PETERSON INSTITUTE FOR INTERNATIONAL ECONOMICS

Conference on

The Macroeconomic Implications of Climate Action

Monday – Tuesday, June 5 – 6, 2023

Comments on:

The macroeconomic implications of a transition to zero net emissions

by S. Hallegatte, F. McIsaac, H. Dudu, C. Jooste, C. Knudsen and H. Beck

Climate action: Implications for Factor Market Reallocation

by R.A. Lawrence

The Macroeconomic Implications of a Transition to Net Zero Emissions

- A **bottom-up, hybrid modelling approach** combining:
  - **Resilient Net Zero Scenarios (RNZP)** for 4 key sectors – Power, Buildings, Transportation, Forestry – to construct an illustrative resilient and net-zero decarbonization trajectory. They provide estimates of the *additional investment* needed in each of the sector to achieve net zero emissions by 2053 compared with baseline *achieving the same output*
  - **CGE (MANAGE):** a multi-sector GE framework with all (38) production activities. All product market are perfectly competitive, with CES technology. Labour market with frictions limiting movement of labour across sectors and groups. *Existing* capital is not perfectly mobile, while *new* capital is.
    - The key parameters and elasticities of the CGE model are *calibrated* to replicate the emissions reductions determined in the sectoral analysis. E.g. Investment requirements to achieve net-zero in power sector are introduced into CGE as an exogenous shock: the additional investment relative to baseline is paid for by an increase in public and private savings, thereby reducing total consumption in the economy.
  - **WB Macro model (MFMod):** an aggregate macro-structural model to assess the macro-fiscal consequences of the sectoral net-zero strategies e.g. USD 313 billion cumulative additional investments). Infrastructure investment if 50% funded by government and 50% by private sector. For the latter:
    - **TFP scenario** whereby reforms and investment boost TFP relative to baseline to stimulate private investment
    - **Carbon tax incentive scenario** with carbon prices and subsidies for energy.

The Macroeconomic Implications of a Transition to Net Zero Emissions

- Main findings:

  - **RNZP scenario would contribute positively to Türkiye's economic growth compared to baseline:** improved energy efficiency in transport and building sector + reduced air pollution. **But results much weaker (even –ve) if:**
    - **Frictions in LM** delay shift in employment to expanding sectors such as renewable;
    - If massive investments to implement mitigation measures **divert funds from other investments** (crowing out effect)
  - The transition would be **progressive** in terms of household welfare, if carbon tax revenues are used to stimulate investment: poorer HHS better because higher E and W, richer HHs worse off because lower return to capital and higher energy intensity of their consumption
  - **Need to strike a balance between supporting growth in the long-run by boosting investments and supporting HHs in the short-term to avoid welfare losses. → Well designed and targeted social protection programmes.**
  - **The transition would cause a shift of the structure of the economy toward services, construction & agriculture,** but this is because no scenario to fully decarbonize industrial sector.

The Macroeconomic Implications of a Transition to Net Zero Emissions

- Suggestions:

  - **Need to add an additional sectoral scenario for the industrial sector.**
    - Massive de-industrialization not very plausible, but also with that shift in E from industrial to construction ag, and services
      - Not only skills mismatch downward shift in the demand for high-skills at aggregate level with effects on wages
  - **TFP vs. carbon-tax incentive scenario.** Not clear which reforms and investment will boost TFP to the extent needed to incentivize green investment, nor what cost would the reforms have. Some may not be costly (e.g. better rules of law, improved market regulations), others are (e.g. better institutions, investment in human capital, better social protection programmes).

