

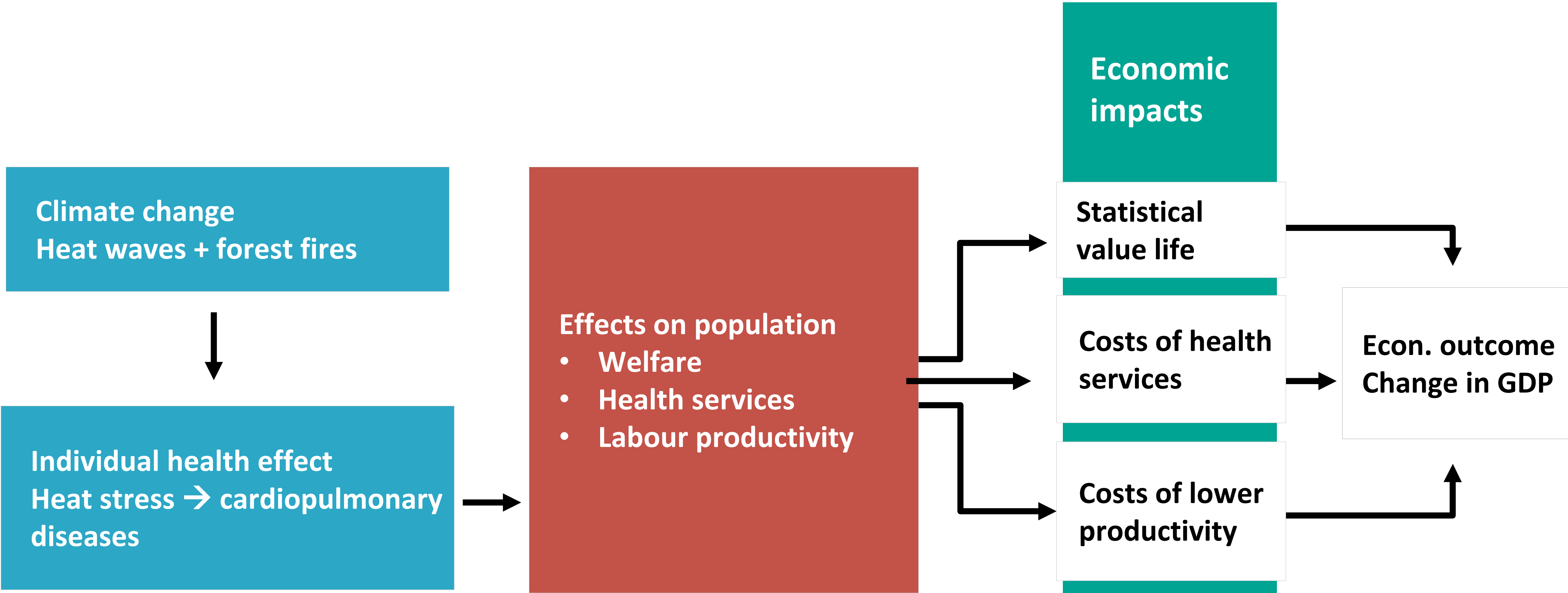


Social and economic consequences of health effects caused by climate change

Policy Conference

Asbjørn Aaheim and Lin Ma (CICERO)

