Comments on Papers by Esteban Rossi-Hansberg and Solomon Hsiang

Richard Damania

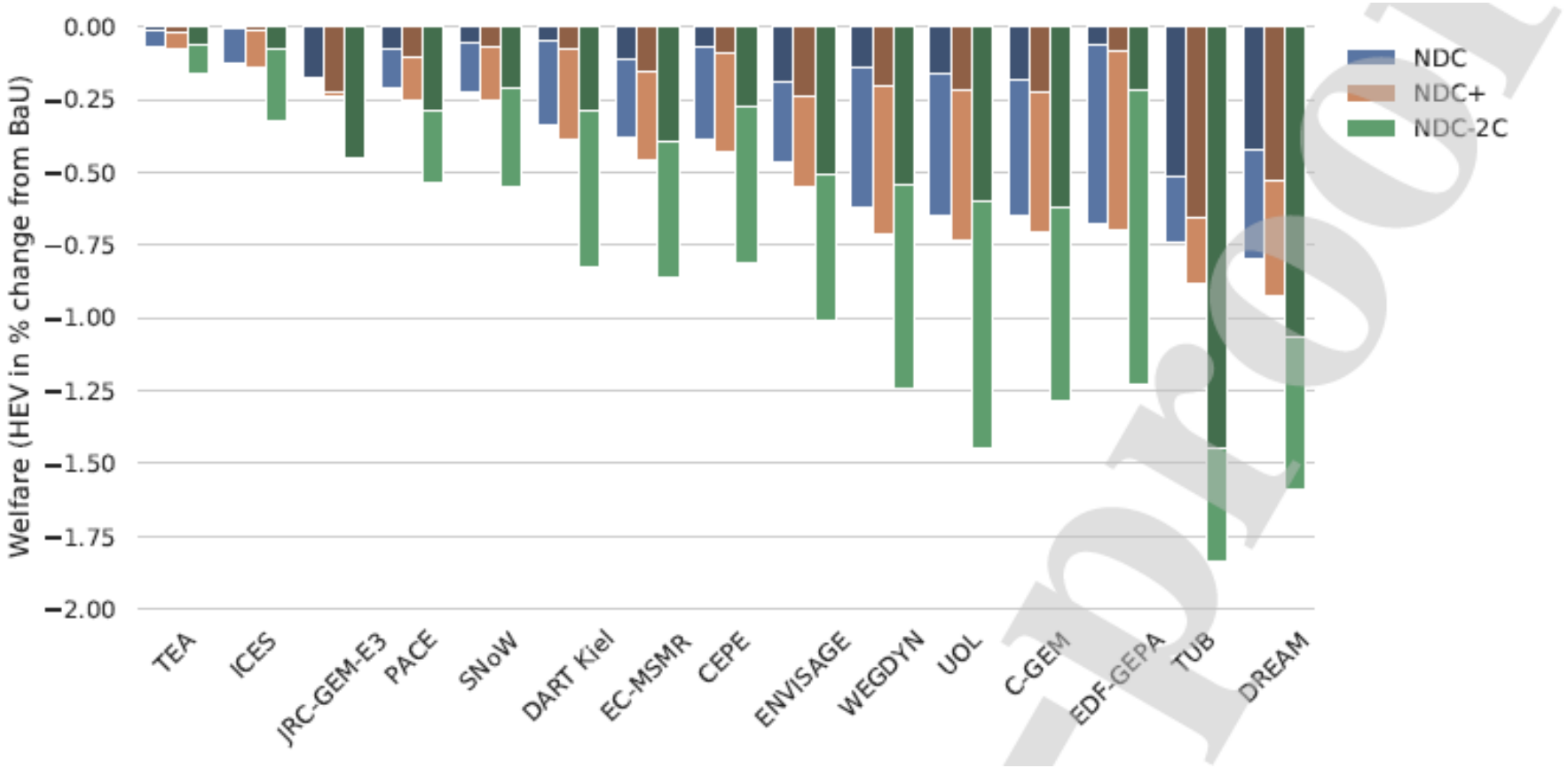
Key takeaways (1) **Significant methodological advances**

- Esteban's model: Long horizon, spatial detail, endogenous adaptation (migration, trade, innovation), mitigation policies (tax, subsidy, abatement technology)

- Solomon's work: Identification of climate responses versus weather signals

- Uncertainty of estimates increases as we move from biological impacts (e.g. crop yields, health), to economic impacts (especially GDP)

Different global CGE models running **same scenario, using same data and calibration**



Key takeaways (2): results

- Climate change is a **core economic concern**
  - With two-way causality – from growth to climate and climate to growth
- A new "***Equator Principle***" emerges strongly (worsens development challenges)
- **Migration** (≈ 480 million people…..)
  - Are impacts on destination captured adequately?
- Projecting climate impacts from observed data
  - **Tipping (inflection) points** -> "domino effects" (ice-sheet melt, GHG feedback, circulation, ….)
  - Stay within guard-rails of the safe zone (Wietzman rule)

Can we stay in the “safe zone”?