  - More on the **distributional effects.**

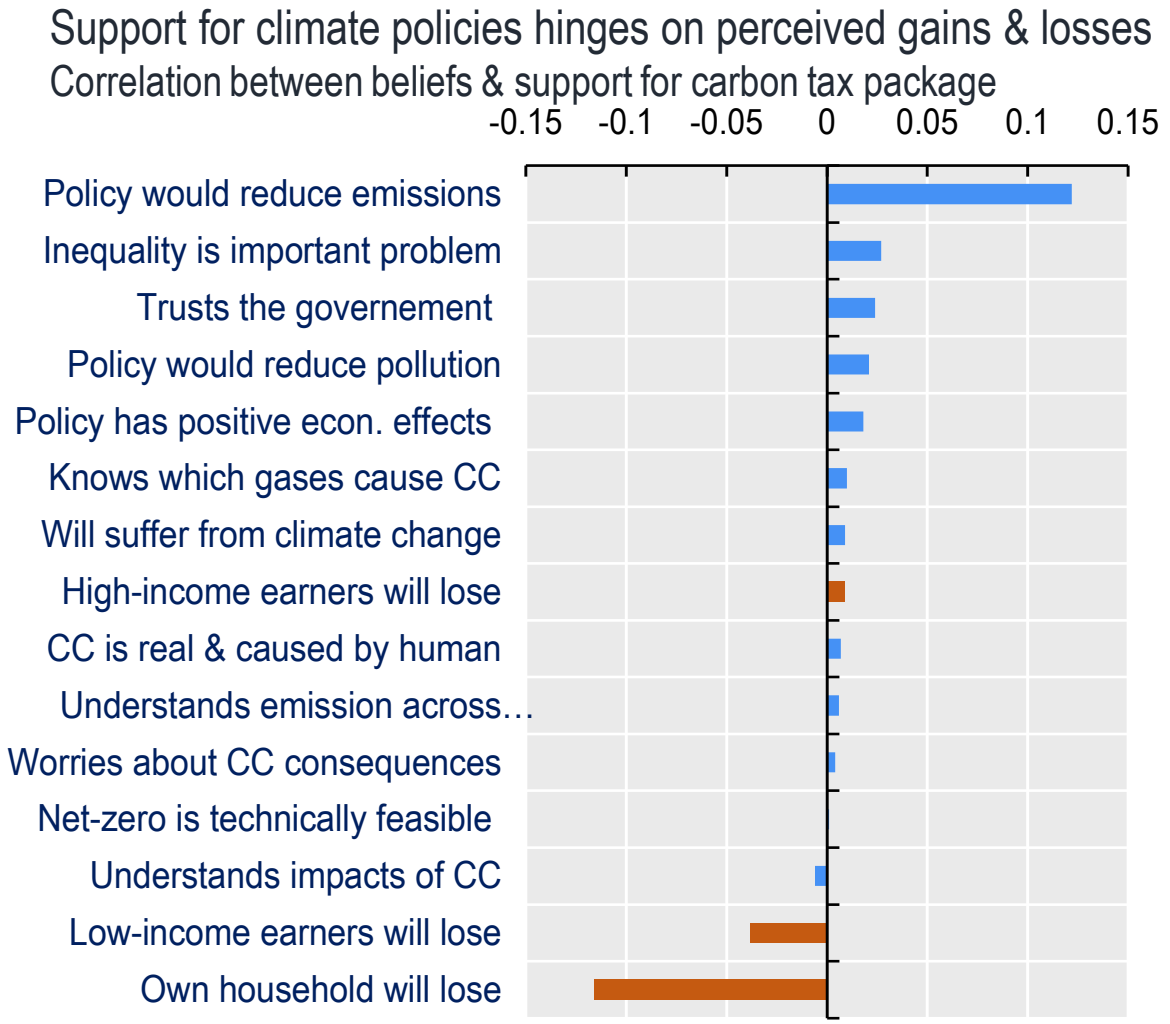
    - Especially in the carbon tax incentive scenario carbon tax is recycled through subsidies to the private sector to invest in the sectors identified in the RNZP roadmap and the increase in investment offsets the losses to households from the tax.

    - But a tax on energy consumption will weight more heavily on low income HHs: they tend to spend a higher share of their income on energy; they face barrier to credit making it more difficult to invest in greening their consumption.

Climate action: Implications for Factor Market Reallocation

- Focus on **"collateral" benefits** of climate policies on workers & investments as well as on **"painful" reallocation** of labour & capital. Important because:
  - **+ve aggregate employment effects** should not hide **distributional effects & job displacement**. Indeed, well known that job displacement carries large and persistent earnings losses (Jacobson et al, AER 1993
  - **Public support** for climate-change mitigation policies compromised due to alleged costs of job displacement
- Various reasons why the **costs of job displacement may be larger in brown industries**
  - Job displacement costs are larger in declining industries (Carter Braxton and Taska, AER 2023; Helm et al., 2022)
  - Job displacement costs may be larger in high-wage firms (Lachowska et al., AER 2020; Schmieder at al., AER 2023)
- Need for effective policies to support **displaced workers** from brown industries and build support for climate-change mitigation policies
  - Suggestive evidence that policies and institutions matter for the cost of job displacement (Bertheau, AEI 2022)

