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Water and Climate Change: From Global Dynamics to Local Challenges

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ifo Center for Energy, Climate and Resources

Coping with the risks of climate change

Analyzing impacts of climate change risks on households, firms, and regions, and developing evidence-based insights and policy responses

For example:

Local/national level: Adaptation to climate change

Global/regional level: Impacts of trade, technological development and climate polices on CC risks …

Investing in the transition to a climate-resilient economy

Analyzing investment behavior, financial regulation and climate policy shape investment in the low-carbon transition

For example:

Impact of reporting requirements on firms

Investment into power generation of different economic actors

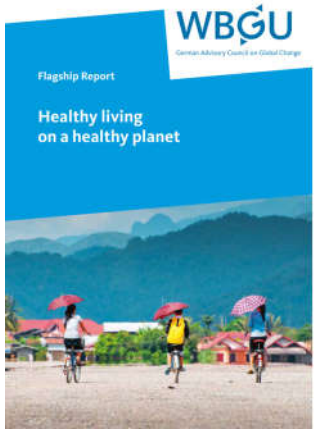
WBGU (Advisory Council Global Change)

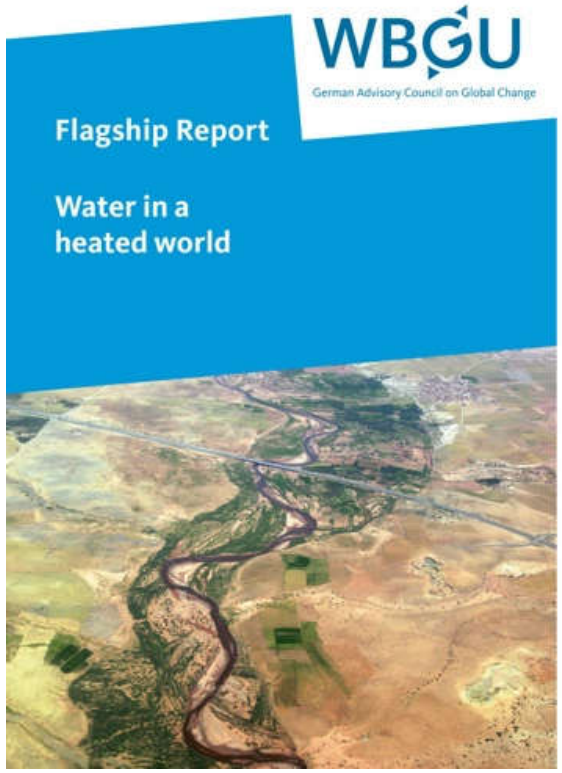
Strategic long-term advice to the German Government

9 interdisciplinary members (+ Secretariat)

Appointed for 4 years

Latest Flagship report: Water in a heated world





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Global challenges and a climate-resilient water management