Standard approach for economic impact assessment: bottom-up approach



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Micro-level



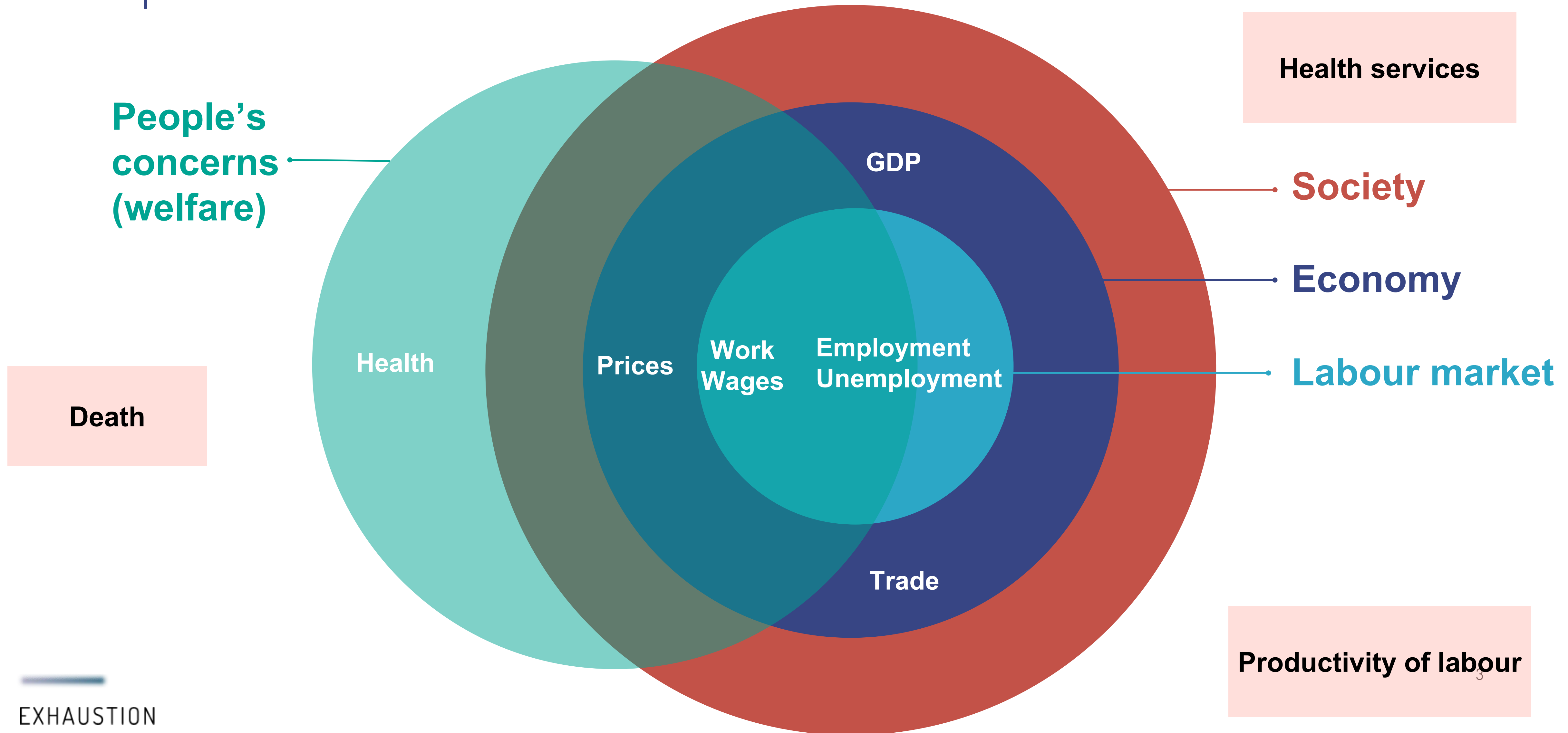
Intermediate level



Macro level



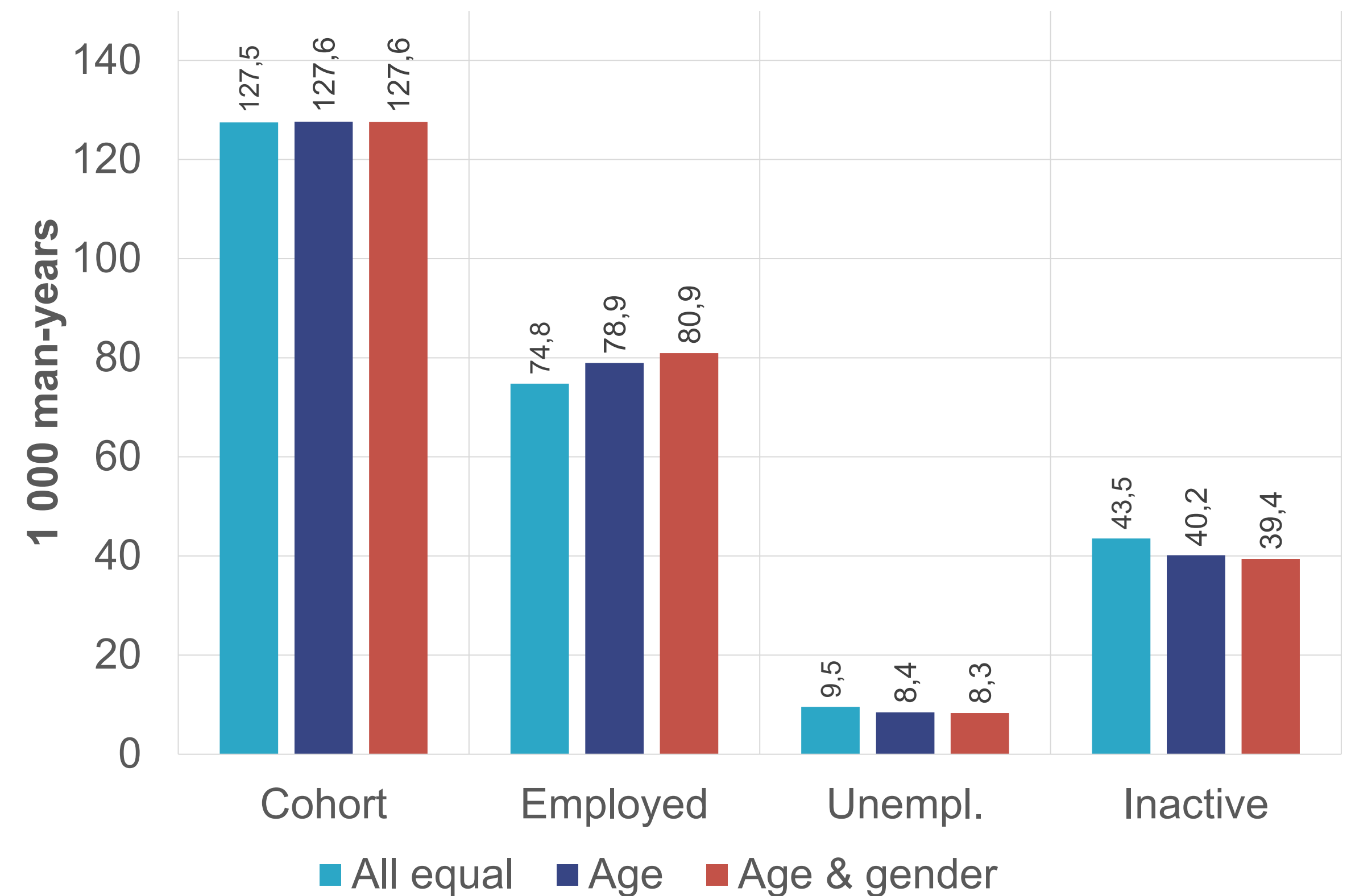
Complementary method: A top-down method for assessing socioeconomic consequences



