

Distributional & Equity Effects of Carbon Pricing

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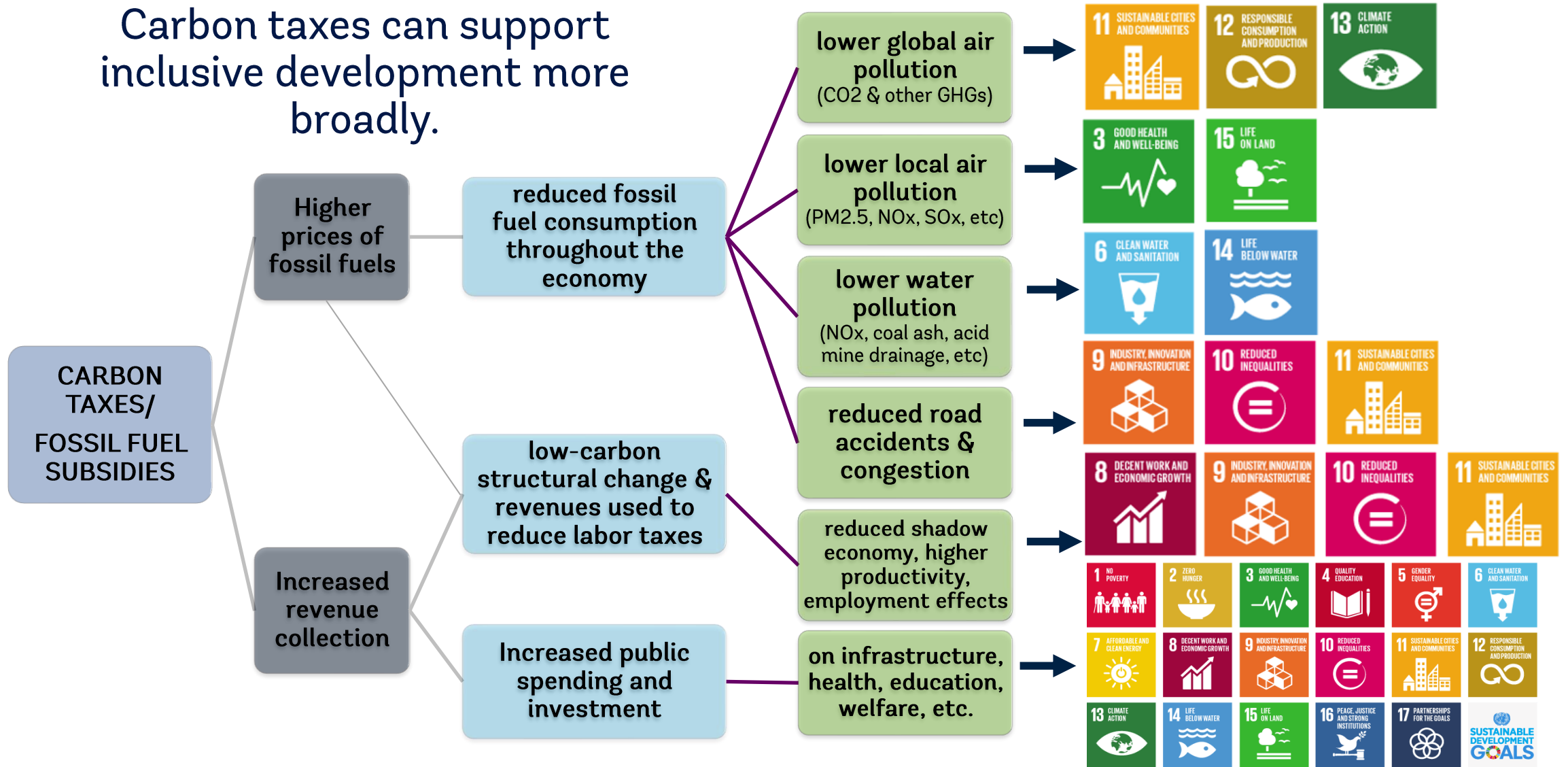
Chief Economist Office, Equitable Growth, Finance & Institutions (EFI)/
Macroeconomics, Trade & Investment (MTI) GP, World Bank

