Climate Change and Labor

Climate change may affect labor in a number of ways, but projections of hotter summer temperatures raise a particular concern. Extreme summer heat is increasing in the U.S. and will be more frequent and intense in the future. Heat exposure can affect workers’ health, safety and productivity. When exposed to high temperatures, workers are at risk for heat-related illnesses and therefore may take more frequent breaks, or have to stop work entirely, resulting in lower overall labor capacity. This is especially true for high-risk industries where workers are doing physical labor and have a direct exposure to outdoor temperatures (e.g., agriculture, construction, utilities, and manufacturing).

Risks of Inaction

Without global GHG mitigation, an increase in extreme heat is projected to have a large negative impact on U.S. labor hours, especially for outdoor labor industries. In 2100, over 1.8 billion labor hours across the workforce are projected to be lost due to unsuitable working conditions (95% confidence interval of 1.2-2.4 billion). These lost hours would be very costly, totaling over $170 billion in lost wages in 2100 (95% confidence interval of $110-$220 billion).

As shown in Figure 1, the majority of the country is projected to experience decreases in labor hours due to extreme temperature effects. In 2100, parts of the Southwest and Florida are estimated to experience a decrease in hours worked for high-risk industries ranging from -5% to -7%. Although the impacts vary by region, only a limited number of counties are projected to experience increases in labor hours.

Figure 1. Impacts of Unmitigated Climate Change on Labor in the U.S.
Estimated percent change in hours worked from 2005 to 2050 and 2100 under the Reference scenario. Estimates represent change in hours worked at the county level for high-risk industries only, and are normalized by the high-risk working population in each county.
Reducing Impacts through GHG Mitigation

At the national level, impacts to labor under the Mitigation scenario (Figure 2) are substantially smaller compared to the Reference (Figure 1). Counties in the Southwest, Texas, and Florida that are estimated to lose up to 7% of high-risk labor hours under the Reference in 2100 do not experience such losses under the Mitigation scenario.

When comparing the two scenarios (Figure 3), global GHG mitigation is projected to prevent the loss of approximately 360 million labor hours across the workforce in 2050, saving nearly $18 billion in wages. In 2100, the avoided loss of labor hours more than triples, and losses are substantially reduced over a majority of the contiguous U.S. Specifically, mitigation is estimated to prevent the loss of nearly 1.2 billion labor hours and $110 billion in wages in 2100 compared to the Reference.

**Figure 2. Labor Impacts in the U.S. with Global GHG Mitigation**

Estimated percent change in hours worked from 2005 to 2050 and 2100 under the Mitigation scenario. Estimates represent change in hours worked at the county level for high-risk industries only, and are normalized by the high-risk working population in each county.

**Figure 3. Economic Impacts to Labor with and without Global GHG Mitigation**

Estimated wages lost under the Reference and Mitigation scenarios for all labor categories in the contiguous U.S. (Billions 2014$). Error bars represent lower- and upper-95% confidence intervals of the dose-response function. For more information on the CIRA approach for the labor sector, please refer to Graff Zivin and Neidell (2014) and Section G of the Technical Appendix for this report.