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Next generation of advanced integrated assessment modelling to support climate policy making

Inequality and Climate Policy and Impacts

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NAVIGATE-CHIPS Stakeholder Workshop

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The role of inequality for climate policy and change

- Heterogeneity of individuals
- Energy Expenditure shares ➔ Energy and carbon prices
- Food expenditure shares ➔ carbon prices for agriculture
- Vulnerability and local climate damages ➔ impact incidence
- Main dimension: income (poorest x%, deciles, Gini index, …)
- IPCC AR6 (overall a bit silent on inequality):
  - divergent results on the effect of economic inequality reduction on emissions
  - One good example is *Brazil*, which has simultaneously increased minimum wages of low income families, achieved universal energy access, and raised the quality of life

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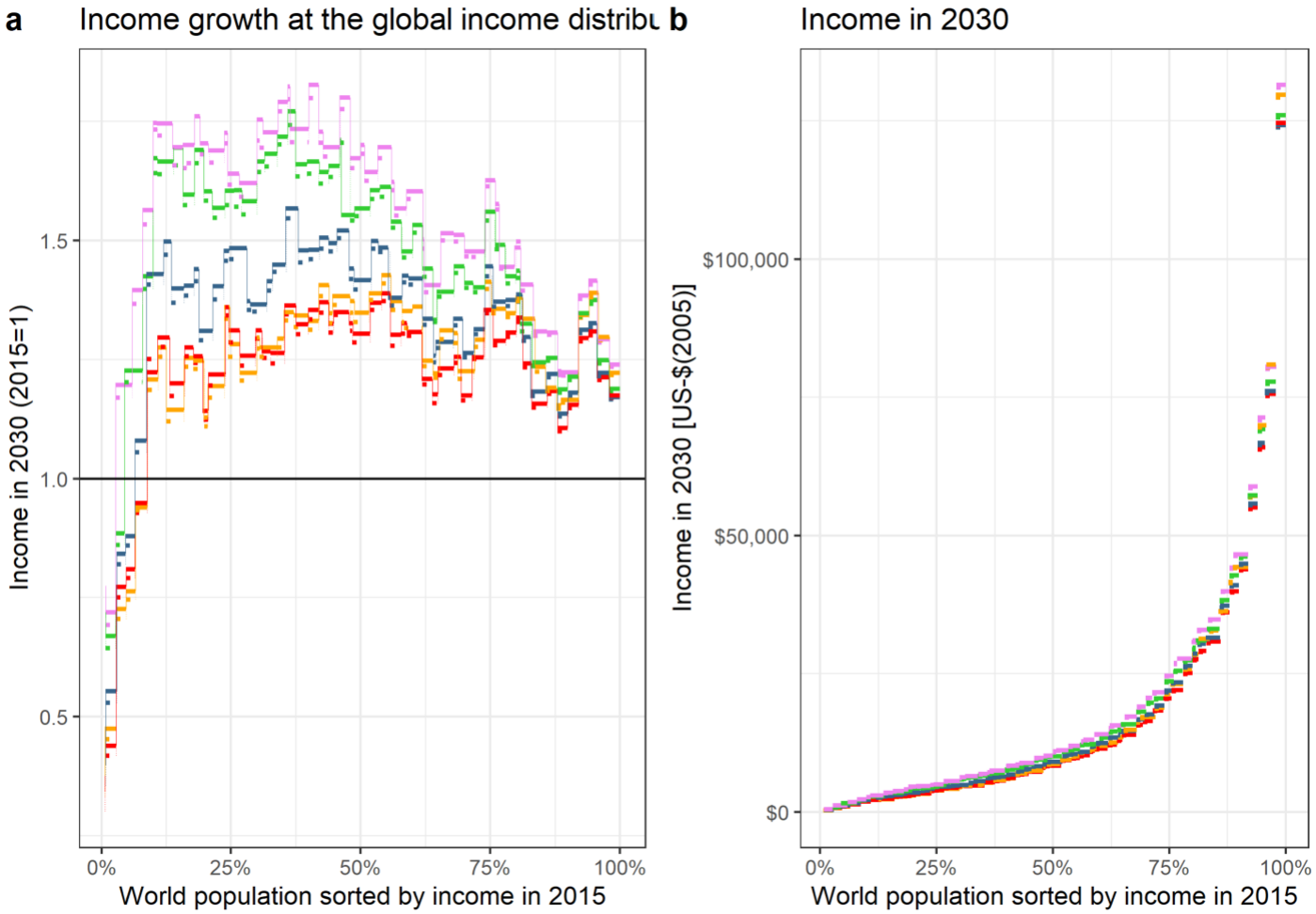
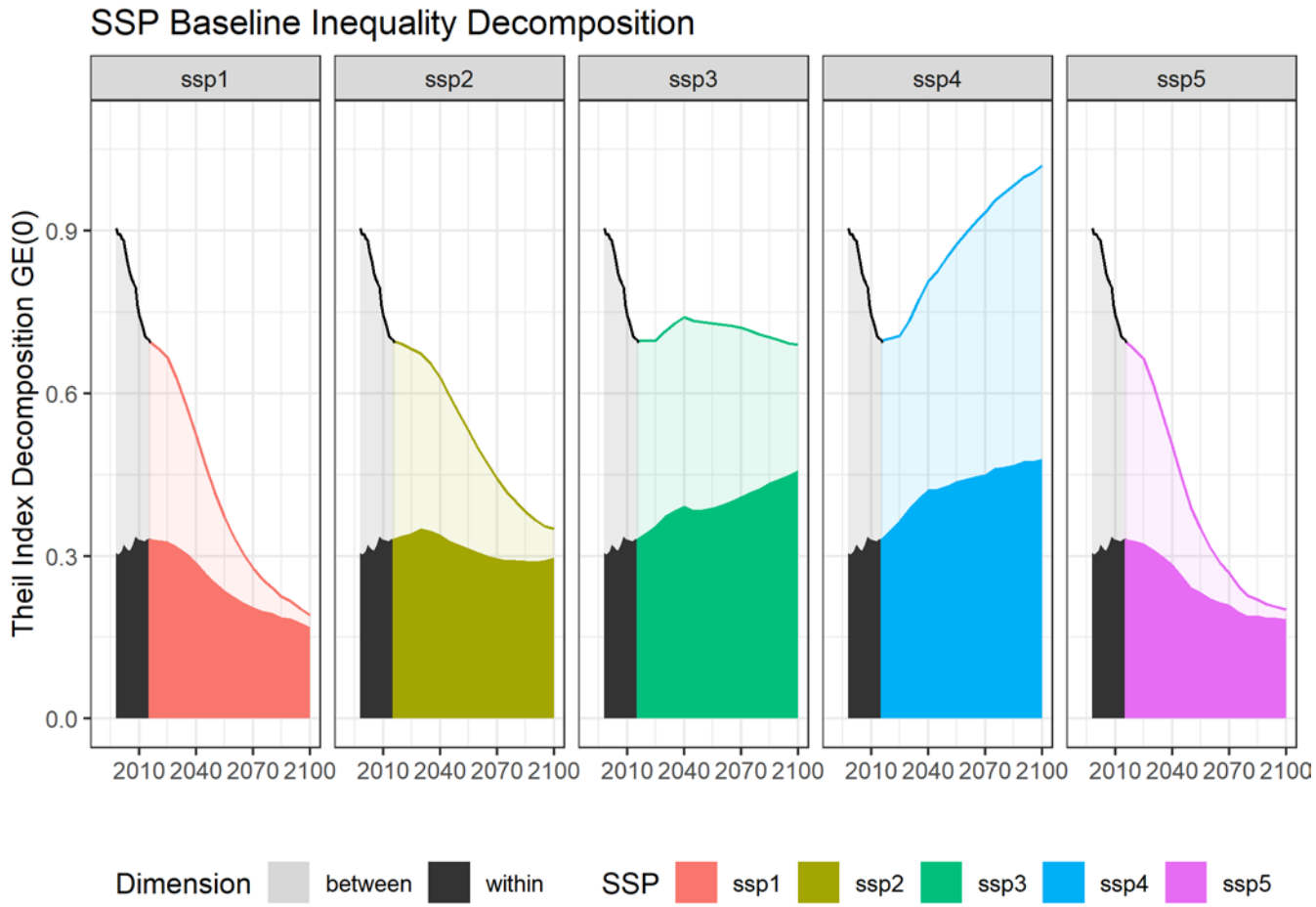
Income and growth – the global picture