Importance of considering impacts for different groups of people

- Converting physical information into socio-economic assessment is complicated and challenging.
- Traditional methods often assume a standard value for a year of a person's life across the entire population.
- However, how the aggregated of people is affected depends on how different people within the aggregate are affected.
- By including group differences, we also get a little closer to the assessment at the micro-level.

Change in the number of sick days in the workforce for a single extra sick day due to climate change

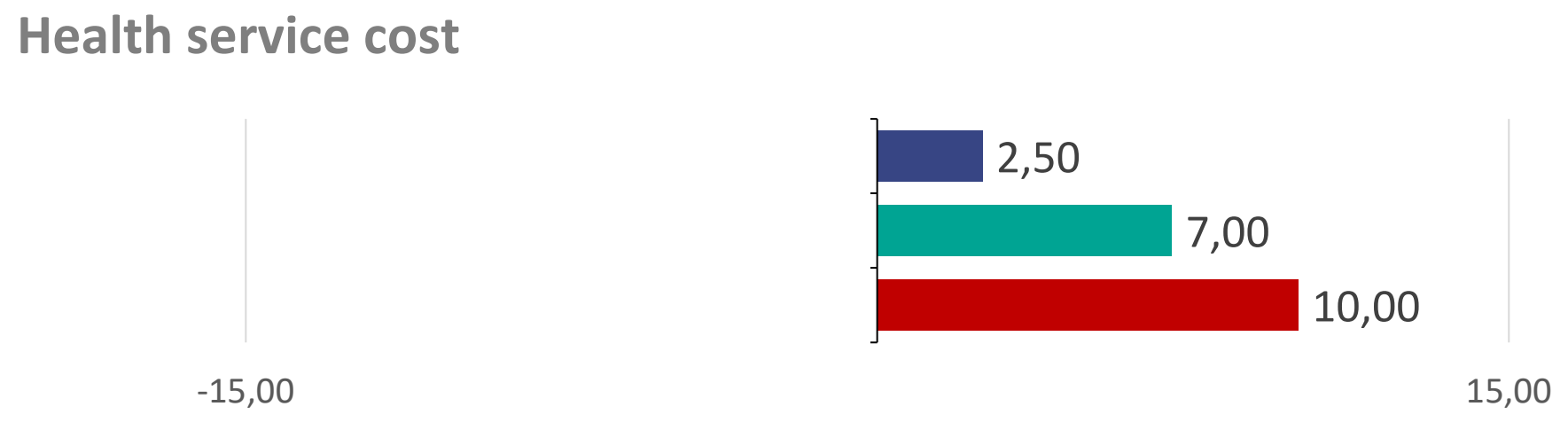
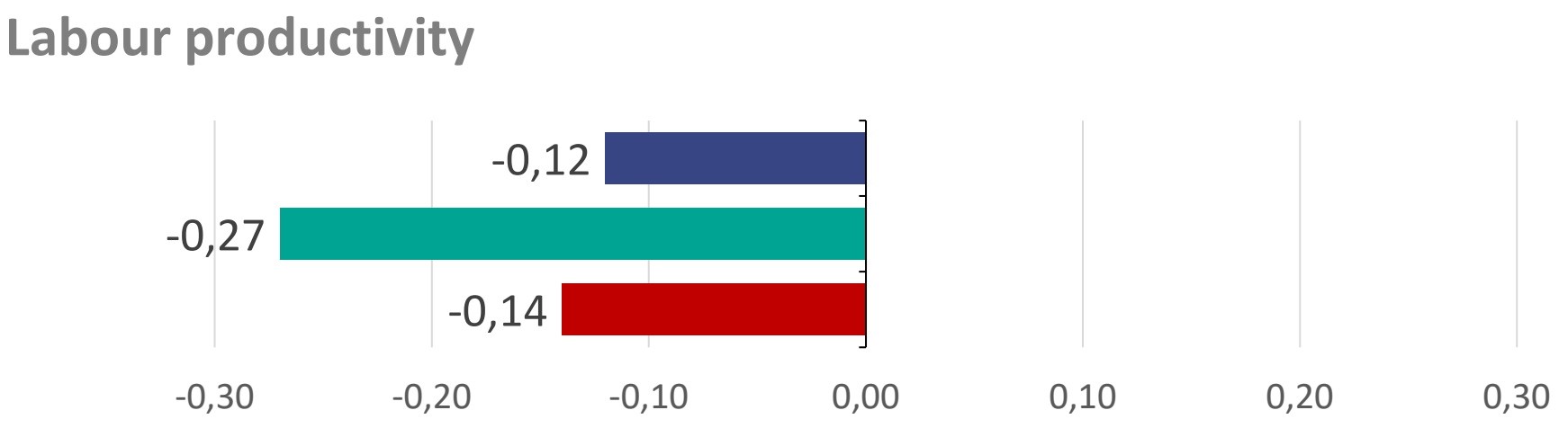


