Influence of climate change and its mitigation measures on global poverty

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Introduction

- Climate change impacts and mitigation will both affect poverty.
- While strong mitigation measures can alleviate the poverty impacts of climate change, the adverse impacts of mitigation policies may be significant.
- We estimate the global poverty impacts of both climate change and its mitigation under multiple climate policy scenarios.

Methodology

① Projecting macroeconomic changes by climate change impact and that by mitigation measures separately using different models:

② Projecting poverty headcount from income distribution using Income model of AIM/PHI model

We analyzed the difference between Reference and a scenario with impact.

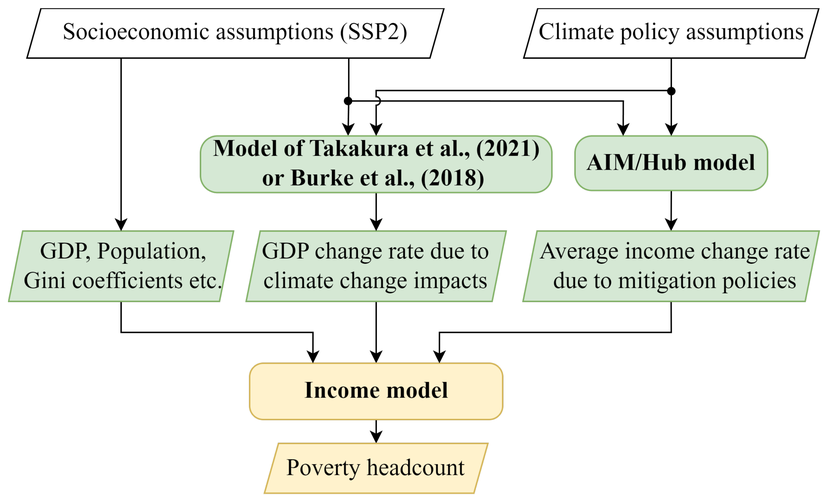

Figure 1 Model overview

Table 1 Scenario

Scenario Names	Climate Conditions	Emission Constraints	Impact to be considered
Reference	NoCC	None	None
Baseline	RCP6.0	None	Climate change impact
WB2C	RCP2.6	2 ℃ target	Climate change impact & mitigation policies
Sub Scenario			
WB2C_CC	RCP2.6	—	Climate change impact
WB2C_M	—	2 ℃ target	Mitigation policies

Results

- For Takakura's model, GDP loss rate is greater under WB2C than Baseline.
- For Burke's model, the GDP loss rate is greater under WB2C in 2030, but the GDP loss rate is greater under Baseline in 2070 and 2090.
- Poverty headcount is larger under WB2C than under Baseline in most years.

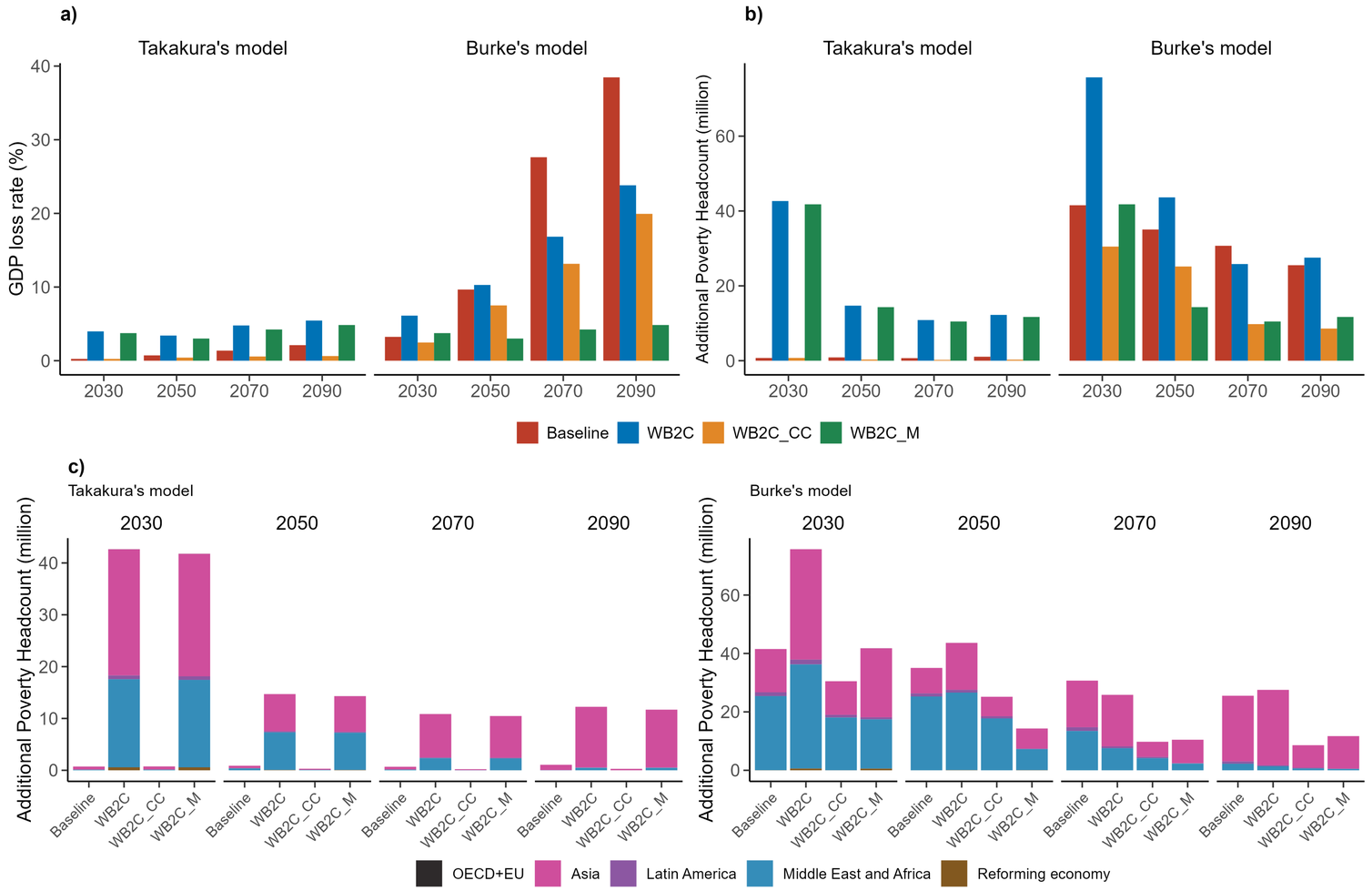

Figure 2 a) Change in global GDP relative to Reference scenario. b) Global trend of additional poverty headcount relative to Reference scenario. c) The regional breakdown of the poverty headcount.

Discussions & Conclusions

- Poverty headcount would increase under the well below 2℃ scenario, compared with the Baseline scenario. The major driver of this increase is general income loss associated with climate change mitigation.
- Climate change mitigation would require a special focus on vulnerable people.

Reference : 1) Takakura et al., Reproducing complex simulations of economic impact of climate change with lower-cost emulators, Geoscientific Model Development, Vol.14(5), pp.3121–3140, 2021.
2) Burke et al., Large potential reduction in economic damages under UN mitigation targets, Nature, Vol.557(7706), pp.549–553, 2018.

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