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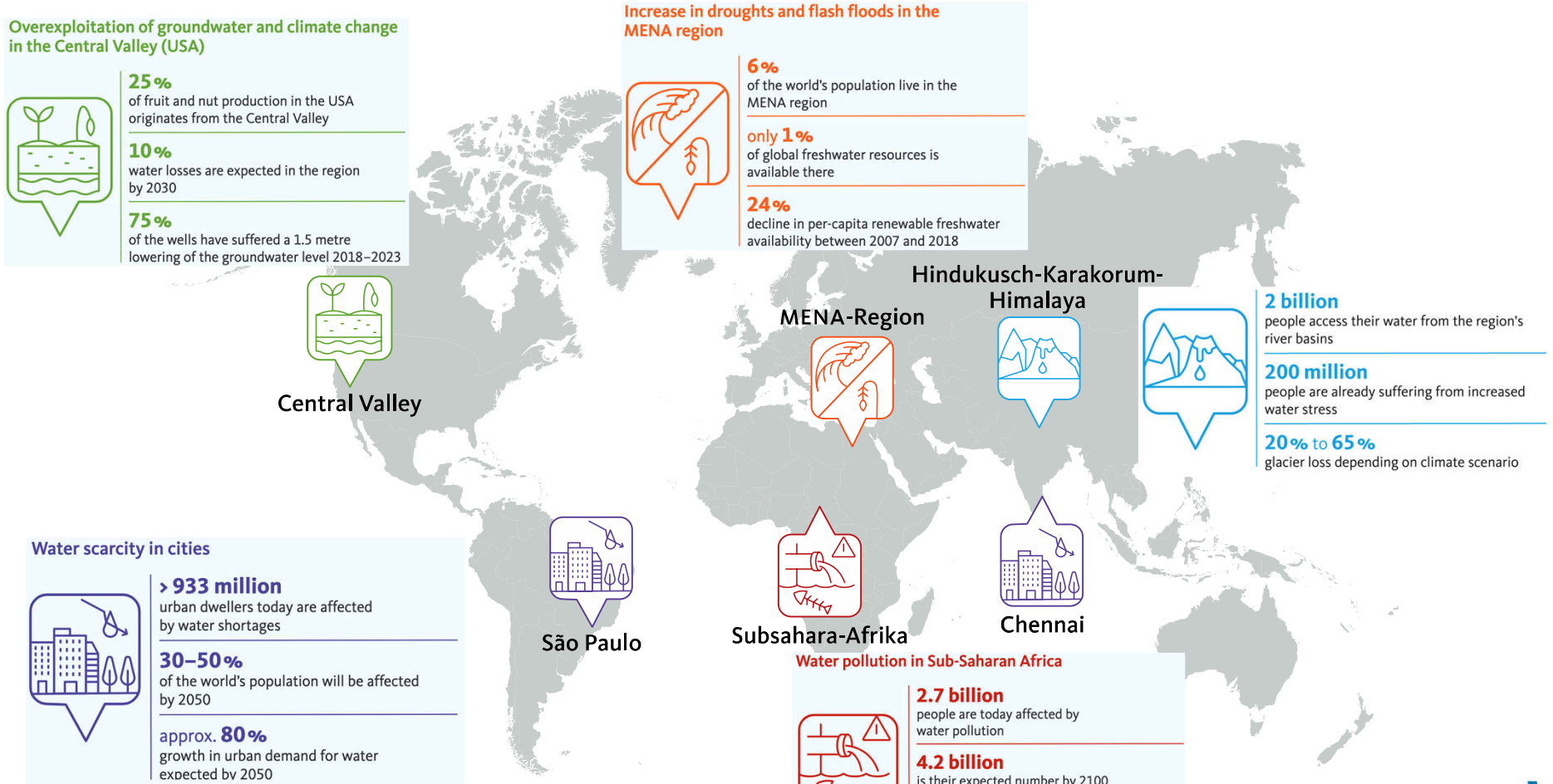
Regional water crises with a planetary dimension