ICAP Webinar

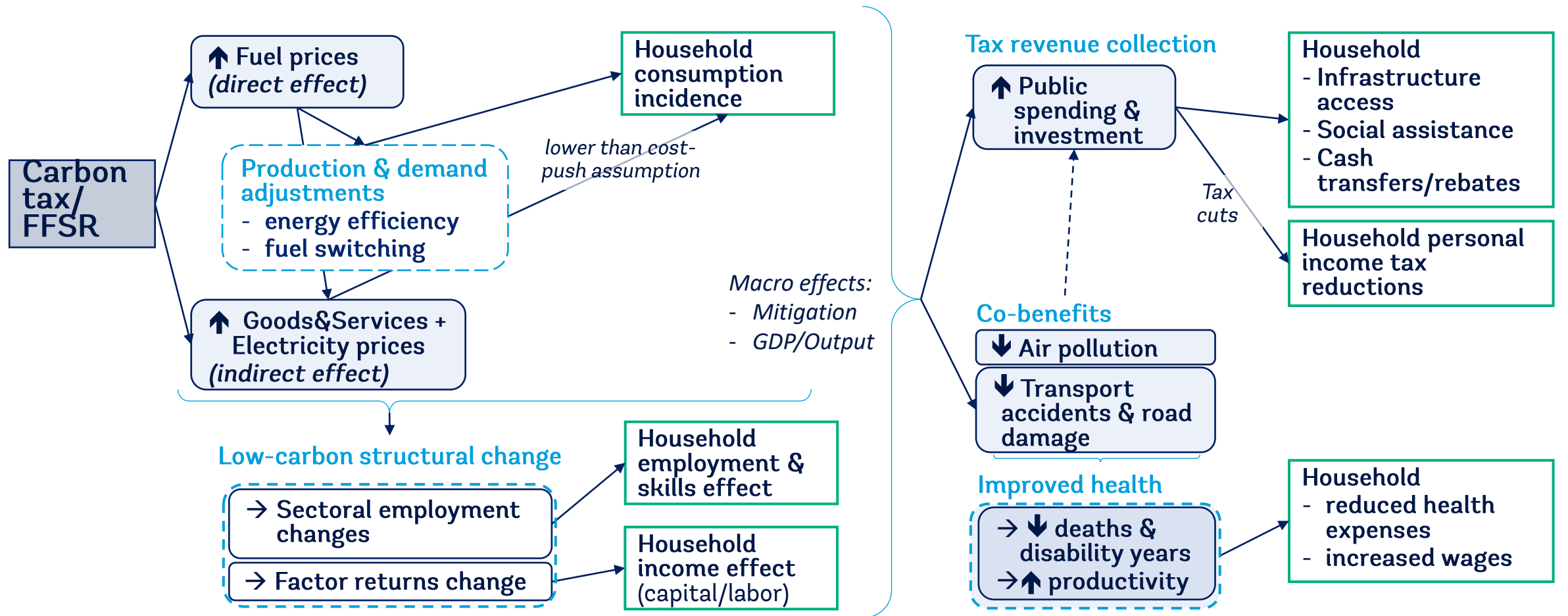
Understanding and Mitigating Distributional Effects of Emissions Trading

January 19, 2022

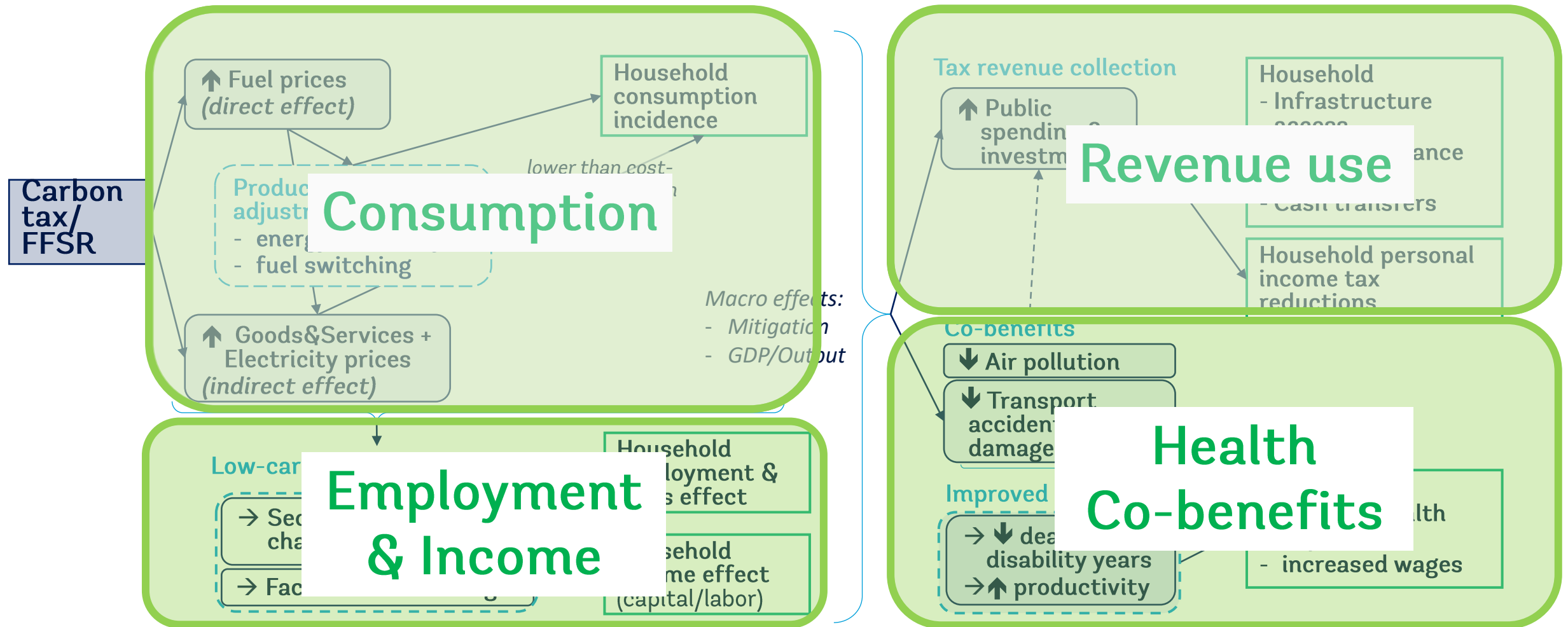
Carbon taxes can support inclusive development more broadly.



