

# Labour sector update

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# Introduction

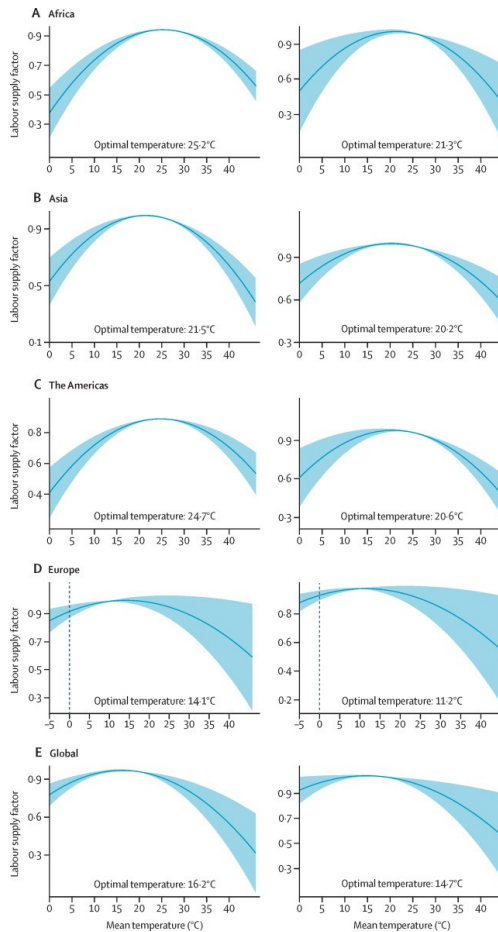
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- Labour accounts for a significant share of the total valued added, as much as 50% in some sectors
- Our work improves the exposure-response functions on the impact of warming on global and regional labour
- Compute future climate impacts under warming scenarios
- **Attributing labour force impacts to historical climate change**
- **Parameterizes macroeconomic modelling**
- **Critical to incorporate adaptation**



# Exposure-response functions

- We use micro surveys from ~150 countries for 30 years
- Low-exposure (outside in the shade or indoors, e.g., manufacturing) and high-exposure (outside with no shade e.g., agriculture and construction)
- Publicly available

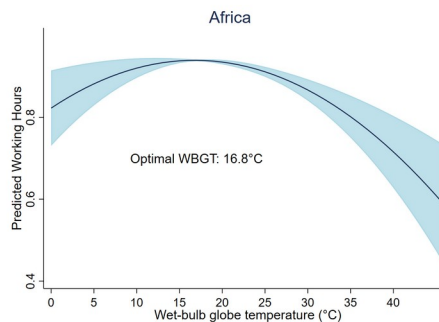
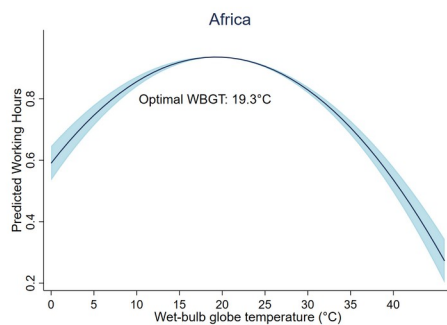


# WBGT - labour supply response functions

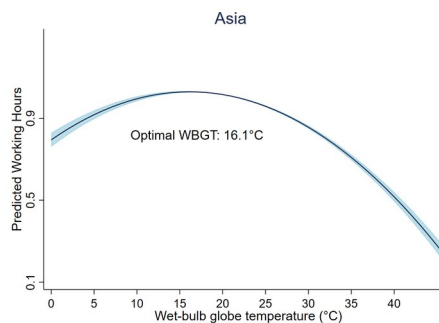
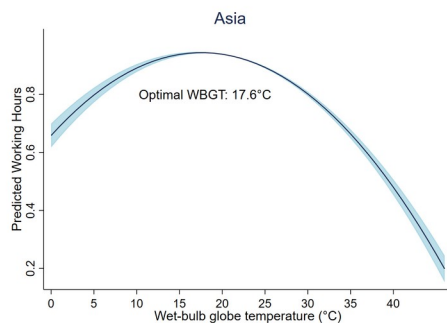
Indoor/outdoor in the shade