Source: WBGU 2024

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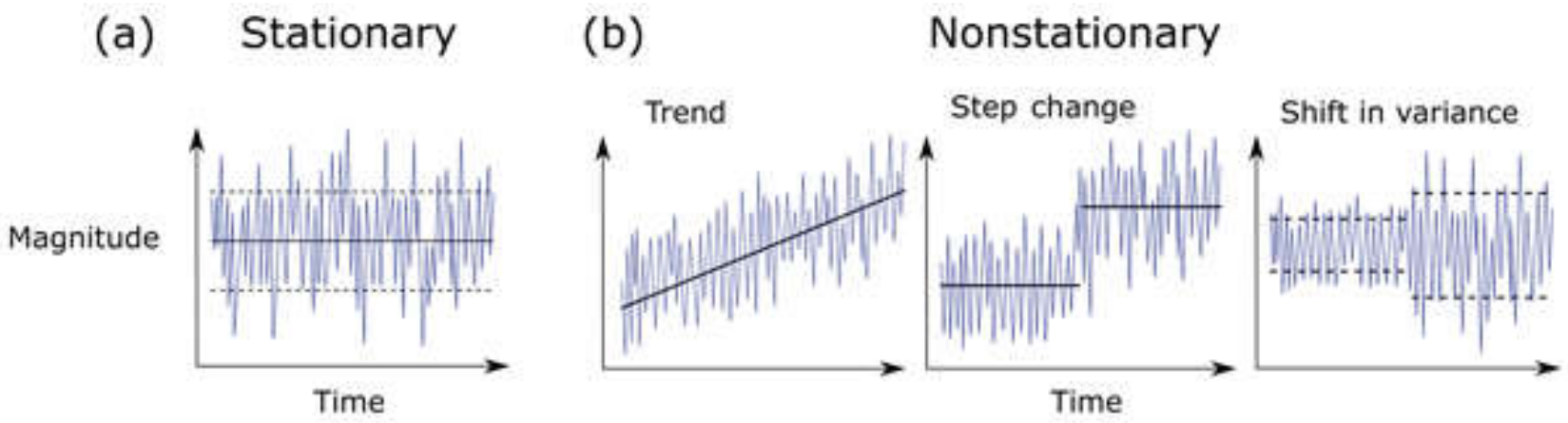
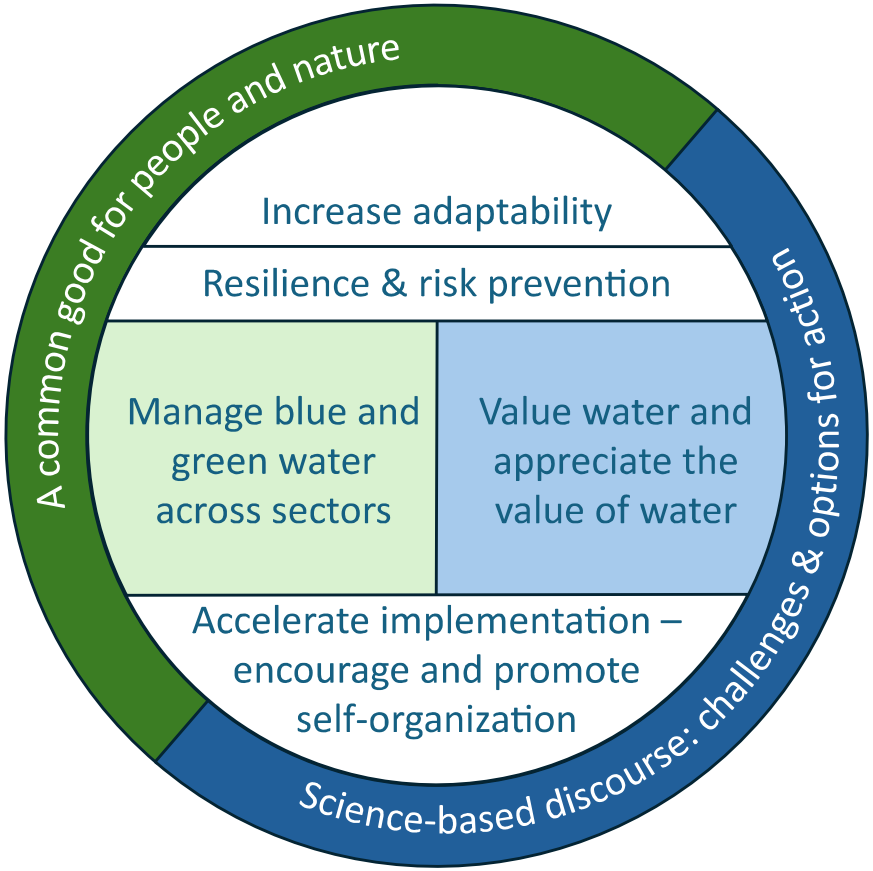
New quality of risks and uncertainties



Source: Slater et al. 2021

Climate-resilient and sustainable water management



Applied to...

- **Ecosystems**
- **Agriculture**
- **Cities**

Source: WBGU

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Climate-resilient water management

Four criteria for water management in the development, selection, and implementation of measures

Water-related **effectiveness today and in the future**

Feasibility: technologies, finances, institutions, acceptance, etc.

