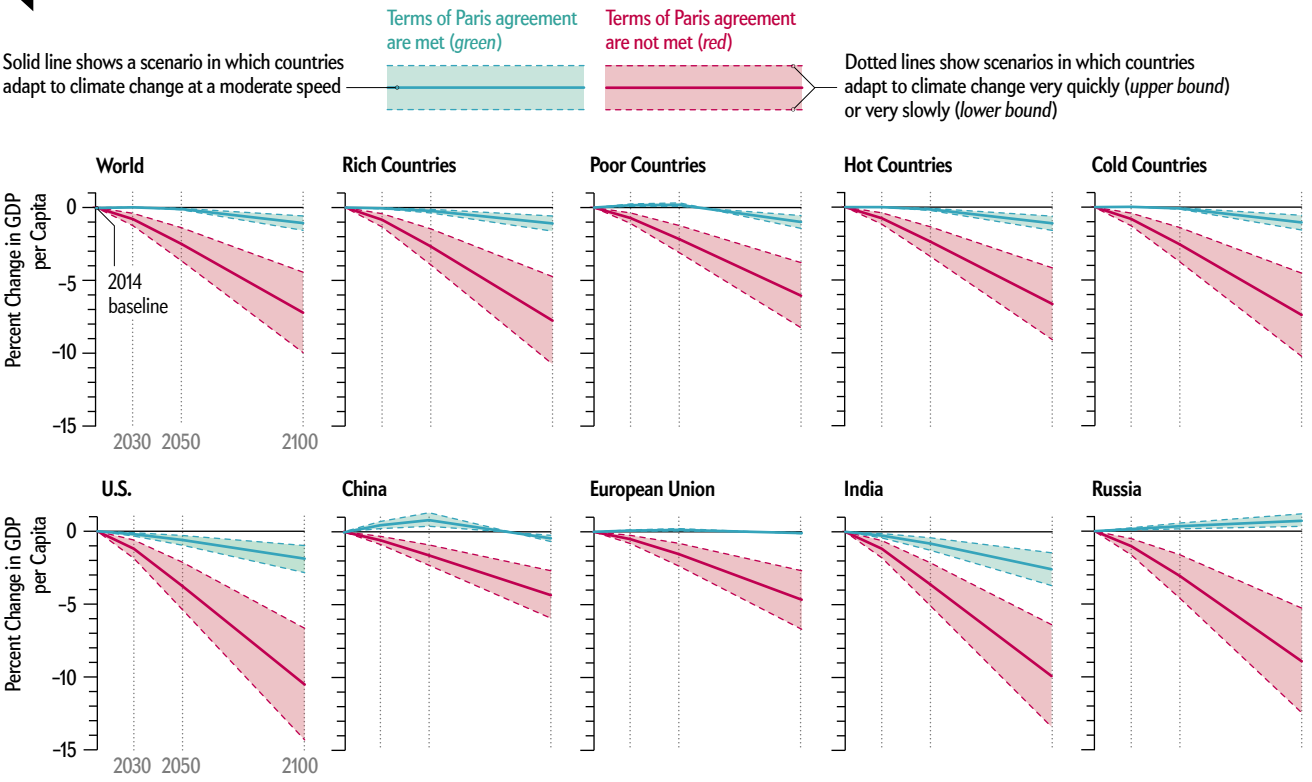

The Price of Warming

Countries rich and poor will take a financial hit

By Andrea Thompson

When a major heat wave engulfed western Europe in summer 2019, Paris and other cities recorded their highest temperatures ever. The furnacelike weather killed hundreds of people, and it exacted a financial toll in infrastructure damage, lost labor productivity and potentially lower agricultural yields. The situation illustrates how even relatively wealthy countries can take an economic blow from climate change.

That is a key message of a recent study from the nonprofit National Bureau of Economic Research (NBER). Earlier research has suggested that climate-related losses would be higher for poorer, hotter countries and that colder countries could even see economic benefits from warming. But this analysis indicates financial suffering will be widespread. "It doesn't matter what kind of country you are, you are going to get hit by climate change," says study co-author Kamiar Mohaddes of the University of Cambridge.

In a preliminary report for NBER, Mohaddes and other economists compiled per capita gross domestic product (GDP) and temperature data for 174 countries going back to 1960 to capture how above-normal temperatures have impacted income levels historically. They then projected that relation into the future to see how further warming could affect GDP, a measure of all the goods and services a country produces.

If greenhouse gas emissions continued to grow along their current trajectory, about 7 percent of global GDP would be lost by 2100, the researchers found. Rich and poor countries, as well as those with hot and cold climates, would all see GDP losses (*graphic*). The U.S. would lose 10.5 percent of its GDP, whereas Canada—which some economists say could benefit from warming because of expanded agriculture—would lose 13 percent.

Limiting emissions in accordance with the Paris climate agreement (which aims to keep global temperature rise below two degrees Celsius by 2100) would substantially stem the losses. Globally, the decline in GDP would be a mere 1 percent; in the U.S. and Canada, it would about 2 percent.

Unlike earlier studies, this one looked not just at temperatures but at how they deviate from the normal conditions to which societies have adapted. Although rich countries such as the U.S. may have more resources to compensate for swings away from those norms, the study results make clear that adaptation alone will not prevent major losses, Mohaddes says. "All of the infrastructure and the technology that we have mitigates the cost but cannot conceal it fully," says World Bank economist Stéphane Hallegatte, who was not involved with the study.

Both Mohaddes and Hallegatte say the projections most likely underestimate GDP losses because the study does not take into account the bigger variations in climate extremes expected in the future. SA

Andrea Thompson, an associate editor at *Scientific American,* covers sustainability.

SOURCE: "LONG-TERM MACROECONOMIC EFFECTS OF CLIMATE CHANGE: A CROSS-COUNTRY ANALYSIS," BY MATTHEW E. KAHN ET AL. NATIONAL BUREAU OF ECONOMIC RESEARCH, AUGUST 2019

Graphic by Amanda Montañez