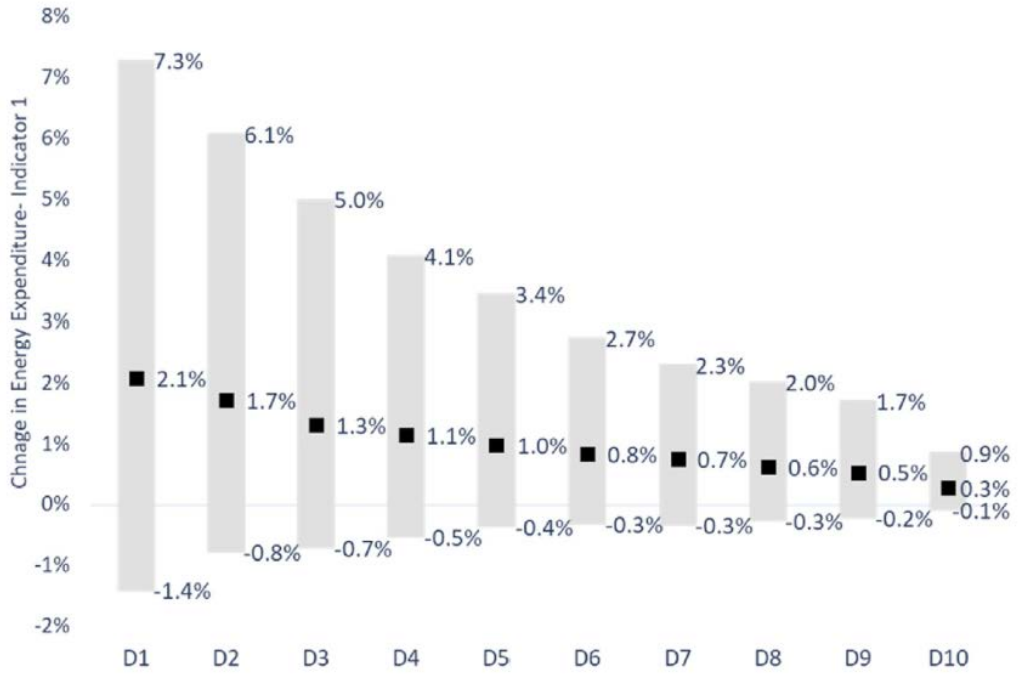


Inequality and growth – the global picture

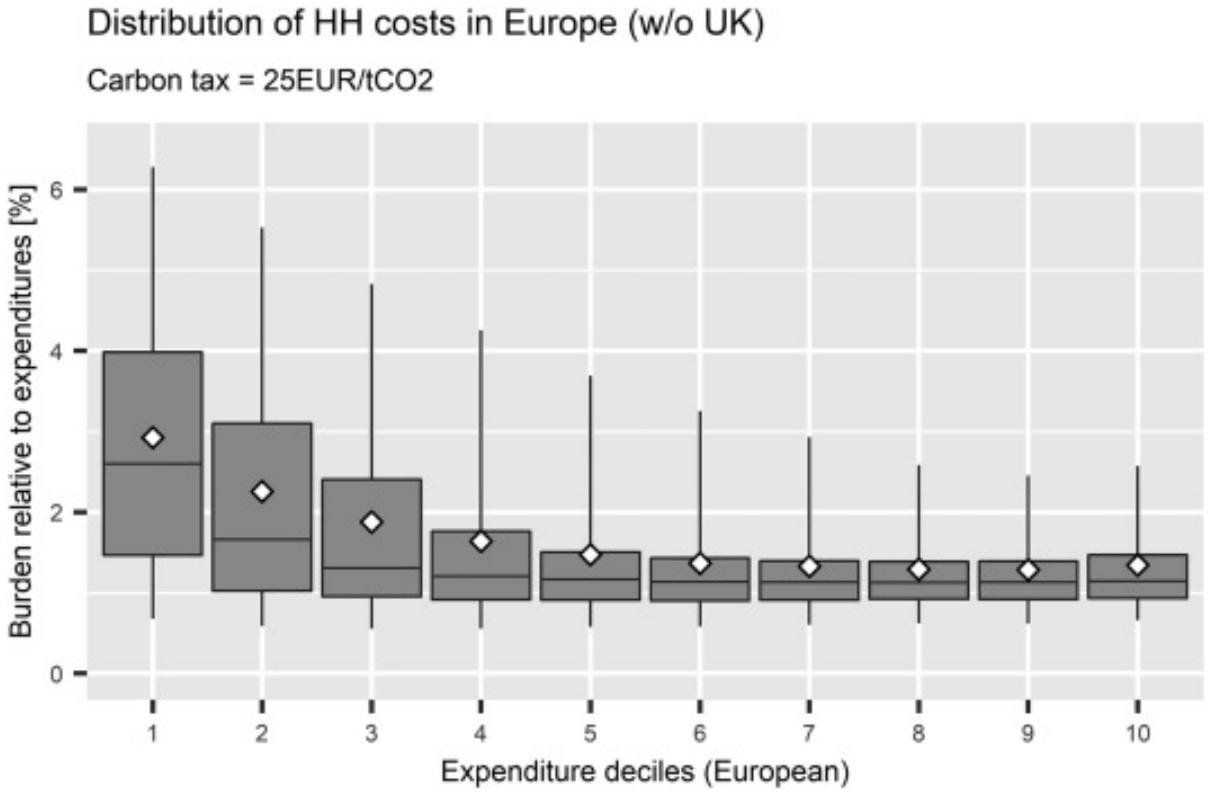


Inequality within countries likely to become much more important than between countries

Energy Expenditures and Carbon Price Incidence



Fragkos et al. (2021). Equity implications of climate policy: Assessing the social and distributional impacts of emission reduction targets in the European Union (2deg vs. Ref)



Feindt et al. (2021):
Policy Incidence of a carbon tax across Europe

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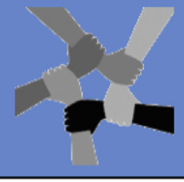
Inequality in IAMs

- Dimensions of inequality?

Variable	Gender 	Age 	Education 	Settlement 	Income 	Family size 	Health 	Race 	Religion 
Scenarios quantified	SSPs, Ext. SSPs	SSPs	SSPs	SSPs	Ext. SSPs (Gini)	-	-	-	-
Endogenization in IAMs so far	-	low	-	-	medium	-	low	-	-
Relevance … general	***	***	***	**	***	**	**	**	*
… for climate policies	**	*	**	**	***	**		*	?
… for climate impacts	**	***	**	***	**	*	***	**	?