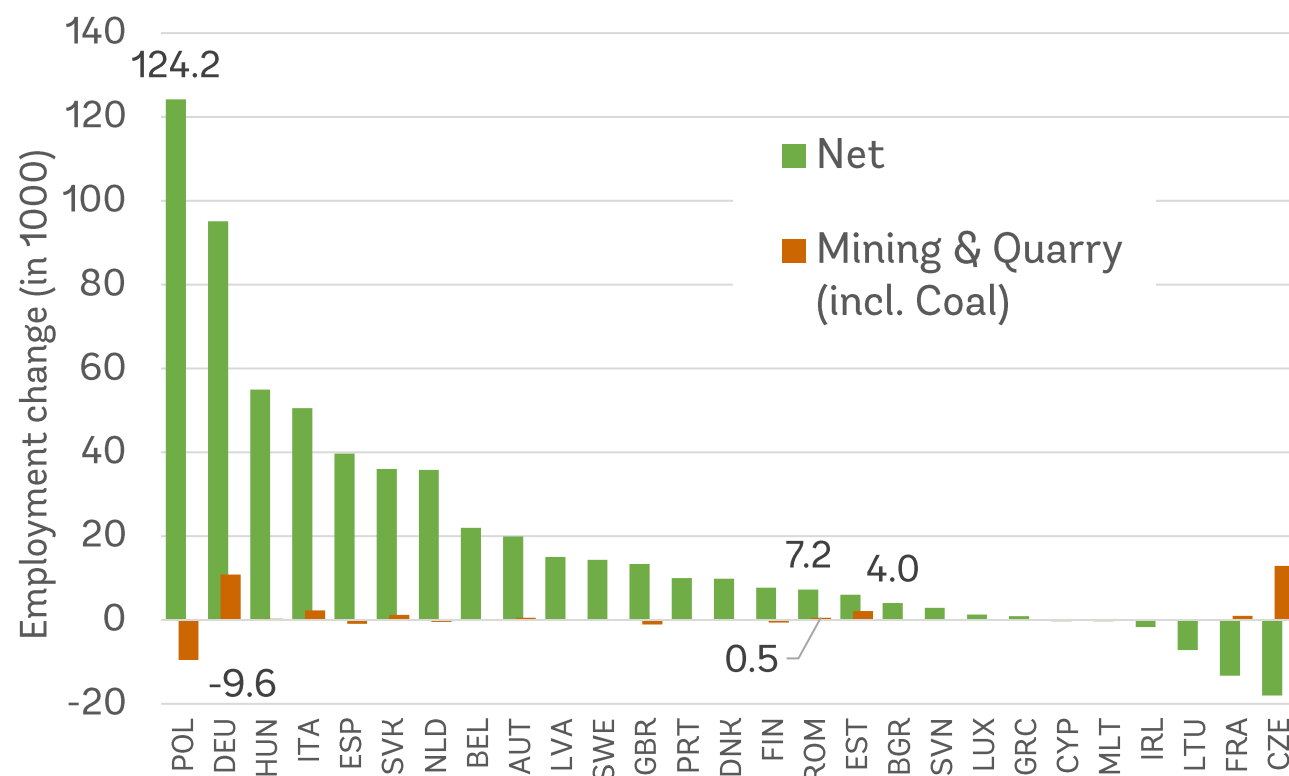
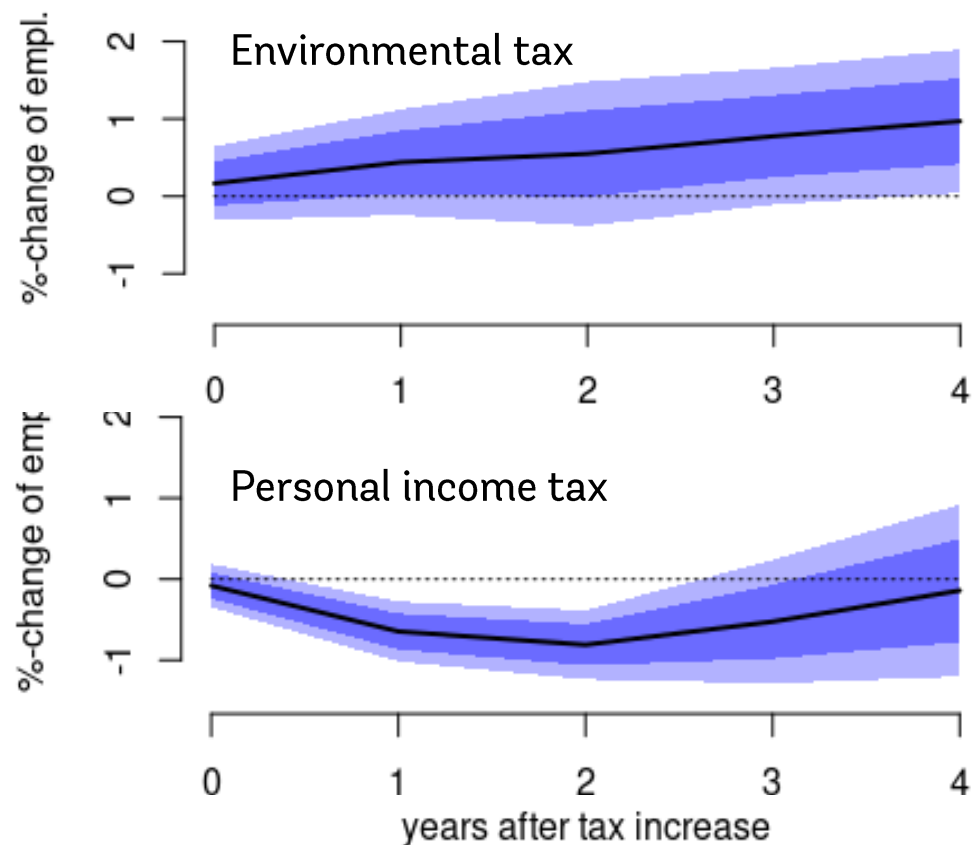
Framework: Economic channels & equity of carbon pricing