Outdoor in the sun

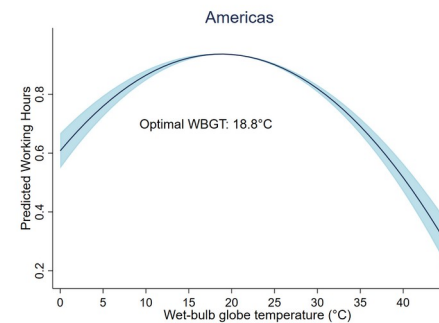
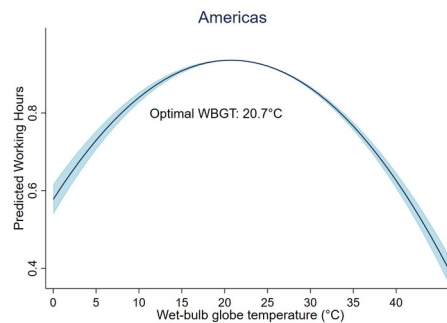
Africa



Asia



Americas



- Stull (2011) method to quantify WBGT
- Hobbs (1977) and Salby (1996) to compute RH

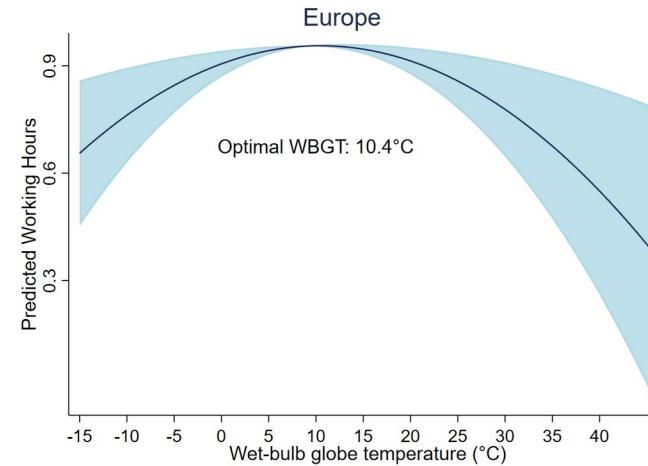
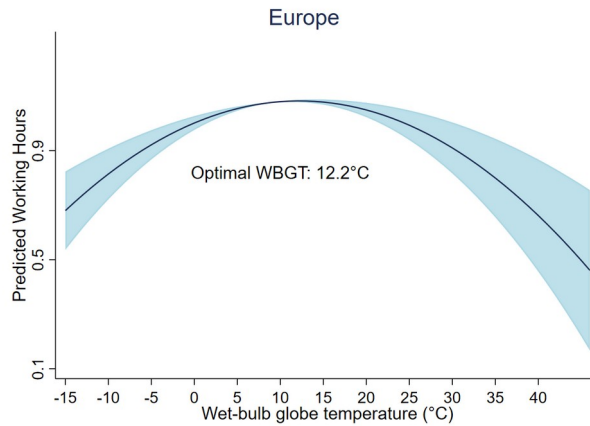