A holistic top-down assessment on the health effects

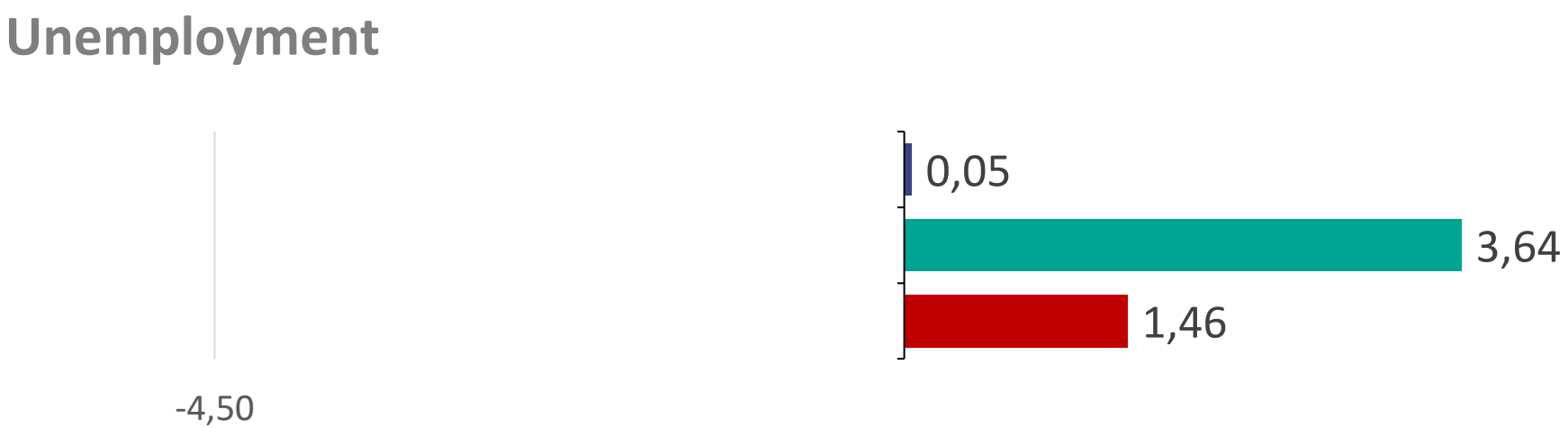
- A macroeconomic model (GRACE) extended with labour market module (LAMENT) is employed to address the socioeconomic implications of the health effects and resulting responses
- We have a focus on the UK, Italy and Norway.
- Climate change-induced health effects are derived from micro-level data and integrated into the economic model:
 - how much work is missed due to heat-related sickness,
 - how much more we might have to spend on healthcare because of climate change.
- The heterogeneous impacts for different age-sex groups of people are included to evaluate the aggregated consequences.