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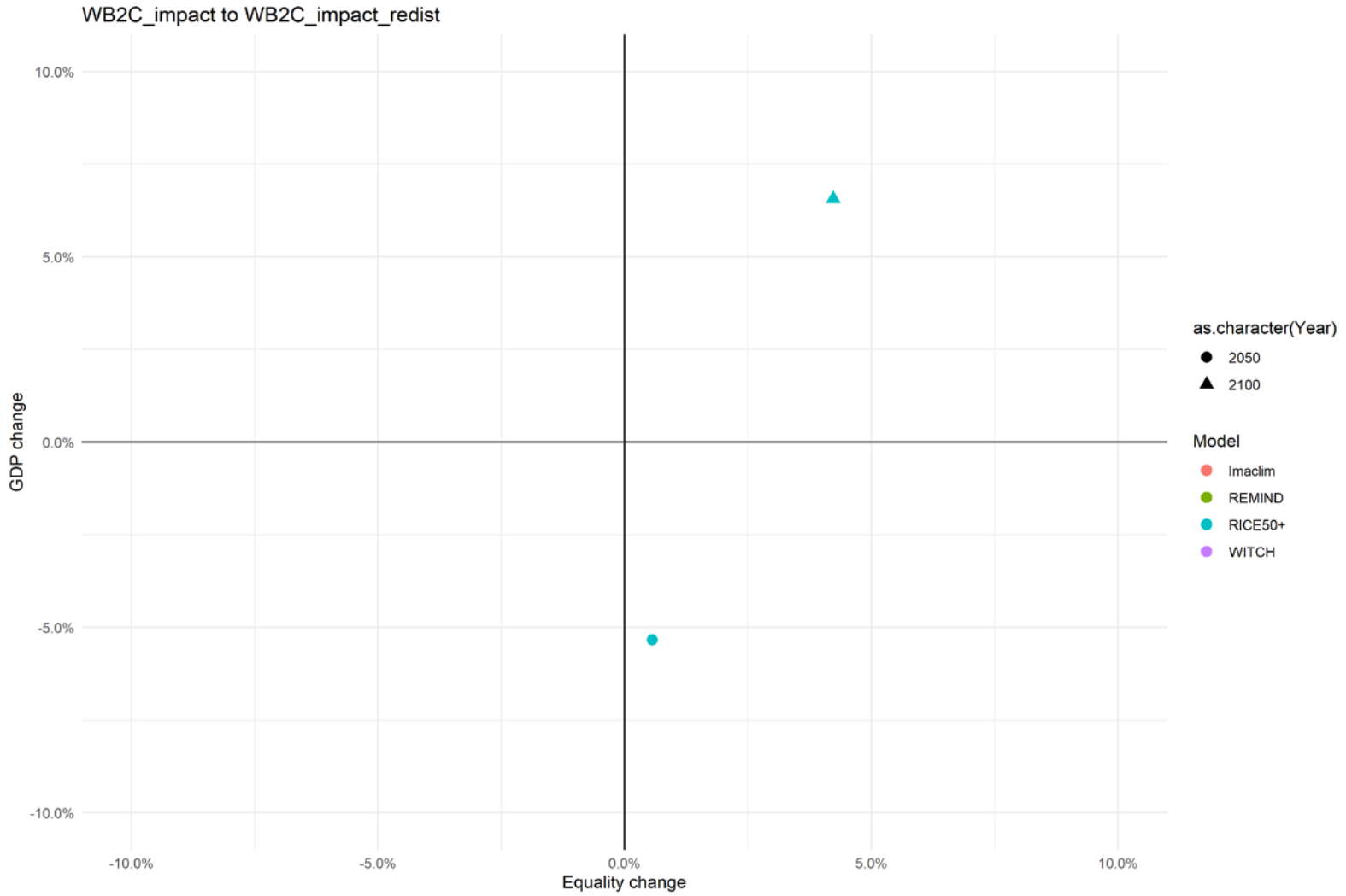