Framework: Economic channels & equity of carbon pricing



Carbon taxes can be beneficial for overall employment



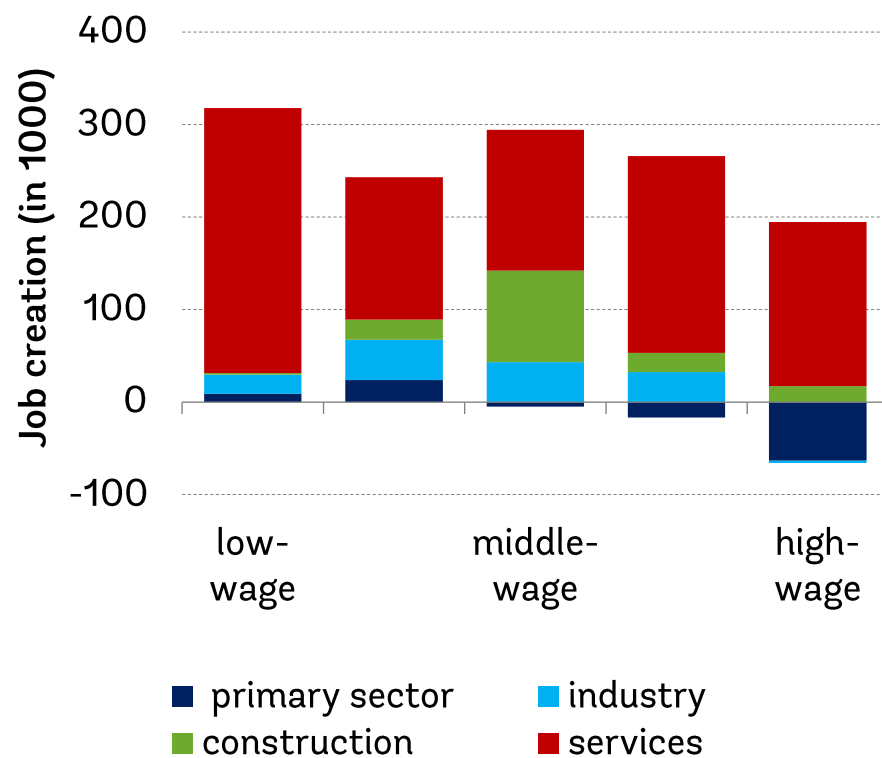
Employment responses to 1 % of GDP increase in tax revenue in 11 Central & Eastern EU countries (1993-2020)

Overall job creation from low-carbon transition in electricity & gas sector, incl. sectoral/cross-border spillover (1995-2009)

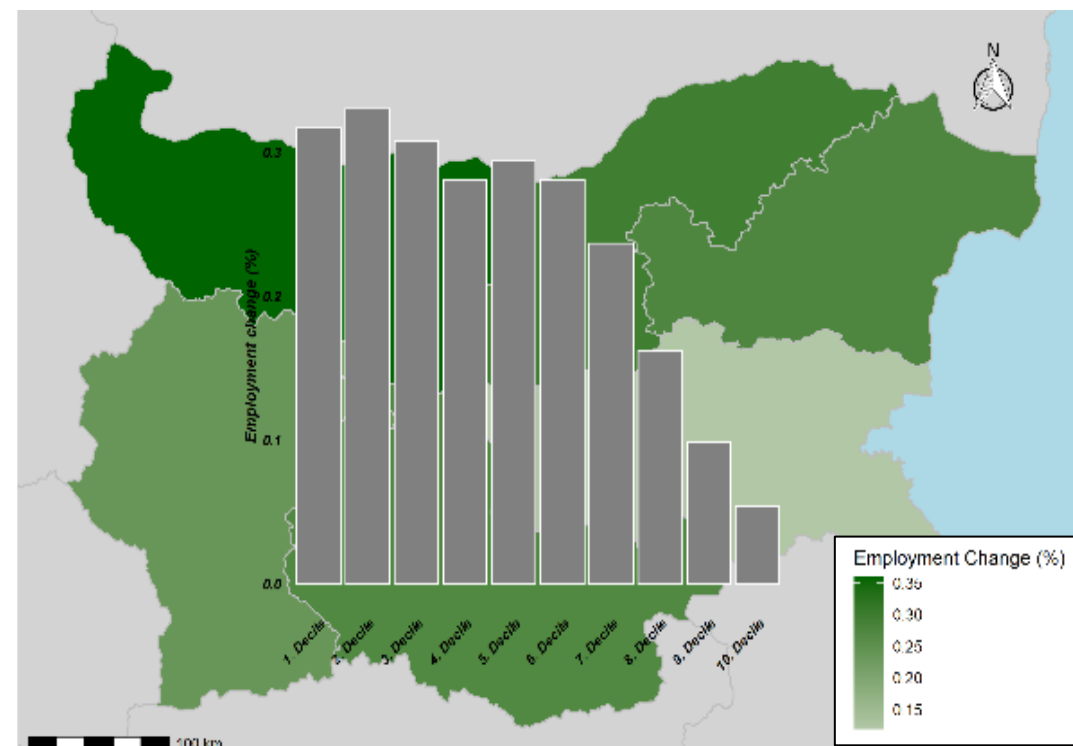
Source: WBG staff/Schoder 2021

Source: Markandya, A et al. 2016 [] Applied Energy.