Multiple benefits: Climate, biodiversity, health, social issues, economy

Avoiding maladaptation and unintended consequences

Source: www.bochier.de

Financing climate-resilient water management

Estimated **investment required** by 2030 (2050): US$6,700 (22,600) billion

Global average **cost-benefit** ratio: 3.4 and 6.8 for drinking water supply in urban and rural areas, respectively

Making water-related **risks transparent** in order to mobilize (private) investment

Make the water sector more attractive through **more stable sources of income** (water pricing)

Increasing the cost burden on polluters and users (pesticide taxation)

Promote alternative financing approaches (blended finance, water funds, etc.)

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Challenges of local (flood) adaptation

Challenges for local adaptation in a decentralized system

- Adaptation often small-scale
- Tailored to regional and local circumstances
- Existing legal divisions of responsibility in the multi-level system

- Content challenge: assessment of climate risks and adaptation measures
- Finance challenge: high financing requirements
- Adaptation vs. state aid: moral hazard problem

Possible financing instruments

Financing preventive climate adaptation

- New funding program design
- New joint task for climate adaptation
- Reform of financial relations between the federal government, states, and municipalities
- (Local) climate adaptation levies
- Local climate adaptation funds

Financing climate damage / damage protection

- Climate-resilient debt clauses
- Catastrophe bonds
- Resilience bonds
- Parametric insurance
- Mandatory insurance (natural hazards)
- The state as (re)insurer

Flooding and insurance in Germany

July 2021

Extremely heavy rainfall led to local flash floods, extreme flooding, and landslides

Roughly **85,000 people and 10,000 firms** affected

Damages amounted to more than **€40 billion** (€11.5 billion of which were insured)

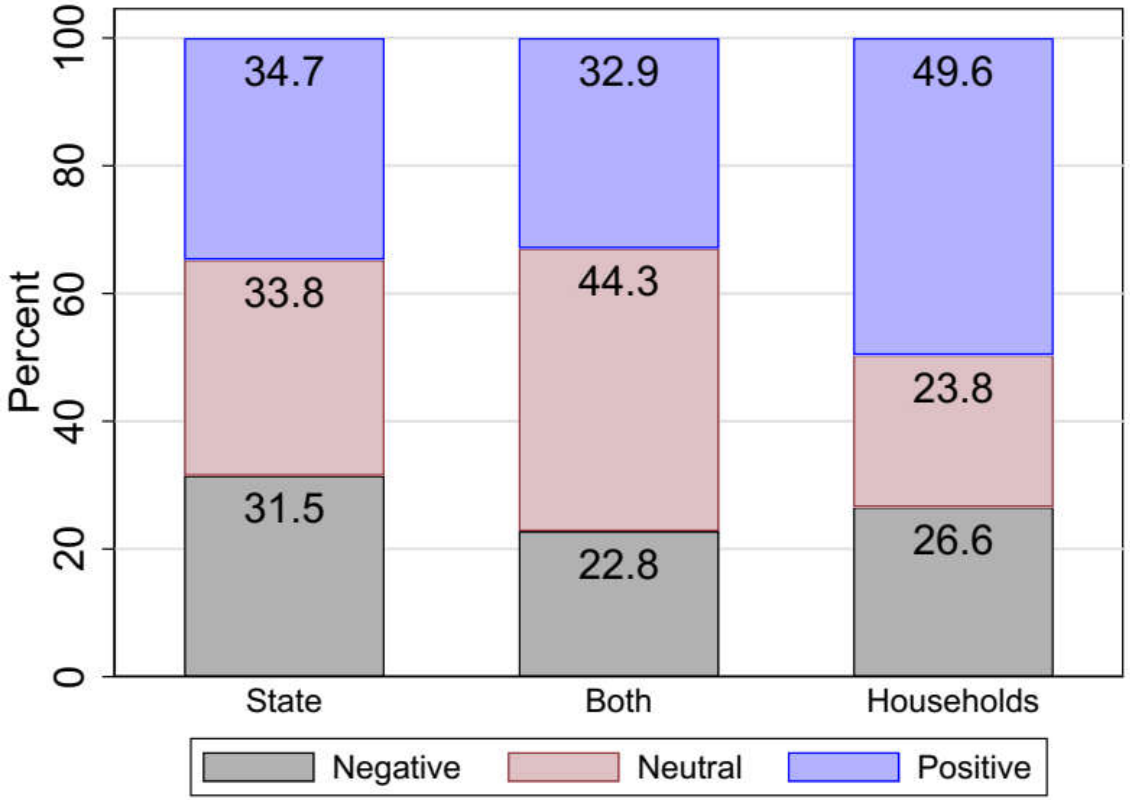
Emergency fund of the German government of €30 billion (about 1% of GDP)

Insurance coverage

Increasing over time: 39% of all residential properties insured against natural hazards in 2016 (50% in 2021 and **54% in 2024**)

Penetration rates: vary across German states (**between 28% and 94%**)

Who should be responsible for dealing with the consequences of flood events?