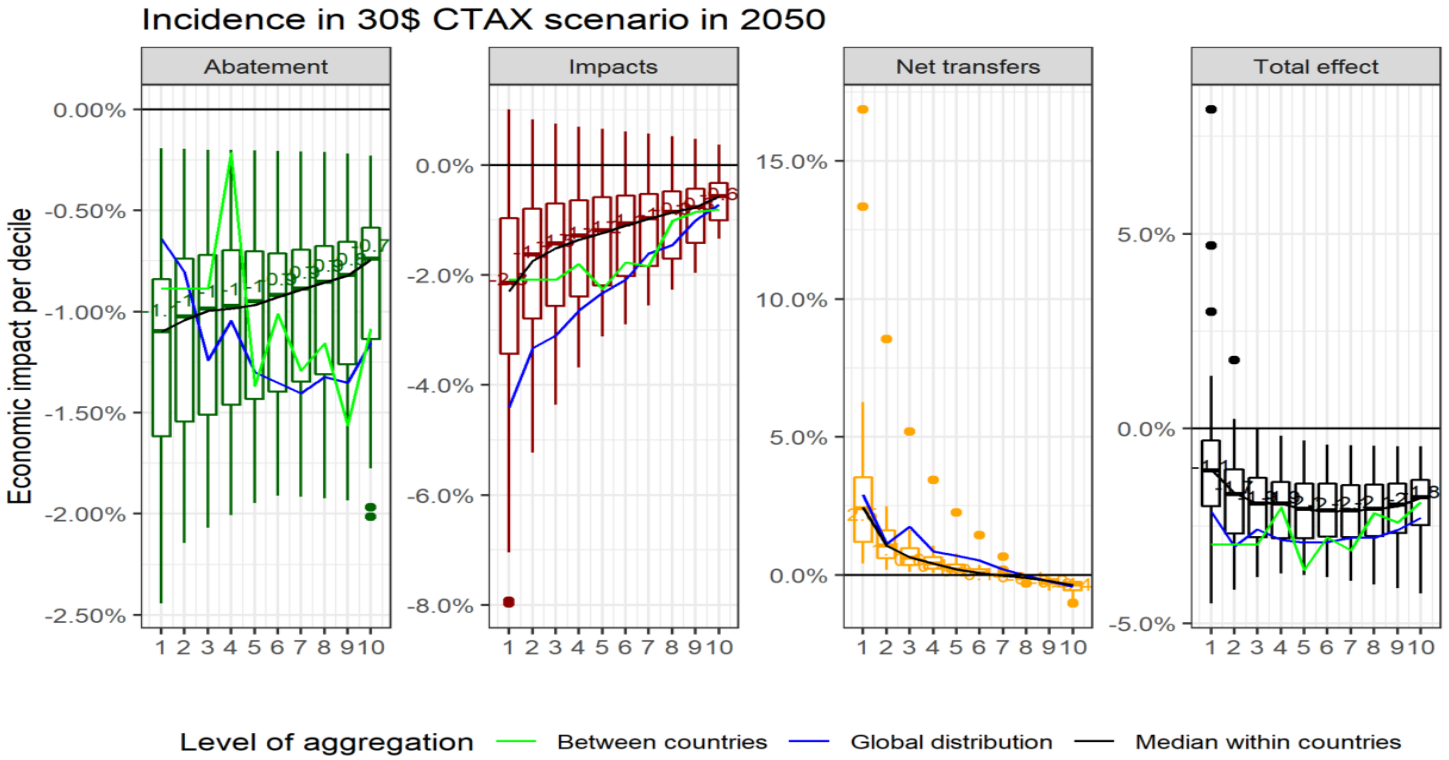
Inequality MIP: preliminary results