Distribution of employment effects may be equity-enhancing



Progressive projected EU job creation under decarbonization scenario 2015-2030 (rel. to baseline)

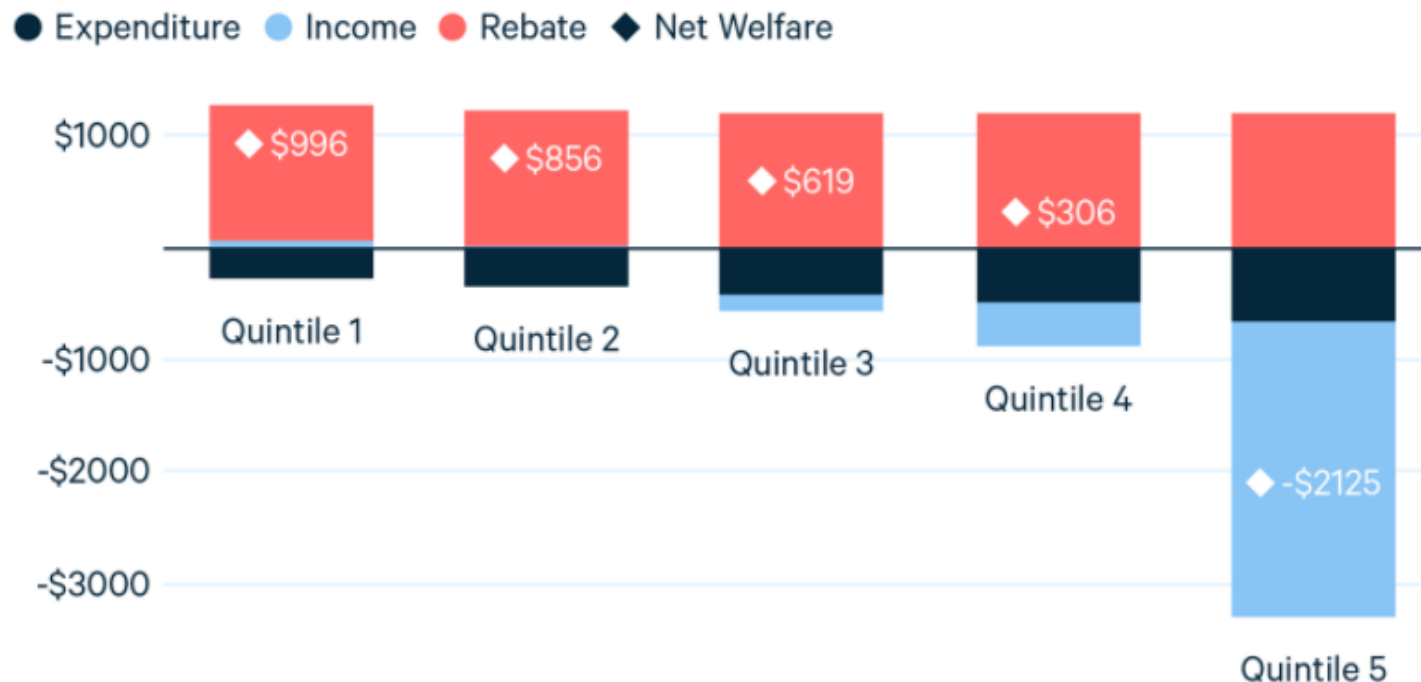


Bulgaria: progressive projected labor demand increases of revenue-neutral €55/tCO₂ tax with low-skill labor tax cuts

Source: [European Commission 2019: ESDE](#).

Source: WBG staff/Dorband et al. 2021

Income effects of carbon pricing can be large & progressive



Note: Results show household welfare changes in first year of illustrative carbon tax policy with price of \$45 per ton of CO₂ and all revenues used for lump-sum household rebates. Diamonds represent net benefits/costs.

