



The Value of Milder Weather

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Many Americans travel to escape the weather—we head to the beach in February or visit Maine in the summer. The weather can even factor into our moving decisions. As a result, we can think about climate as an amenity for which people are willing to pay. Understanding the amenity value of climate (what people are willing to pay to experience warmer winters or avoid hotter summers) is an important component of the benefits of climate policies. Household location decisions—which balance earnings opportunities and housing costs against local amenities, including summer and winter temperatures, rainfall, snowfall, and humidity—can provide some insight into this issue.

In recent research with my colleague Paramita Sinha of RTI International, we reviewed residential location choices for US households in 2000 to estimate

how much households are willing to pay for changes in mean winter and summer temperatures under two climate scenarios. Both are taken from the Intergovernmental Panel on Climate Change's *Special Report on Emissions Scenarios*, which presents a set of emissions scenarios based on different demographic, economic, technological, and environmental developments.

Scenario 1 is the more climate friendly, projecting that the atmospheric concentration of carbon dioxide (CO₂) will reach 550 parts per million (ppm) in the year 2100. As a result, on average, summer temperatures will increase by 3.3°F in 2050, and winter temperatures will rise by 3.4°F.

The more dramatic Scenario 2 leads to an atmospheric CO₂ concentration of 850 ppm, resulting in a 3.6°F rise in summer temperatures and a rise of 2.1°F in winter temperatures, on average.

Our results indicate that households are willing to pay to avoid cold winter temperatures and hot summer temperatures; however, these values vary significantly by

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residential location. In general, we see the following:

» *A connection between willingness to pay and where the household lives.* Unsurprisingly, we find a strong positive correlation between a household's willingness to pay for warmer winter temperature and the average temperature of the household's city: households that are willing to pay the most for warmer winters live in Florida, whereas those that are willing to pay the least live in the Midwest.

» *A connection related to weather tolerance.* Preferences for summer temperature and winter temperature are, however, an inverse relationship—households that prefer milder winters prefer milder summers, while households that prefer colder winters don't seem to mind the heat as much either (they are less willing to pay to reduce summer temperatures). As a result, households in the Midwest, on average, are willing to pay less to increase winter and reduce summer temperatures than households in the Pacific and South Atlantic regions.

» *The importance of regional preferences.* Although there is considerable variation, these patterns point to the importance of understanding and correctly accounting for regional preferences. Under future warming scenarios, winter temperature is likely to increase the most at northern latitudes, specifically in the Midwest and Northeast. But these areas have lower-than-average willingness to pay for warmer winters. This means that using an average willingness to pay for warmer winters for the entire United States is likely to overstate the value of warmer winters under most climate scenarios.

At the same time, households' willingness to pay to avoid hotter summers is greatest in the areas that are expected to experience about average increases in summer tempera-

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ture: the South and parts of southern California. Thus, using average willingness to pay for cooler summers will understate the value of avoiding hotter summers.

Together, these results suggest that ignoring regional preferences could understate the value of avoiding climate change. Taking them into account, we find that, aggregated over the entire United States, households are willing to pay 1 percent of their income to avoid the more climate-friendly Scenario 1 and approximately 2.4 percent of their income to avoid the more dramatic climate changes seen in Scenario 2.

Estimates of market-based damages associated with climate change in the United States have typically been in the range of 1 percent of gross domestic product for an increase in mean temperature of 2°C (3.6°F). Because Scenario 2 would result in average increases of 3.6°F in summer temperature and 2.1°F in winter temperature, our results suggest that the amenity value of climate could significantly increase estimates of climate damages, even for moderate temperature increases. ●

FURTHER READING

Sinha, Paramita, and Maureen L. Cropper. 2016. Household Location Decisions and the Value of Climate Amenities. Discussion paper 16-02. Washington, DC: RFF.