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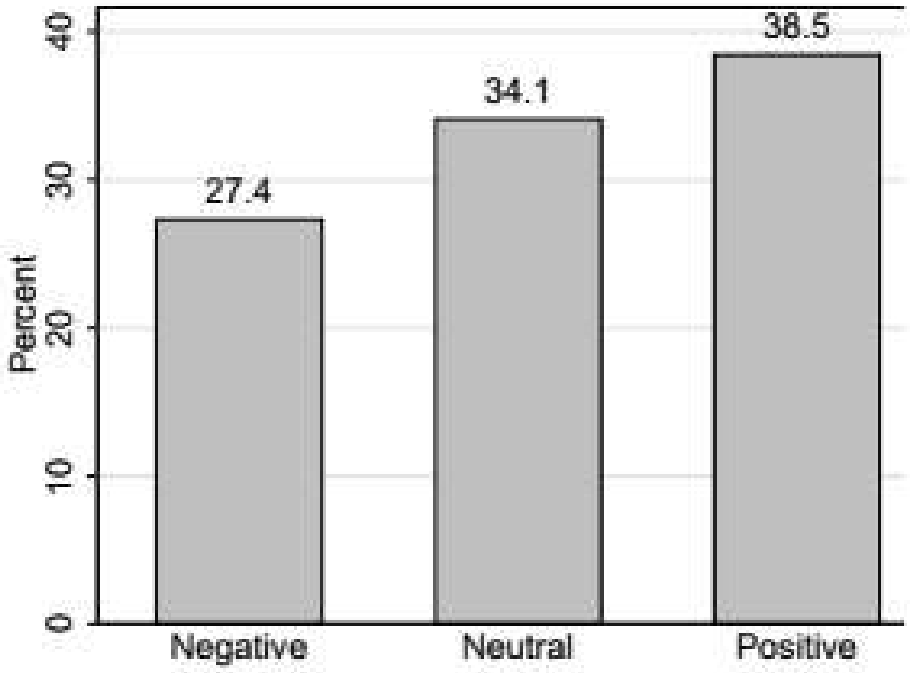
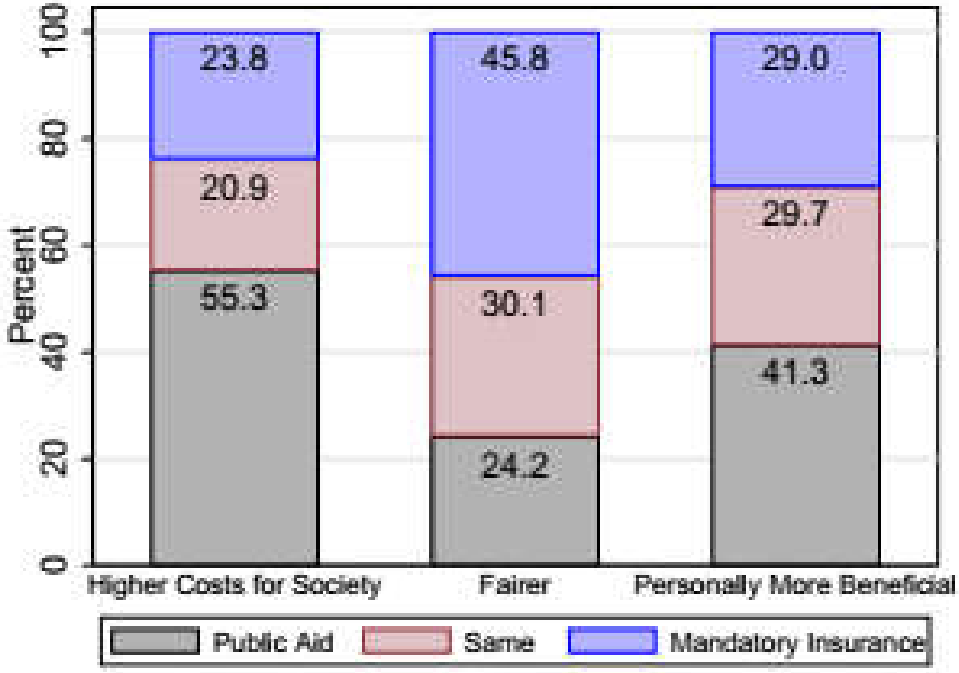
Views on mandatory insurance and state aid