A diverse and uneven distribution of socioeconomic impacts

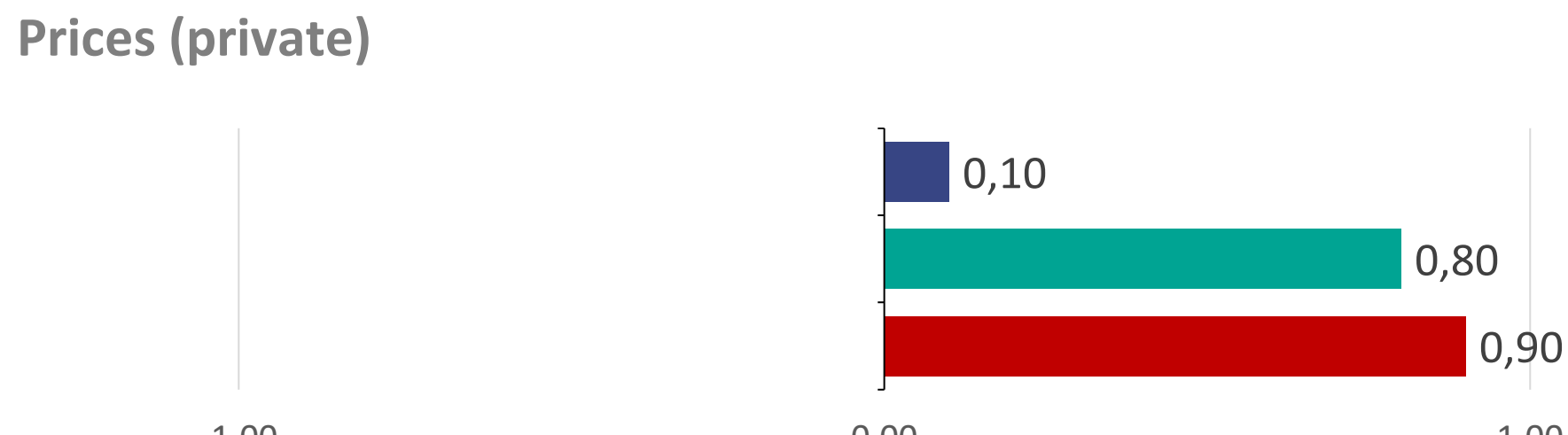
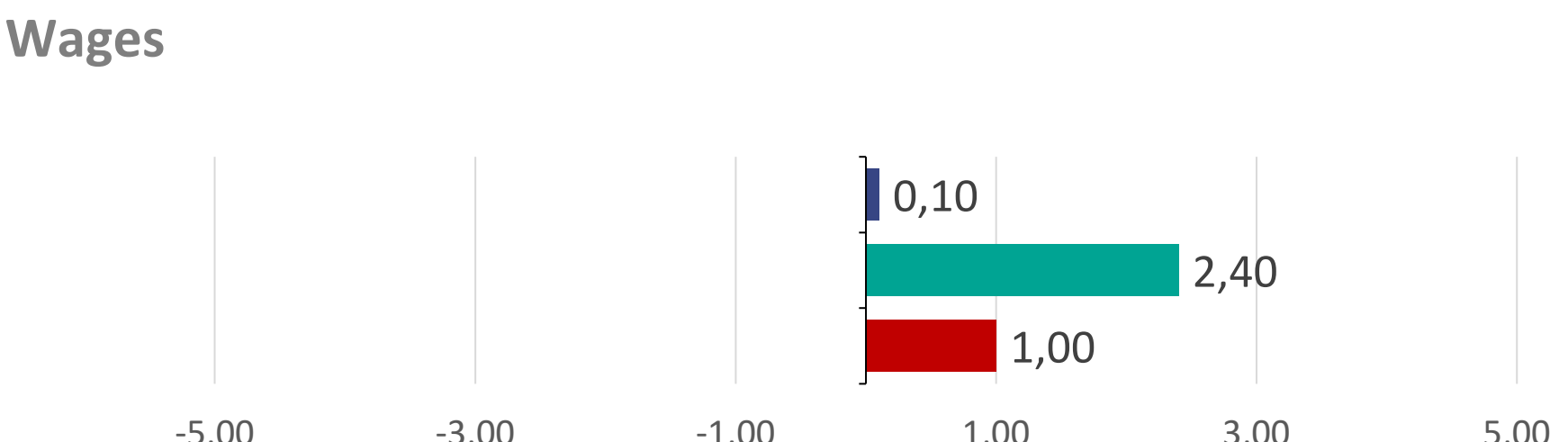
Direct impacts