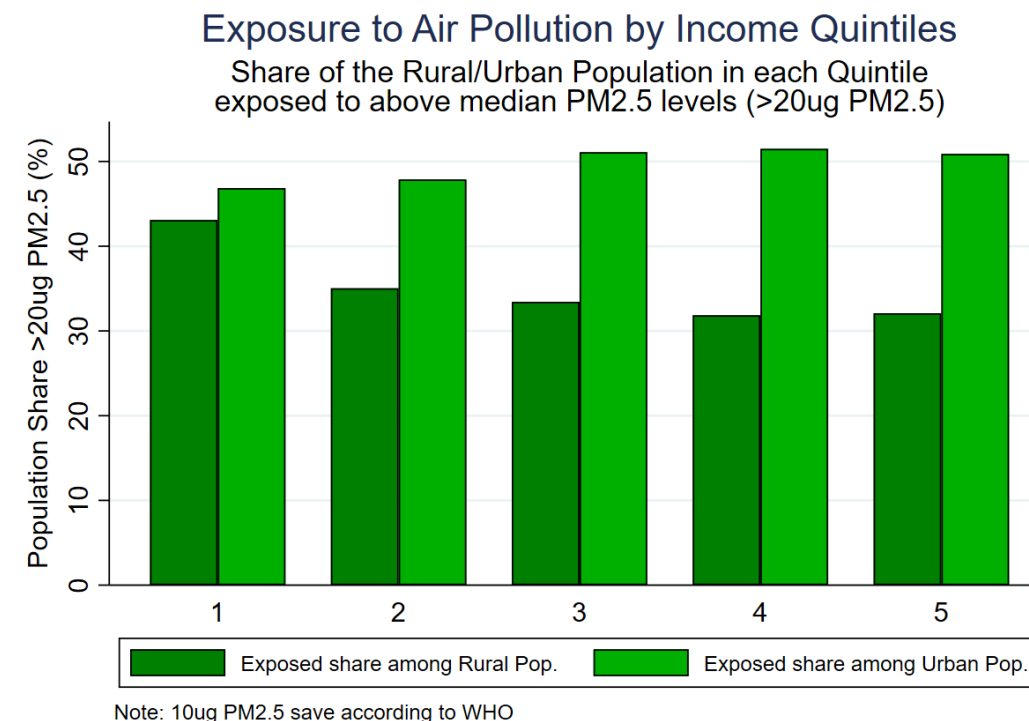
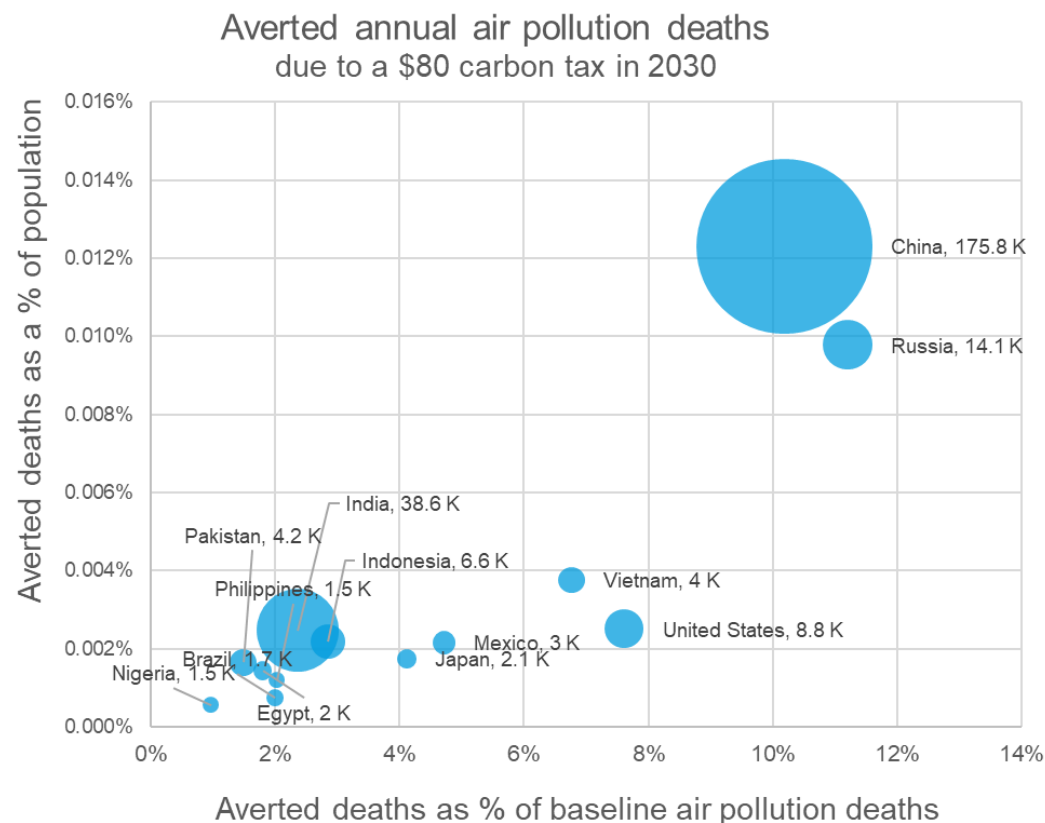
Intuition:

Carbon pricing reduces returns to capital more than returns to labor. Carbon-intensive sectors tend to be more capital-intensive, such that a carbon price would reduce the demand for capital relative to that for labor. Lower-income households derive a relatively larger share of their income from labor.

