

Geospatial Equity and Economic Implications of Health Development Offices in Hungary

~85% probability of positive net budget impact (model-based estimate)



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BACKGROUND

- Hungary operates 108 Health Development Offices (HDOs) providing preventive services
- However, their real-world economic impact remains uncertain
- In particular, limited evidence integrates spatial accessibility with economic outcomes

OBJECTIVE

- To estimate the annual net economic impact of HDOs in Hungary using geospatial modelling and probabilistic analysis

METHODS

- Baseline disease burden was derived from national statistics (KSH, 2023)
- HDO coverage was approximated using population-weighted county-level indicators
- Disease-specific annual cost per case estimates were derived from the literature and used to estimate potential cost savings
- Avoided cases were estimated using relative risk reduction and adherence parameters
- Net budget impact was calculated as cost savings minus estimated program costs
- Uncertainty was assessed using probabilistic sensitivity analysis (Monte Carlo simulation; 5,000 iterations) implemented in Python

Model structure (simplified)

Annual savings \approx Burden \times Relative risk reduction \times Adherence \times Coverage

where:

- Burden = baseline disease cost
- Relative risk reduction = intervention effectiveness
- Adherence = patient compliance
- Coverage = county-level access to HDO services

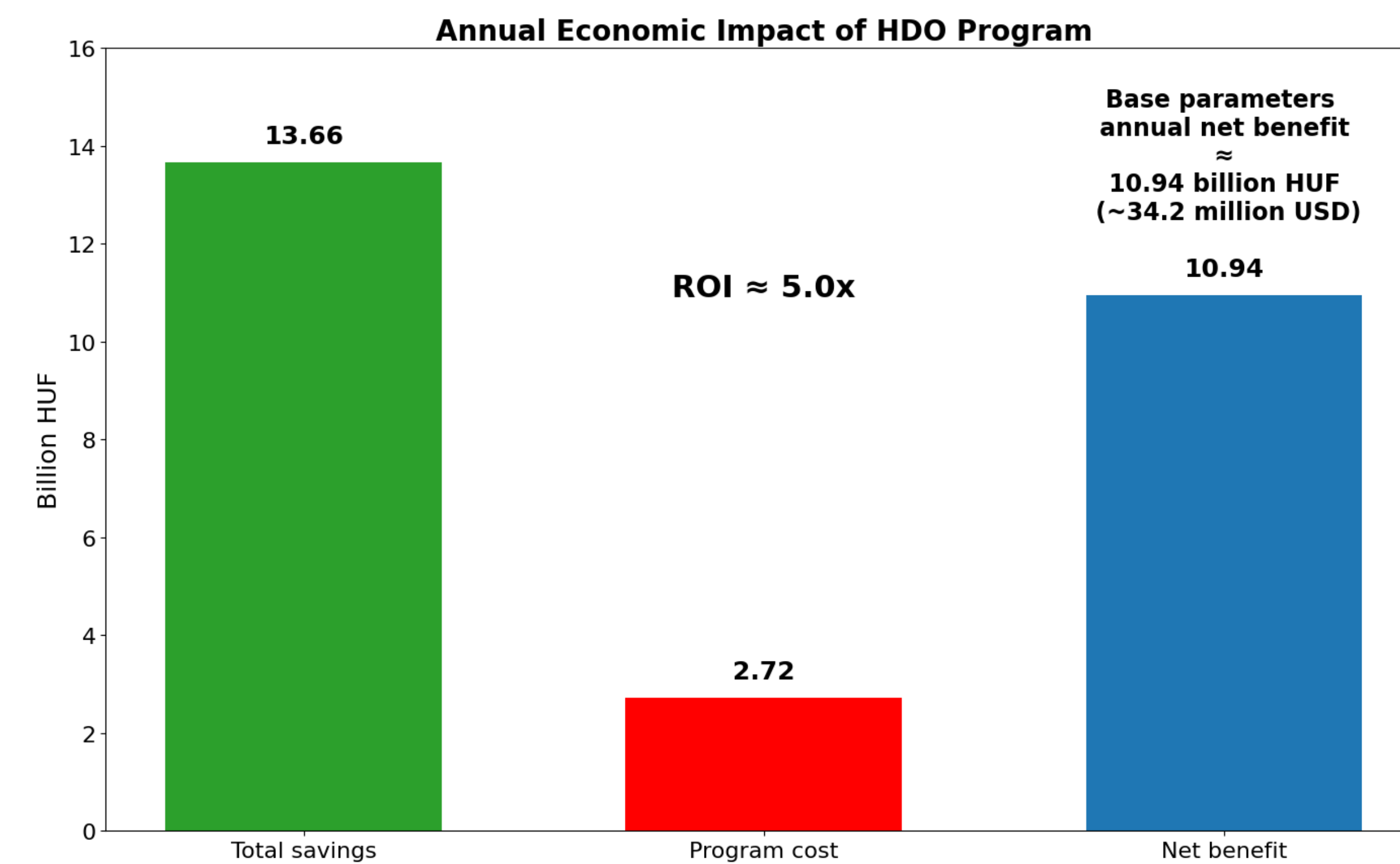
Monte Carlo parameter ranges

- Relative risk reduction: 0–3%
- Adherence: 30–70%
- Diabetes cost: 150,000–250,000 HUF/year
- CVD cost: 250,000–400,000 HUF/year
- Mental health cost: 100,000–200,000 HUF/year

