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The Price of Climate Change

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The famous old quip about the weather — everyone talks about it but nobody does anything about it — is not as true as it once was. Alarmed by the threat of global warming, lots of people are actively trying to change human behaviors in order to change the weather.

Even economists are getting into the weather business. Olivier Deschênes of the University of California at Santa Barbara and Michael Greenstone of the Massachusetts Institute of Technology have written a pair of papers that assess some effects of climate change. In the first, they use long-run climatological models — year-by-year temperature and precipitation predictions from 2070 to 2099 — to examine the future of agriculture in the United States. Their findings? The expected rises in temperature and precipitation would actually increase annual agricultural production, and therefore agricultural profits, by about 4 percent, or $1.3 billion. This hardly fulfills the doomsday fears conjured by most conversations about global warming.

For other economists, meanwhile, the weather itself has proved useful in measuring wholly unrelated human behaviors. From an economist's perspective, the great thing about the weather is that there is nothing humans can do to affect it (at least until recently).

Contrast this with social changes that people enact: a new set of laws, for instance. Very often, new laws come about when there is a perception that a big social problem — think violent crime or corporate fraud — is growing worse. After a while, and after the laws have been enacted, the problem diminishes. So did the new laws fix the problem, or would it have improved on its own? Politicians will surely claim that it was their laws that fixed the problem, but it's hard to know for sure.

The weather, however, is different; the beauty of weather is that it does its own thing, and whether the weather is good or bad, you can be pretty sure that it didn't come about in response to some human desire to fix a problem. Weather is a pure shock to the system, which means that it is a valuable tool to help economists make sense of the world.

Consider 19th-century Bavaria. The problem there was rain — too much of it. As Halvor Mehlum, Edward Miguel and Ragnar Torvik explained in a recent paper, excessive rain damaged the rye crop by interfering with the planting and the harvest. Using a historical rainfall database from the United Nations, they found that the price of rye was significantly higher in rainy years, and since rye was a major staple of the Bavarian diet, food prices across the board were considerably higher in those years, too. This was a big problem, since a poor family at the time would have been likely to spend as much as 80 percent of its money on food. The economists went looking for other effects of this weather shock. It turns out that Bavaria kept remarkably comprehensive crime statistics — the most meticulous in all of Germany — and when laid out one atop the other, there was a startlingly robust correlation between the amount of rain, the price of rye and the rate of property crime: they rose and fell together in lockstep. Rain raised food prices, and those prices, in turn, led hungry families to steal in order to feed themselves.

But violent crime fell during the rainy years, at the same time property crimes were on the rise. Why should that be? Because, the economists contend, rye was also used to make beer. “Ten percent of Bavarian household income went to beer purchases alone,” they write. So as a price spike in rye led to a price spike in beer, there was less beer consumed — which in turn led to fewer assaults and murders.

It turns out that rainfall often has a surprisingly strong effect on violence. In a paper on the economic aftermath of the hundreds of riots in American cities during the 1960’s, William Collins and Robert Margo used rainfall as a variable to compare the cities where riots took place with cities where riots probably would have taken place had it not rained. Few things can dampen a rioter’s spirit more than a soaking rain, they learned. After two days of rioting in Miami in the summer of 1968 were finally quelled by rain, they write, the Dade County sheriff joked to The New York Times that he had ordered his off-duty officers to pray for more rain.

The economists Edward Miguel, Shanker Satyanath and Ernest Sergenti have written a paper that uses rainfall to explore the issue of civil war in Africa. Twenty-nine of 43 countries in sub-Saharan Africa, they note, experienced some kind of civil war during the 1980’s or 1990’s. The causes of any war are of course incredibly complex — or are they? The economists discovered that one of the most reliable predictors of civil war is lack of rain. Using monthly rainfall data from many different African countries (most of which, significantly, are largely agricultural), they found that a shortage of rain in a given growing season led inevitably to a short-term economic decline and that short-term economic declines led all too easily to civil war. The causal effect of a drought, they argue, was frighteningly strong: “a 5-percentage-point negative growth shock” — a drop in the economy, that is — “increases the likelihood of civil war the

following year by nearly one-half.”

Since the weather yields such interesting findings about the past, it makes sense that economists are also tempted to use it to anticipate the future. In their second paper on the potential effects of global warming, Deschênes and Greenstone try to predict mortality rates in the U.S. in the last quarter of the current century.

Unlike in their paper on agriculture, the news in this one isn’t good. They estimate, using one of the latest (and most dire) climatological models, that the predicted rise in temperature will increase the death rate for American men by 1.7 percent (about 21,000 extra fatalities per year) and for American women by 0.4 percent (about 8,000 deaths a year). Most of these excess deaths, they write, will be caused by hot weather that worsens cardiovascular and respiratory conditions. These deaths will translate into an economic loss of roughly $31 billion per year. Deschênes and Greenstone caution that their paper is in a preliminary stage and hasn’t yet been peer-reviewed and that the increased mortality rate may well be offset by such simple (if costly) measures as migration to the Northern states — a repopulation that, even a decade ago, might have seemed unimaginable.

Their paper on agriculture also has some wrinkles. While arguing that global warming would produce a net agricultural gain in the United States, they specify which states would be the big winners and which ones would be the big losers. What’s most intriguing is that winners’ and losers’ lists are a true blend of red states and blue states: New York, along with Georgia and South Dakota, are among the winners; Nebraska and North Carolina would lose out, but the biggest loser of all would be California. Which suggests that in this most toxic of election seasons, when there seems not a single issue that can unite blue and red staters (or at least the politicians thereof), global warming could turn out to be just the thing to bring us all together.

Stephen J. Dubner and Stephen D. Levitt are the authors of "Freakonomics." More information on the research behind this column is at www.freakonomics.com.