- Combined Welfare Impacts based on Sen-Fostter SWF $W = GDPpc_{it}(1 - Gini_{it})$



Preliminary results
All for INDIA

Impact of a 30$ Carbon tax and climate impacts



A carbon dividend or premium (equal per capita redistirbution) could significantly benefit lower income households.

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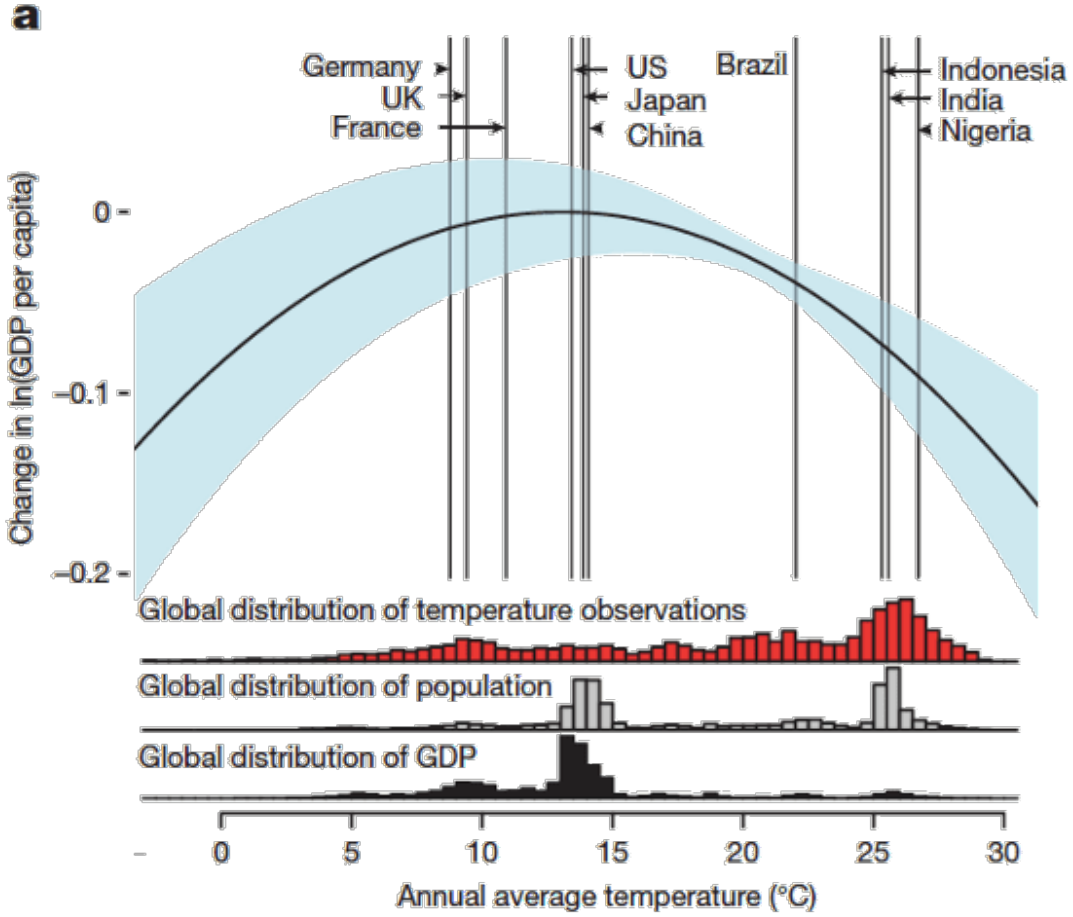
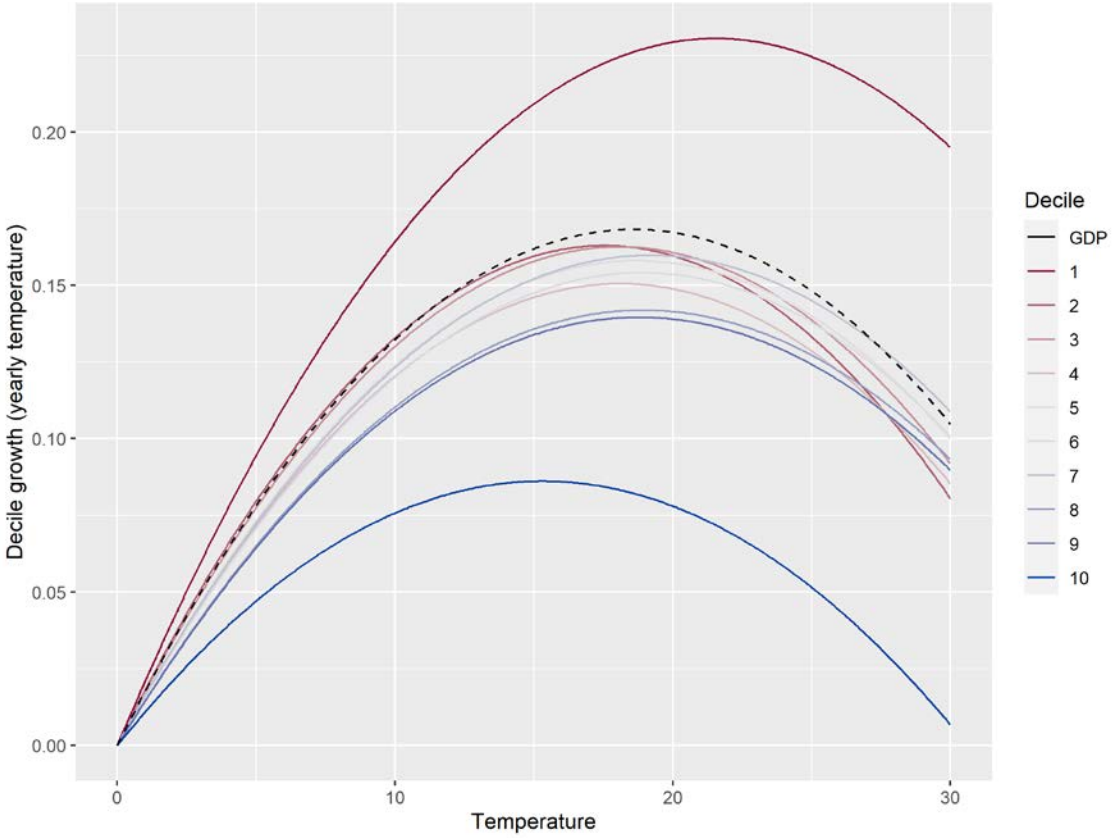
Distributional incidence of climate IMPACTS





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From the IPCC

- Studies give divergent results on the effect of economic inequality reduction on emissions, with either an increase or a decrease in emissions
- One example is *Brazil*, which has simultaneously increased minimum wages of low income families, achieved universal energy access, and raised the quality of life and well-being for the large majority of the population