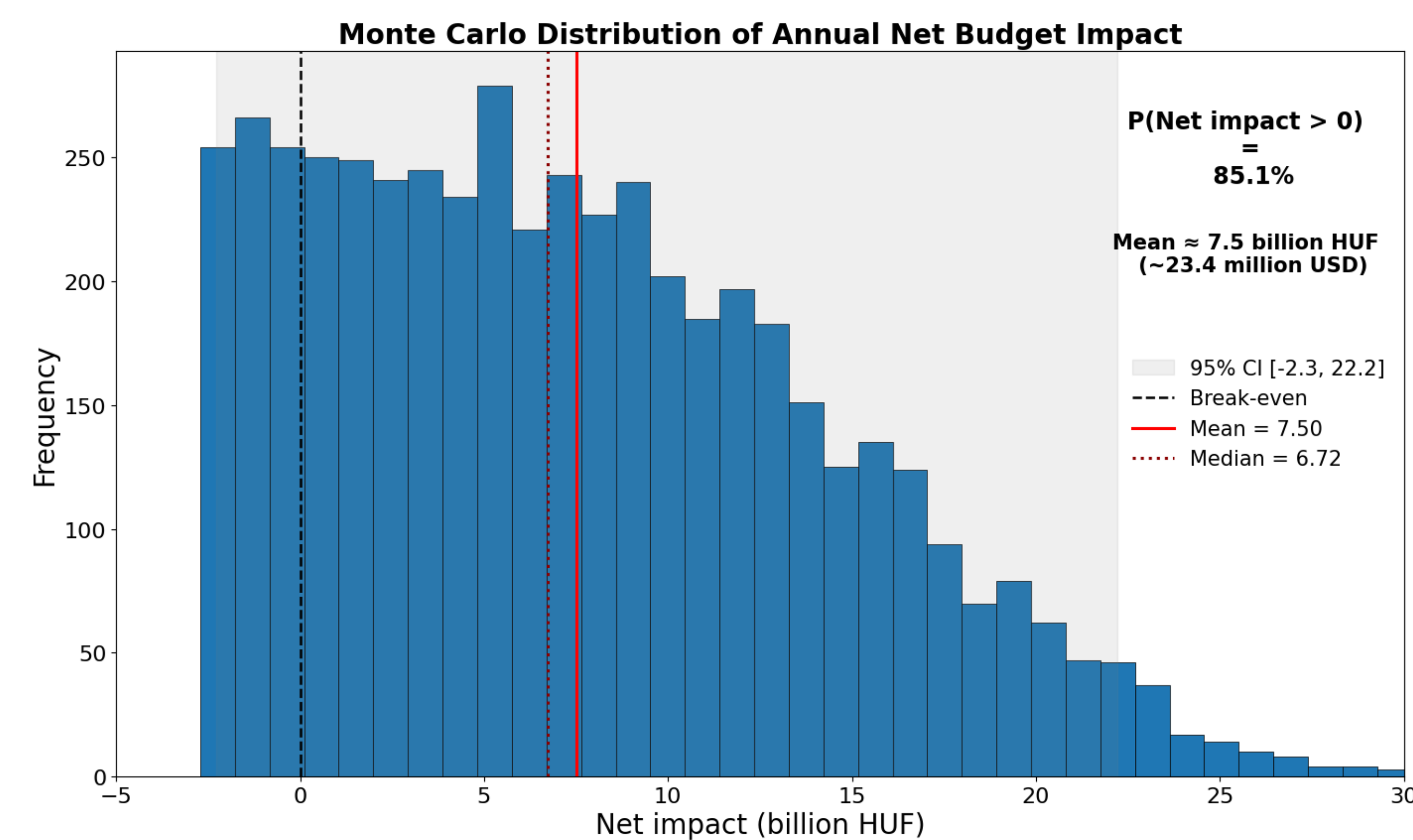
FUNDING

- Supported by the 2024-2.1.2-EKÖP-KDP-2024-00002 university research scholarship programme of the Ministry for Culture and Innovation from the Source of the National Research Development and Innovation Fund