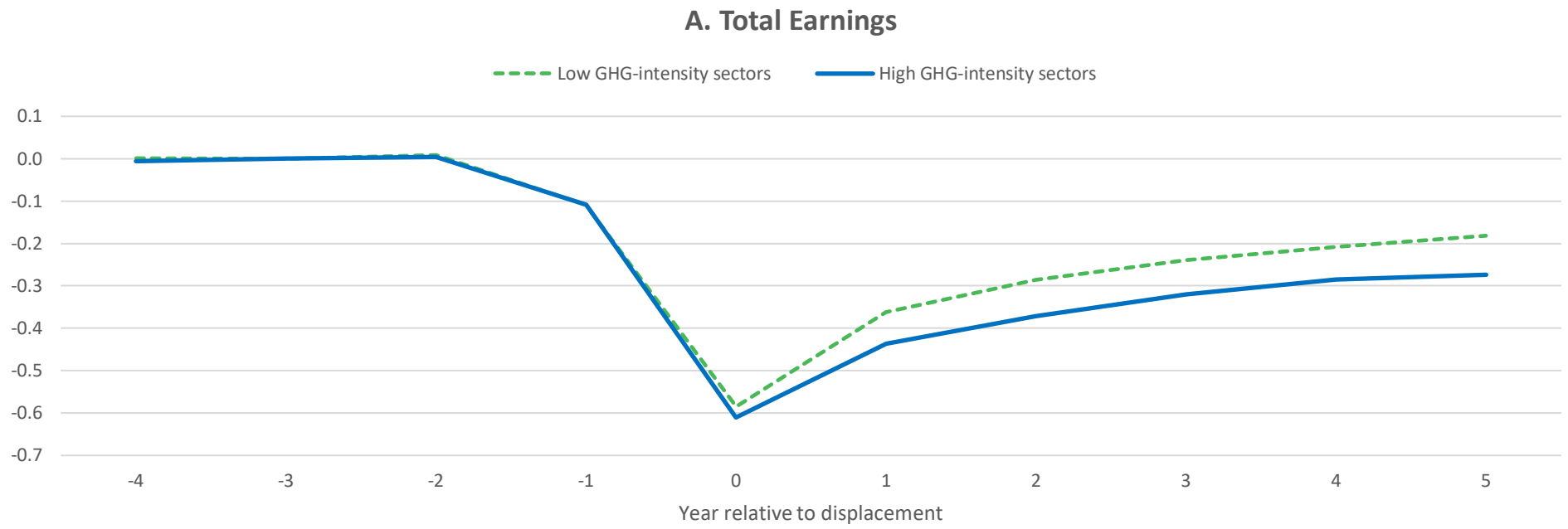
Climate change mitigation and a green transition: Can adjustment costs be shared equitably?



Note: n=40 680, R^2=0.378. 20 OECD and non-OECD countries, accounting for 72% of global CO_2 emissions
Source: Dechezleprêtre et al (2022), "Fighting climate change: International attitudes towards climate policies"

Displaced workers from brown sectors suffer significant and persistent earnings losses

% difference in outcomes between displaced workers and their matched counterparts relative to the time of displacement, average across Austria, Estonia, Germany and Portugal