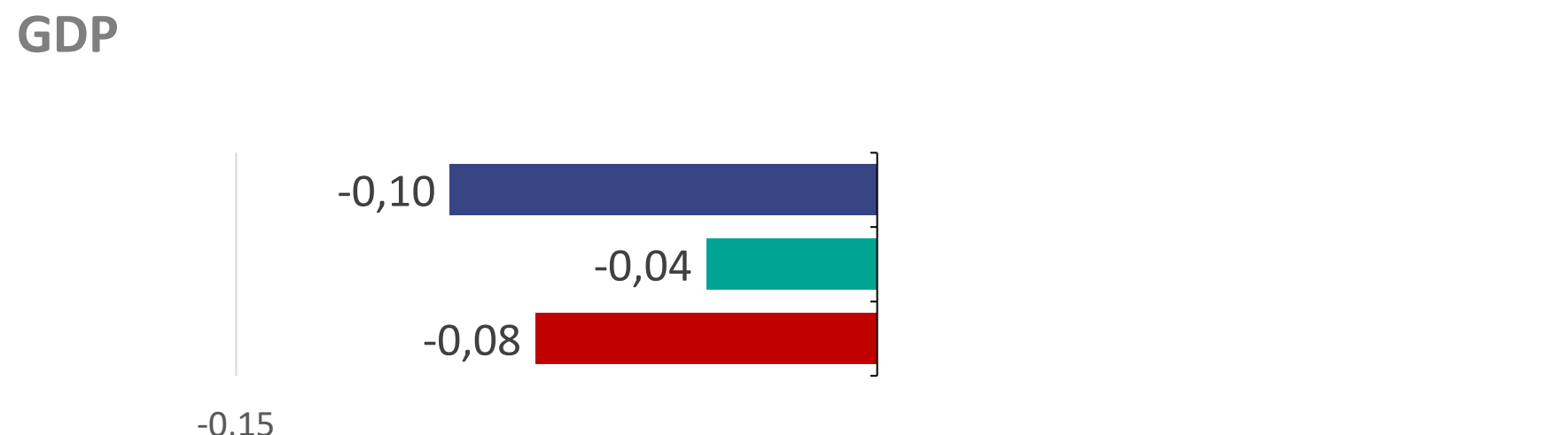
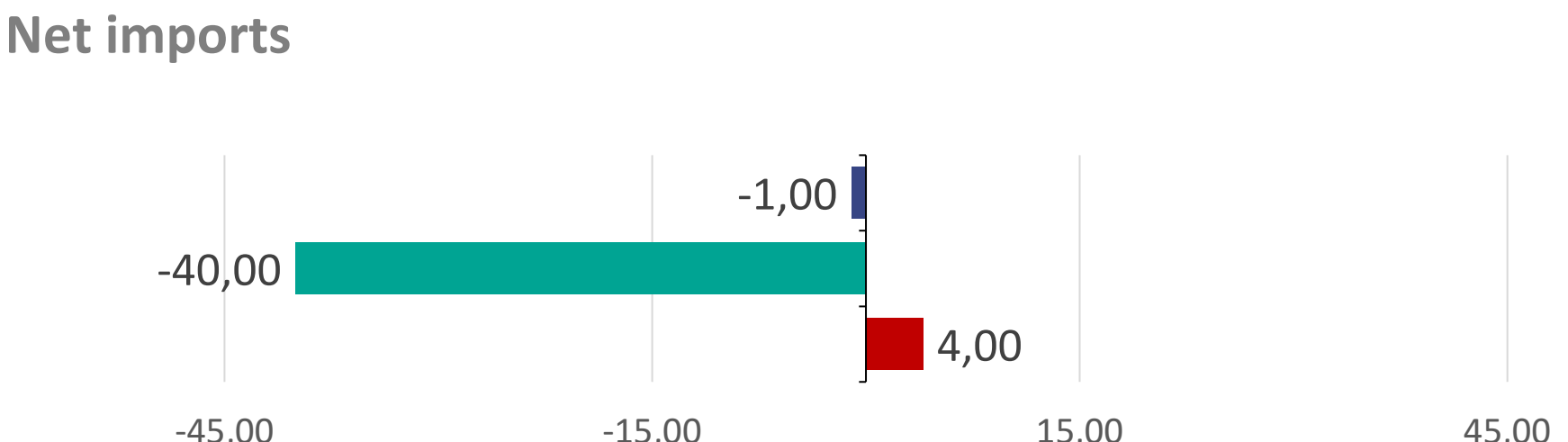
Social impacts



Market effects



Socioeconomic consequences



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Norway

Italy

UK

Key takeaways

- **Emphasizing a macroeconomic approach:** A systematic macroeconomic (top-down) approach is highly recommended when evaluating the broad socioeconomic impact of climate change, with particular attention to the health effects.
- **Acknowledging heterogeneity in policy making:** In formulating policies or making decisions at a macro level, it is crucial to consider how individuals within a population are differently affected.
- **Highlighting differences in impact across countries:** Our analysis shows diverse and uneven socioeconomic impacts of health effects due to climate change among countries. This highlights potential distribution effects within Europe, which should be considered for policymakers.

Thank you!

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The Impact of Heat Stress on Labor Productivity

Research policy and data infrastructure needs

Matteo Pinna Pintor (LISER)