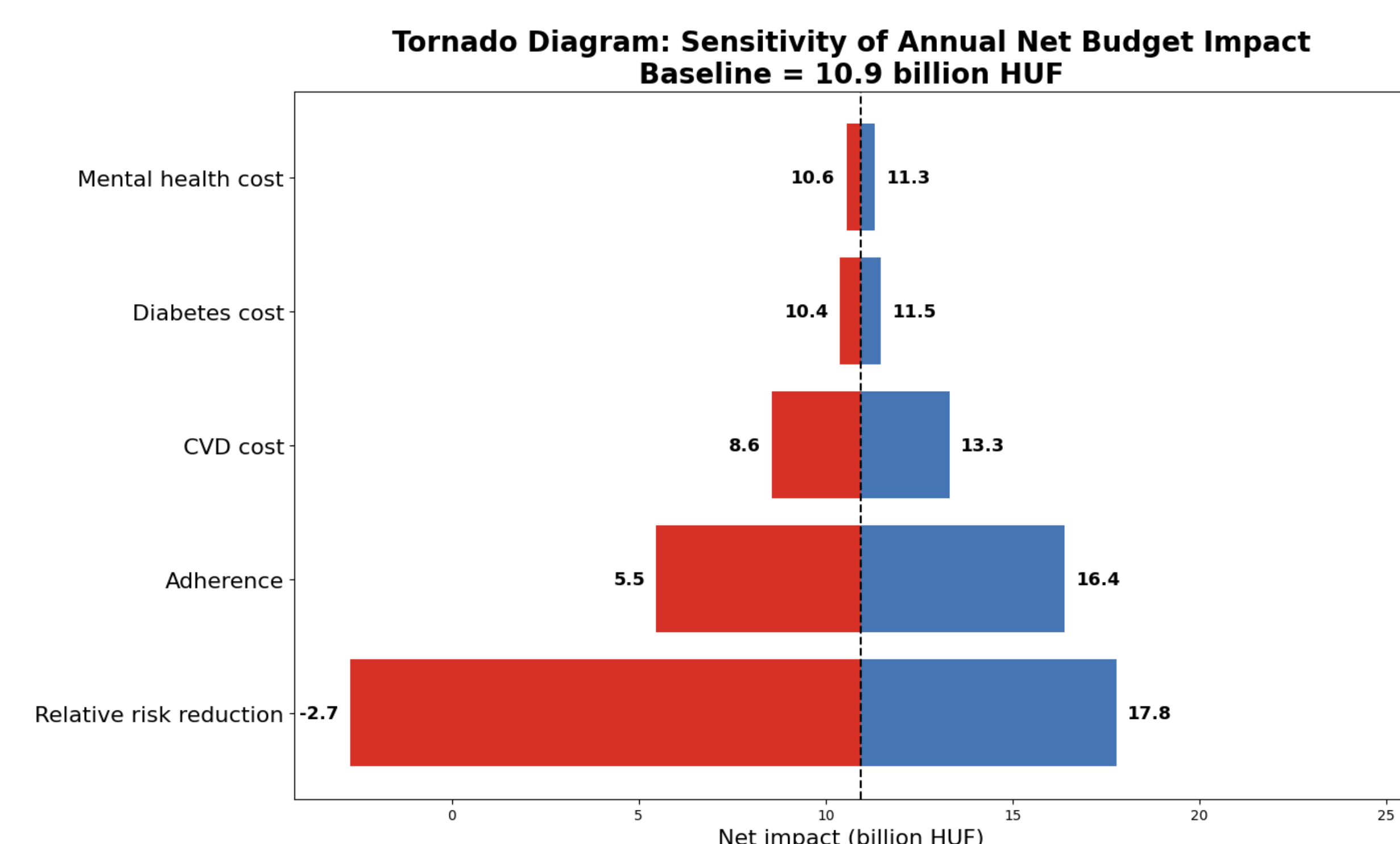
KEY RESULT



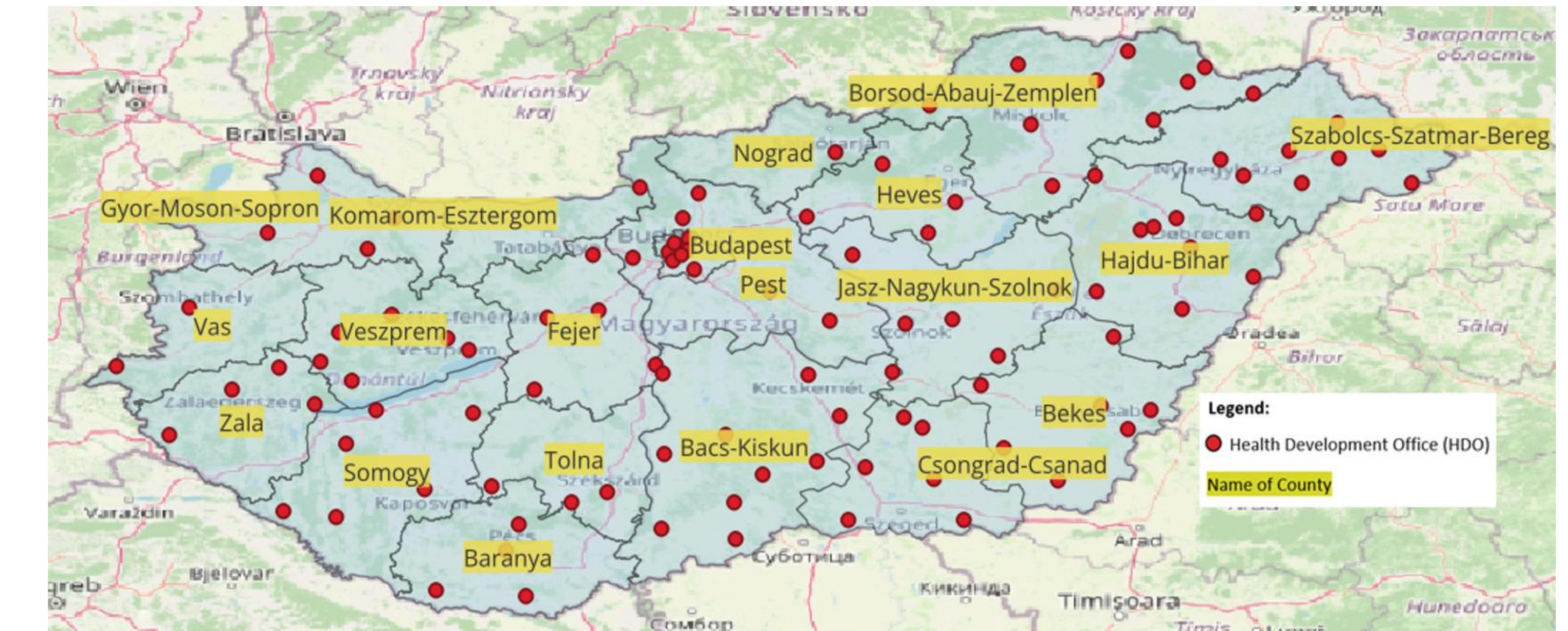
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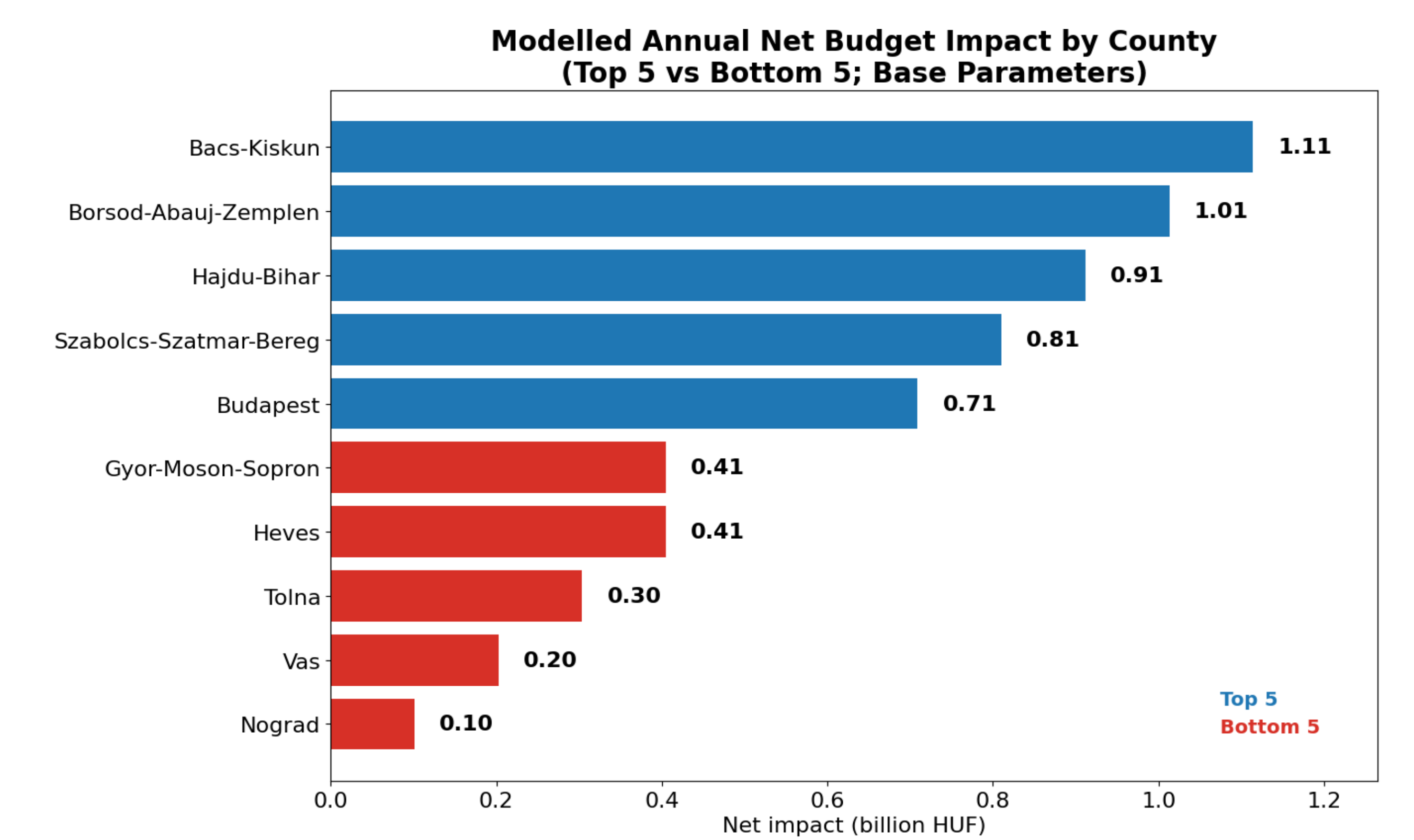
TORNADO



GEOSPATIAL MAP



COUNTY RESULT (TOP 5 / BOTTOM 5)



CONCLUSION

- Under model assumptions, the model indicates a high probability of positive net budget impact
- Results suggest that improving access to preventive services may contribute to cost savings at the system level
- Findings support the potential value of continued investment in preventive health infrastructure, while highlighting the role of uncertainty in decision-making

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