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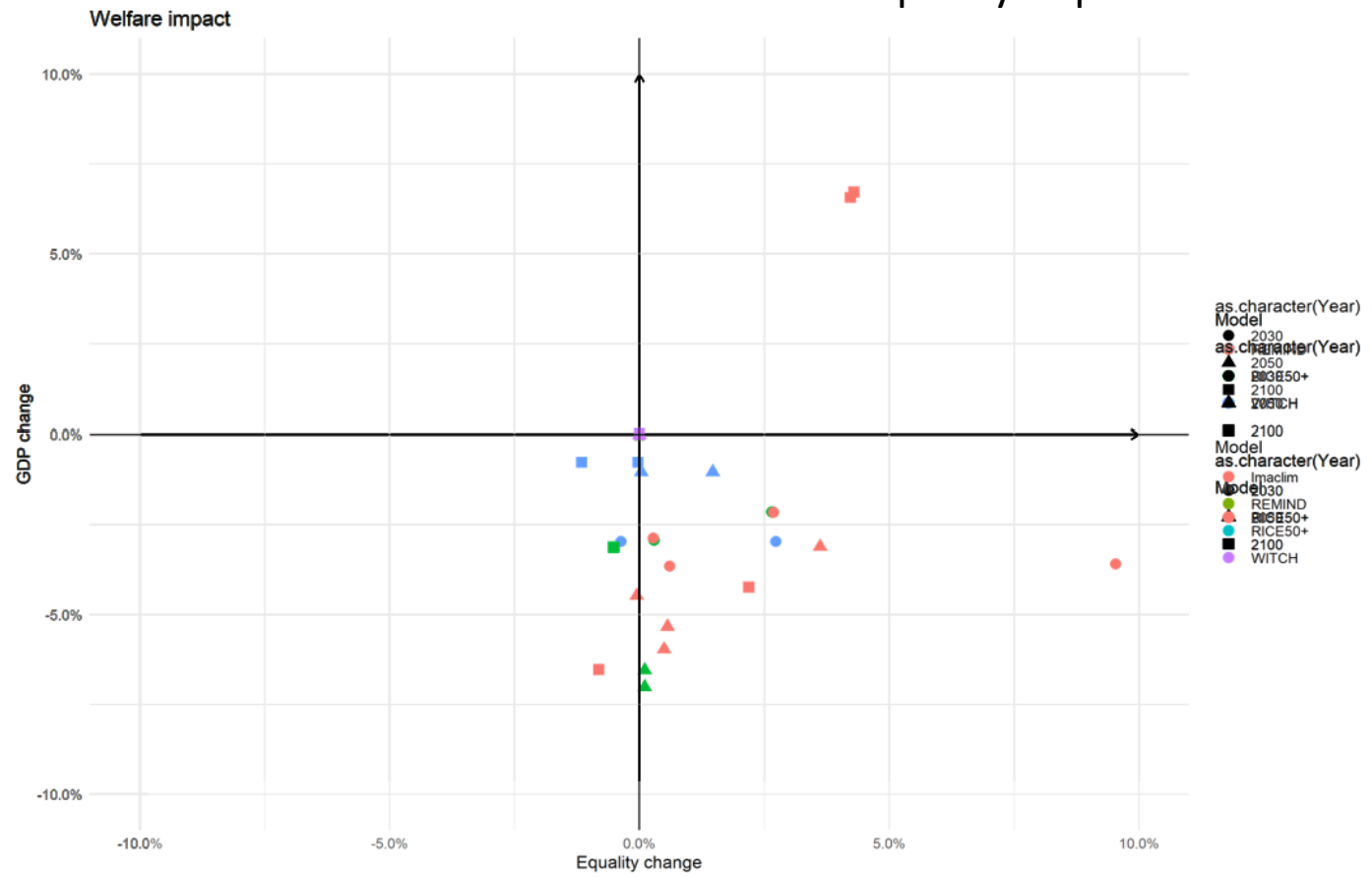
Adding «Equality» as second dimension to GDP

GDP and Inequality Impact: here INDIA



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Conclusions

- Climate policies most likely regressive across incomes
- Other dimensions: more evidence needed
- Impact incidence likewise regressive
- Transfers and climate dividends can make a difference esp. at lower incomes
- Overall: combining macroeconomic and inequality impacts could be desirable for climate policies and impact assessment.

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