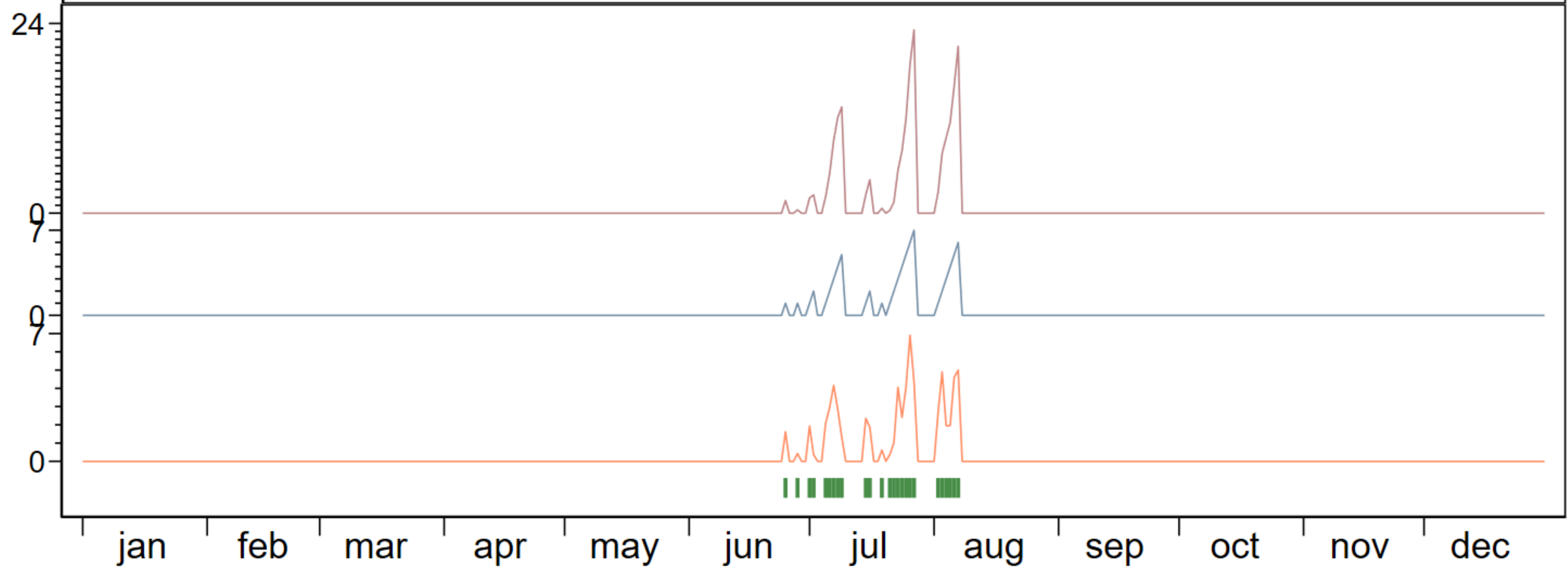
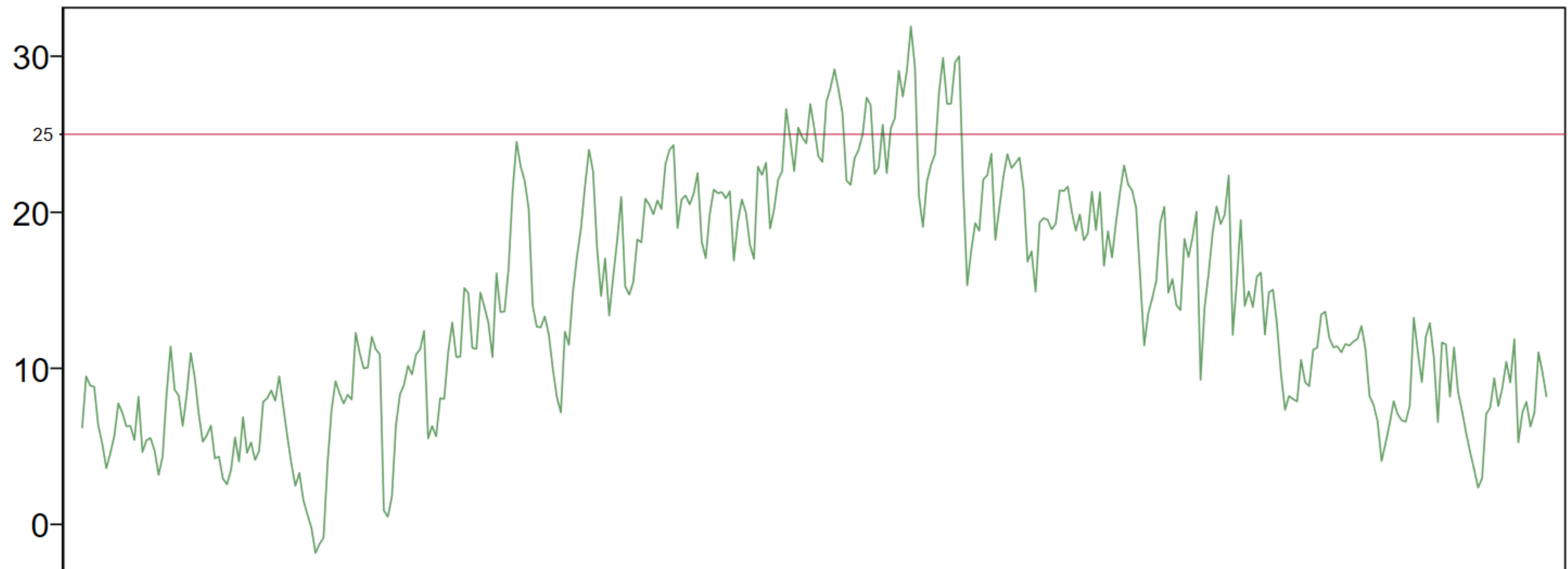
Introduction