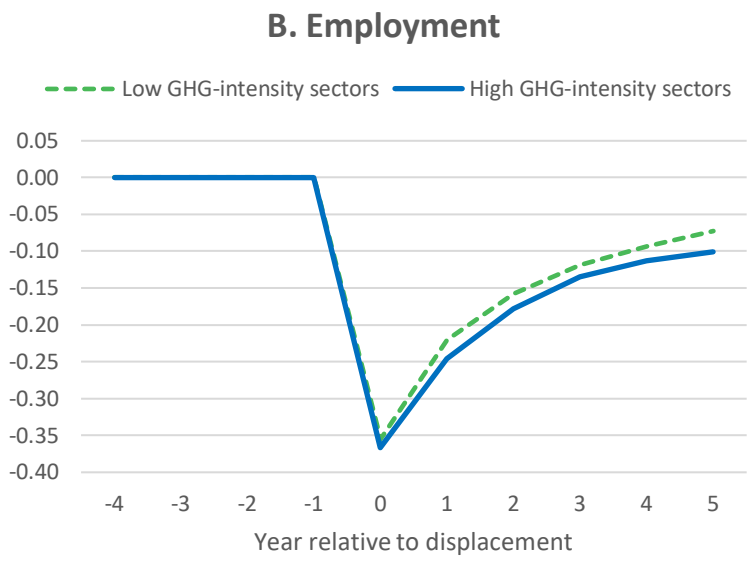


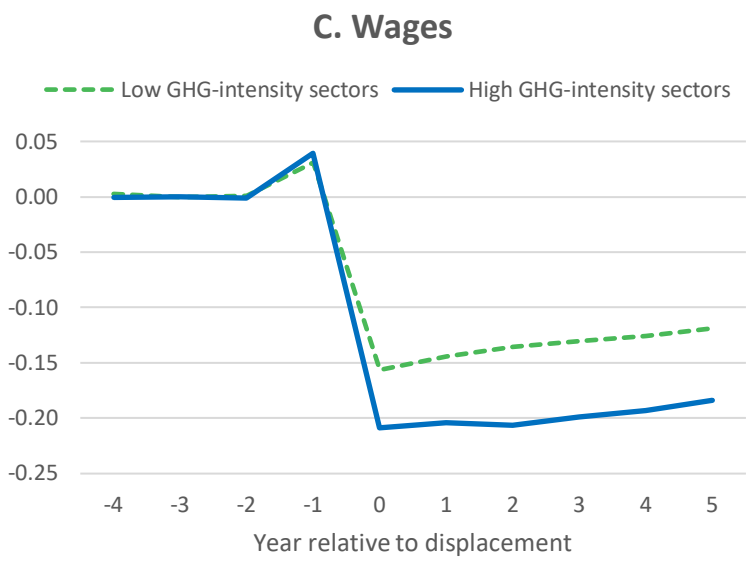
Based on EU data on the GHG-intensity of economic sectors, high GHG intensive sectors are those in top two deciles of the GHG intensity distribution in at least 10 countries. The sectors included are mining, brown manufacturing (e.g. basic metals, chemicals, coke and petroleum), energy, transport (air, water, land) and agriculture.

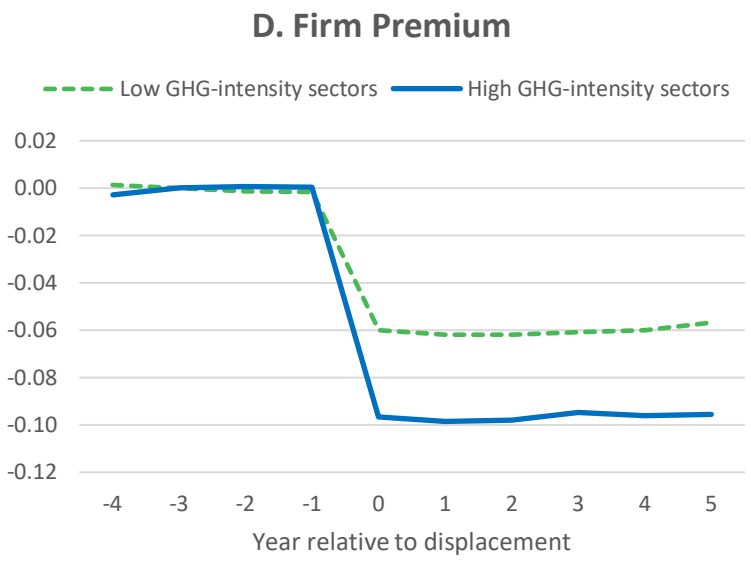
The empirical strategy builds on the framework by Jacobson et al. (1993); displacement effects are estimated by comparing outcomes of displaced and non-displaced workers before and after a mass layoff event. Restricting the analysis to displacements during mass layoff events enables identifying the causal effects of involuntary job separations, as mass layoffs can be assumed to be exogenous to individual characteristics of the worker.

Earnings losses are driven by reduced re-employment wages, due to lower firm wage premia

% difference in outcomes between displaced workers and their matched counterparts relative to the time of displacement, average across Austria, Estonia, Germany and Portugal







Climate action: Implications for Factor Market Reallocation

Key messages:

- **Move away from frictionless transition implies reconsidering the focus, targeting and modalities of support policies**
  - Many fossil-fuel workers who are dislocated might be unable to shift easily into jobs in renewable or other emerging jobs. New jobs require very different skills set and this would require extensive investment in training. Moreover, displaced workers may have to relocate to find new jobs and may be reluctant to do so especially if expanding places are far away and have higher living costs.
  - Many places in which fossil fuel production is concentrated may not be suited for investment in renewable energy

- **IRA poorly targeted for the purpose of environmental justice & too focused on renewable energy.**
  - Definition of energy communities in IRA too broad. Higher share of employment related to fossil fuels would be required
  - Beneficiaries may not be those directly affected
  - Impacted communities may not be suitable to specialize in renewable energy production

- **I would add:**
  - **Income-support systems** crucial for compensating displaced workers from brown industries for their loss in earnings. Unemployment insurance supports incomes during periods out of work and may help finding better jobs (and mitigate wage losses), but can weaken incentives for job search
  - Wage insurance provides alternative tool for compensating wage-premia losses due to job displacement without undermining incentives for job search
  - Activation policies and life-long learning systems are key for supporting the transition of displaced workers brown industries to new jobs

Climate action: Implications for Factor Market Reallocation

Suggestions:

- **Need to help not only individuals affected by the transition as workers but also as consumers.**
  - Low-income & rural households typically spend more on energy for domestic use and also often on transport. How to compensate these households without offsetting incentives for the green transition?
- **From an assessment of individual costs due to job loss to those borne by communities.**
  - Downsizing of concentrated high-emission industries implies dislocation of the entire labour market affecting not only workers in high-emission industries but the whole communities.
  - These (poorer) communities will have less income to attract firms in new, growing technologies.