The Coalition of Finance Ministers for Climate Action

Heat waves, labor productivity, and incomes in India: a rising need for adaptation policies

Environment for Development Initiative

A contribution to the 'Compendium of Practice from a Global Community of Ministries of Finance and Leading Organizations: Economic analysis and modeling tools to assist Ministries of Finance in driving green and resilient transitions'

Topic: Addressing the climate policy questions facing Ministries of Finance: the economic and fiscal impacts of climate change

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Climate change has fiscal implications, operating via a reduction in the tax base if output declines and via a need for increased expenditure on adaptation and social insurance. The impacts of global warming on agriculture are well documented. More recent research has assessed the impacts on the manufacturing and service sectors, which constitute the overwhelming share of the tax base in most countries. For example, research in India has shown that in the absence of climate control, worker productivity declines on hot days. Workplace adaptation (i.e., climate control alone) is insufficient to mitigate the effect of heat on absenteeism. The formal manufacturing sector experiences an output loss of about 2% per degree increase in temperature (Somanathan et al., 2021).

Impacts on the informal sector that accounts for 80% of employment may be much more severe. Das and Somanathan (2024) conducted daily surveys of about 400 informal-sector workers in a variety of occupations in summer 2019. They found that a one-degree increase in wet bulb temperature (which indicates the impact of humidity on perceived heat) was associated with a fall in income of nearly 19%. For a one-degree increase in mean temperature, the income decline was about 16%. Since the temperature will continue to increase (as seen in that year's unprecedented heat wave in northern India) such large effects concentrated in hot months on urban workers are going to have to be addressed. Public policy must respond by enabling adaptation as well as social insurance. This will have fiscal implications that the Indian Ministry of Finance will need to plan for.

Das and Somanathan (2024) calculate that about 320 million informal-sector workers worldwide, most of them in low- and middle-income countries, are already exposed to comparable heat for at least one month a year. These results, therefore, have implications across the tropical and sub-tropical developing world. Their research was conducted at the Centre for Research on the Economics of Climate, Food, Energy and Environment (CECFEE), at the Indian Statistical Institute, New Delhi. CECFEE also hosts EfD India.

References

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