Source: **Goulder-Hafstead E3 CGE Model; RFF Incidence Model**



Health co-benefits of carbon taxes can be large & progressive

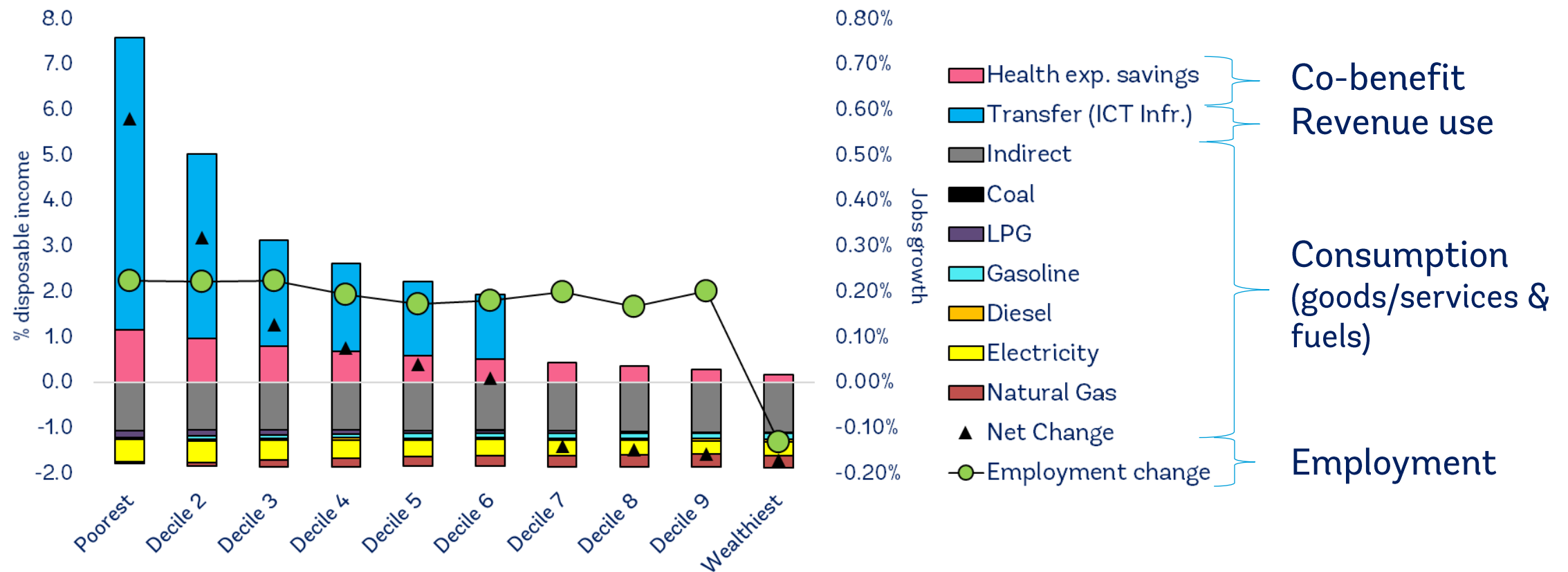


In India, an \$80 CT/tCO₂ could avert up to 40 thousand deaths annually, > 2% of air pollution-related deaths

Mexico: regressive distribution of baseline ambient PM2.5 air pollution suggests *progressive* co-benefits in rural areas

Overall distribution may be (even) more progressive than thought

Romania: \$50 CT/tCO₂, revenue use: ICT access & payroll tax cut



Conclusions

Distributional & equity effects of carbon pricing reforms

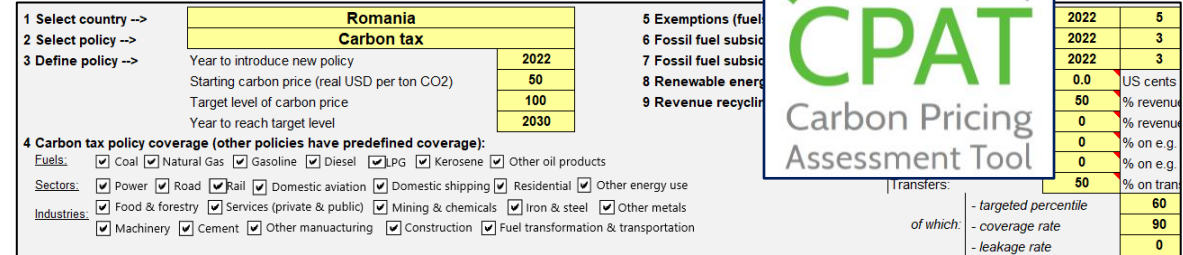
- need to be considered *comprehensively*, beyond consumption.
- tend to be larger & *more progressive* when accounting for changes in employment, income & health co-benefits.
- will vary by country & depend on tax policy design and on pre-existing price distortions (exise taxes, fuel subsidies etc.)
- affect households heterogeneously, thus, necessitate informed government intervention to buffer potential adverse effects

→ need for ex-ante policy advisory and tools

WB-IMF Carbon Pricing Assessment Tool

A ready-to-use *global* diagnostics tool

- Tailored carbon pricing policy analyses
- Various metrics of interest: macroeconomic, energy/emissions, development & health co-benefits, distributional incidence
- Ad-hoc or in-depth diagnostics
- Distributional analysis:
 - By urban/rural deciles, incl. horizontal distribution
 - Direct & indirect consumption incidence, incl. behavioral adjustments
 - Revenue use for: infrastructure access, existing social protection or conditional cash, rebates (for min. cooking requirements)



CPAT Carbon Pricing Assessment Tool

1 Select country --> **Romania**

2 Select policy --> **Carbon tax**

3 Define policy -->

Year to introduce new policy	2022
Starting carbon price (real USD per ton CO ₂)	50
Target level of carbon price	100
Year to reach target level	2030

4 Carbon tax policy coverage (other policies have predefined coverage):

Fuels: ☒ Coal ☒ Natural Gas ☒ Gasoline ☒ Diesel ☒ LPG ☒ Kerosene ☒ Other oil products