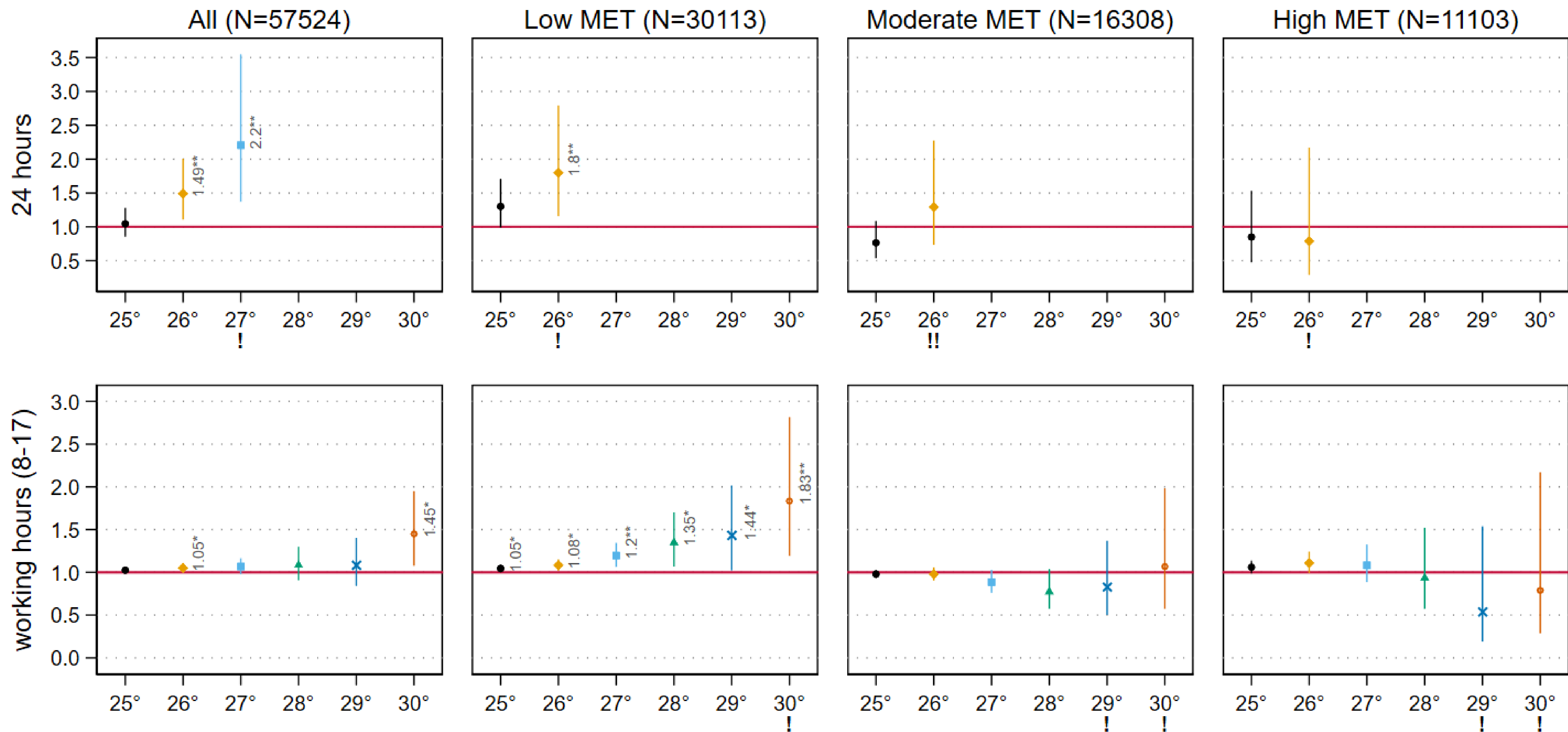
- Heatwaves increasingly recognized as major source of economic damage from climate change.
- Uncompensated heat stress leads not only to morbidity and mortality. Main compensation is to lower activity and effort, including at work.⁽¹⁻⁴⁾
- As social cost of carbon component, heat-related productivity loss “has not received sufficient attention” (Tol, 2018).⁽⁵⁾ Growing evidence,^(6, 7) but substantial gaps.

Missing: population-wide impacts of heat on effort at work, in temperate climates

Impacts of temperature on presenteeism in England and Wales

- Health and socio-economic data. ⁽⁸⁾
 - Understanding Society panel survey, England and Wales, 2010-2019.
 - Productivity measured by PRESENTEEISM: *“During the past 4 weeks, how much of the time have you [accomplished less than you would like] with your work or other regular daily activities as a result of your physical health?”*
- Heat data: ERA5-LAND database (ECMWF, Copernicus).⁽⁹⁾
 - Hourly mean temperature \approx 9 km resolution assigned to small areas
 - Working individuals linked to temperature during past 4 weeks in small area of residence.
 - Multiple heat exposure indicators assessed.
- Regression analyses comparing heat-exposed and ‘control’ individuals, adjusting for differences between regions, years, individual characteristics.
- Separate results for sedentary/physically demanding occupations⁽¹⁰⁾, men and women.





Summary

- Heat stress associated to 1.5 to 2.5 times higher incidence of presenteeism.
- Impact concentrated in sedentary jobs, precise dose-response for women vs. sudden/imprecise effect for men. Why?
 - Workers in sedentary jobs less able/trained to adapt?
 - Reporting effects (performance benchmarks)?

Even using a high-quality survey, observations and variables are insufficient to explore and understand further these results.

Recommendations

- Limited scope to estimate labor outcomes of heat stress with general-purpose data. Dedicated data infrastructure needed.
 - Heatwaves sparse in time/space: surveys require oversampling.
 - To capture short-term individual work output in high-income labor markets: self-reported losses (quantifiable, benchmarked) complemented with firm data (eg hourly absences).
 - Measure moderators: health relevant for thermoregulation, individual habits and investments, built environment.
 - Linkable to data on local climate, infrastructure, policies.

Long-term solution: occupational heat stress surveillance

- 1. Routine surveys of firms and workers immediately after a heat spell.**
- 2. *Ad hoc* surveys in vulnerable occupations (eg food delivery, construction)**
- 3. Evidence-based legislation on compensation, days off, breaks, cooling.**

THANKS FOR LISTENING

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