(a) Assessment of mandatory insurance



(b) View about tradeoffs between public aid and mandatory insurance

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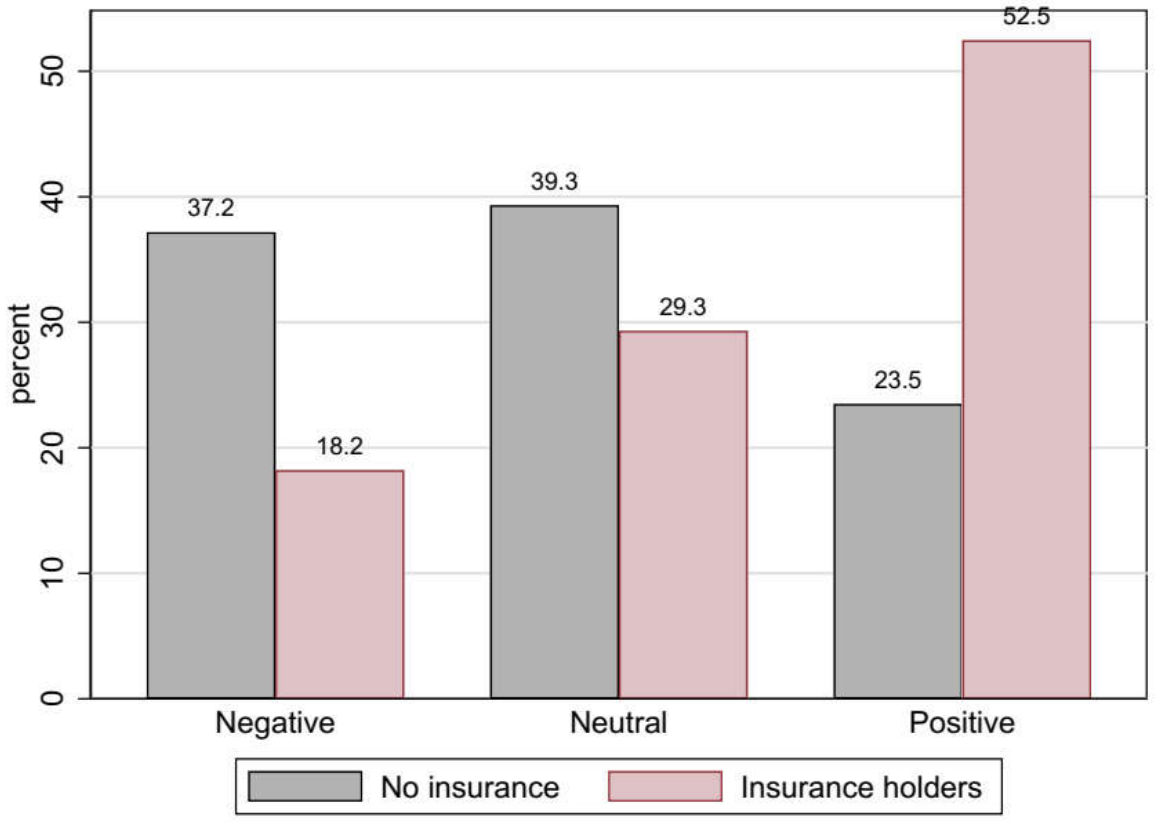
Support for Mandatory Insurance by Insurance Status



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