# WBGT - labour supply response functions

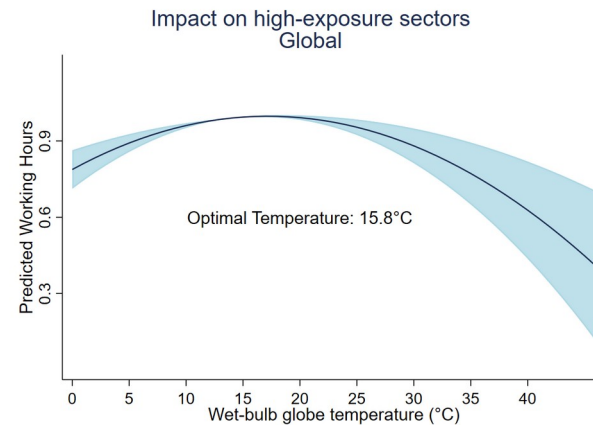
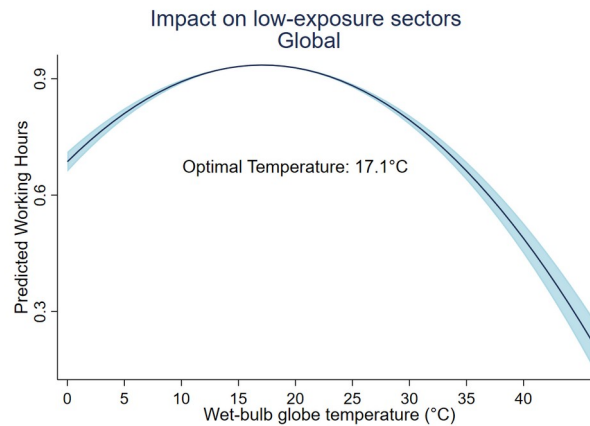
Indoor/outdoor in the shade

Outdoor in the sun

Europe



Global



# Heat stress and the labour force – A review

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- Invited to review for Nature Reviews Earth & Environment
- First review looking explicitly at three labour force outcomes
  - labour supply, labour productivity, and labour capacity
- We address these dimensions of labour separately, responding to a gap in the existing literature
- A better understanding of the differentiated impacts of warming on labour supply, productivity, and worker health, is needed
- For individuals, firms, and governments, to undertake adaptation measures and interventions to protect workers, and enhance firm profitability
- Heat affects labour in multiple ways, with these effects being heterogeneous across regions and sectors
- Both labour supply and productivity are projected to decrease under future climate change in most parts of the world, particularly in tropical regions



# Findings

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- Parts of sub-Saharan Africa, south Asia, and southeast Asia are at highest risk under future warming
- Highest impacts in the high-exposure outdoor sectors (e.g. agricultural and construction) in tropical regions in Southeast Asia and sub-Saharan Africa
- These impacts have clear welfare implications as workers in these sectors also tend to be relatively low-income earners
- Increased exposure to heat affects workers' health and increase the risk of occupational injuries, with increased incidences of cardiovascular, respiratory, and kidney diseases being reported among outdoor workers
- Future warming is expected to worsen impact on the labour force even in relatively colder regions such as Europe
- Projections suggest that mitigation efforts can deliver significant global co-benefits across all sectors and regions



# Criticisms

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- At the same time, adaptation will be required to protect workers from increased heat stress
- There is insufficient detailed information for informed actions, whether by workers and their representative unions, employers, or governments
- Exposure response-functions have to date been based on a small number of observations from a very limited number of locations and workers
- Significant parts of the literature are essentially numerical exercises that combine these response functions without empirical foundation
- Resulting in biases and errors that are not always sufficiently clarified when the outcomes of models are used for policy-related work





# Future research

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- Contextualized design of local policies needs in-depth deep-dive country studies that incorporate local contexts
- Such studies combined with improved response-functions would be also required for policy relevant projections of future climate change impacts
- Identify hotspots to improve targeting of labour protection policies
- To ensure that research provides relevant guidance to policy makers, geographical coverage of research needs to be expanded
- Examining the efficacy of labour protection interventions is inadequate and needs to be prioritised to aid the targeting and effectiveness of such policies
- Existing literature assumes that heat-labour impacts are purely based on biophysical elements, with little consideration of socioeconomic factors
- Differences in vulnerability between workers and their occupational settings, e.g., outdoor jobs have not been often considered



# Future research

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- Lack of consideration of adaptation may lead to inaccuracies in estimating the severity of heat stress and the effectiveness of mitigation policies
- Incorporating adaptation strategies may improve assessments of economic consequences of future climate change impacts on labour
- Collaboration with occupational safety and health institutions, and regulators, is necessary to create early warning systems that
- Combined with heat health action plans, can safeguard workers
- Can serve as the foundation for designing tailored plans to protect workers from extreme heat, maximum temperature benchmarks for work to occur
- Collaboration with labour unions, occupational safety and health institutions, and regulators
- In light of evolving societal structures, there is a growing need for research on the green transformation of the labour force



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**Thank you!**

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