Sectors: ☒ Power ☒ Road ☒ Rail ☒ Domestic aviation ☒ Domestic shipping ☒ Residential ☒ Other energy use

Industries: ☒ Food & forestry ☒ Services (private & public) ☒ Mining & chemicals ☒ Iron & steel ☒ Other metals

☒ Machinery ☒ Cement ☒ Other manufacturing ☒ Construction ☒ Fuel transformation & transportation

5 Exemptions (fuel): ☐ 6 Fossil fuel subsid: ☐ 7 Fossil fuel subsid: ☐ 8 Renewable energ: ☐ 9 Revenue recyclin: ☐

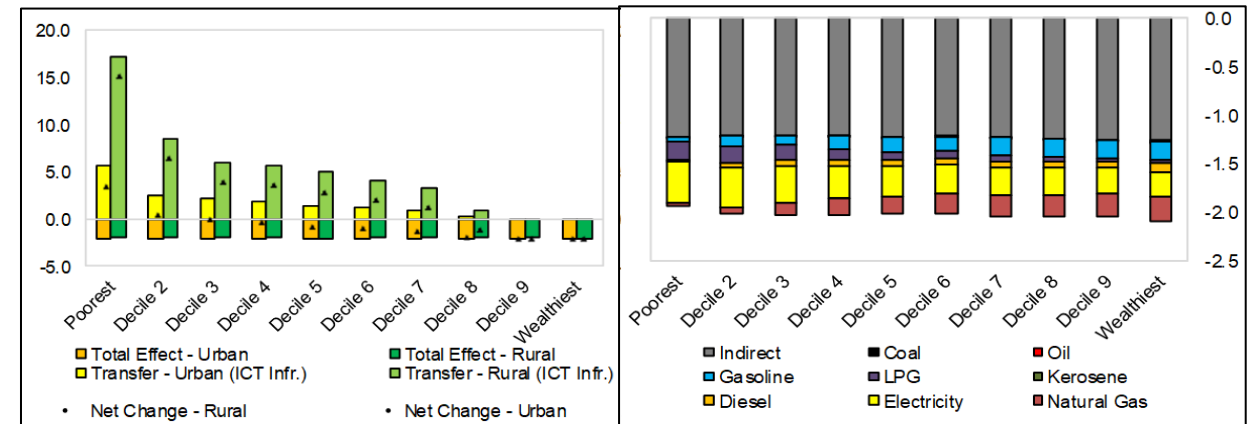
Transfers:

2022	5
2022	3
2022	3
0.0	US cents
50	% revenue
0	% revenue
0	% on e.g.
0	% on e.g.
50	% on tran

of which:

- targeted percentile	60
- coverage rate	90
- leakage rate	0

Relative mean consumption effect (% consumption for \$50 Carbon tax per tCO₂e in 2022), Romania



→ publicly available soon!

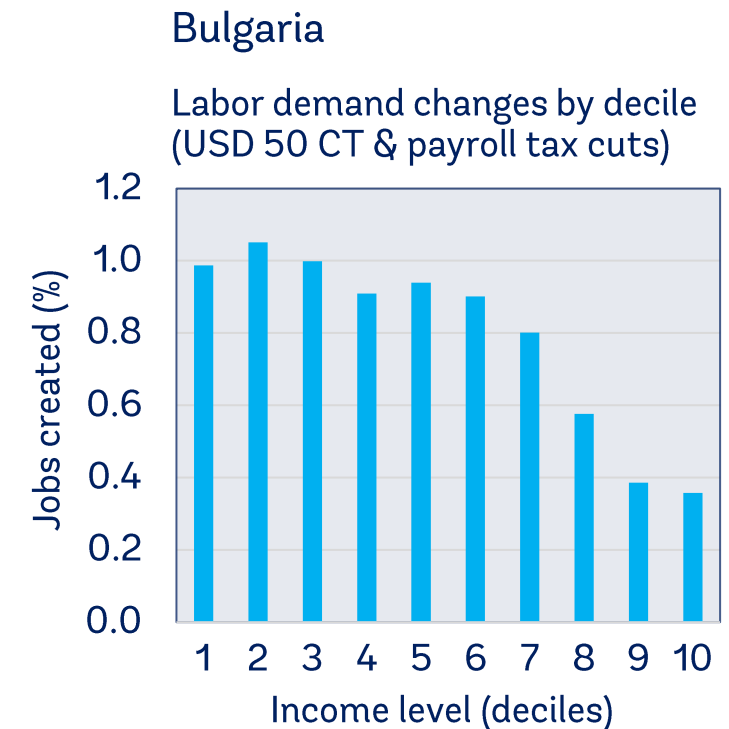
Adjunct model: sectoral employment & competitiveness effects

Multi-Regional Input-Output (MRIO) Model with price-endogenous technology

- **Tax-induced low-carbon structural change**, introducing various *sector-country-specific production, demand & trade elasticities*
- **Competitiveness effects** across borders for BTA/CBAM,
- **Sectoral employment & output effects**, incl. sectoral knock-on domestically & along GVCs

Augmented with labor force survey data:

- **Distribution effects:**
 - income groups
 - occupations/skills
- **Spatial:** international, national & subnational regions



A stylized graphic of a globe, composed of several overlapping light blue arcs that form a grid-like pattern, positioned on the left side of the slide.

THANK YOU

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with great thanks to the whole WB-IMF CPAT Team