- Inaction – likely catastrophic
- Action also challenging (≈ 75% energy from fossil fuels + need to feed extra 2 billion people without wrecking the global ecosystem)

- Suppose all GHGs taxed (@ say $75 - $100/t)

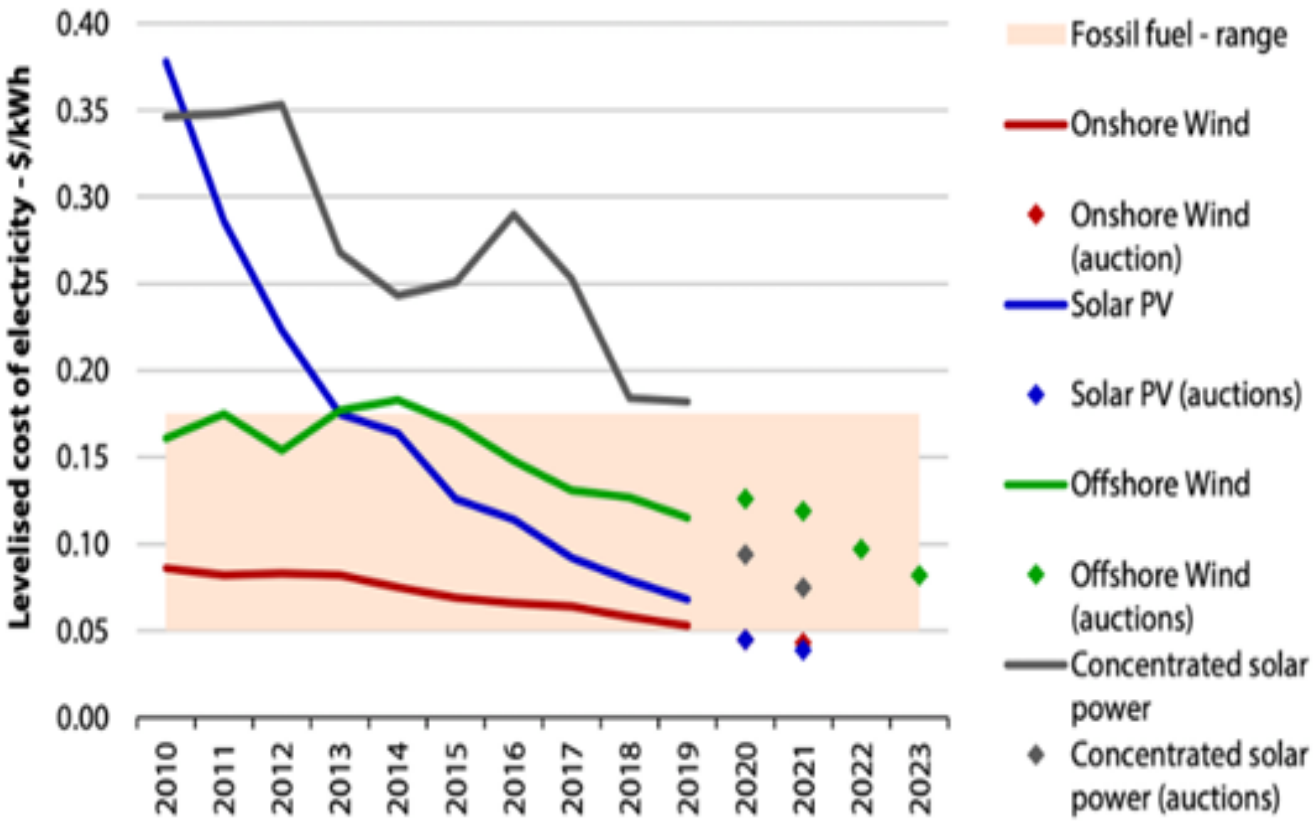
  => formal incidence of tax≈ 3% - 5% of GDP

- Is decarbonization of growth feasible?
  - 3 reasons for optimism and 3 reasons for concern

Dramatic decline in cost of cleaner energy

- Magnitude of decline was not deemed realistic

- Annualized returns on investment in renewables 2 – 3 times > fossil fuels (IEA estimates)

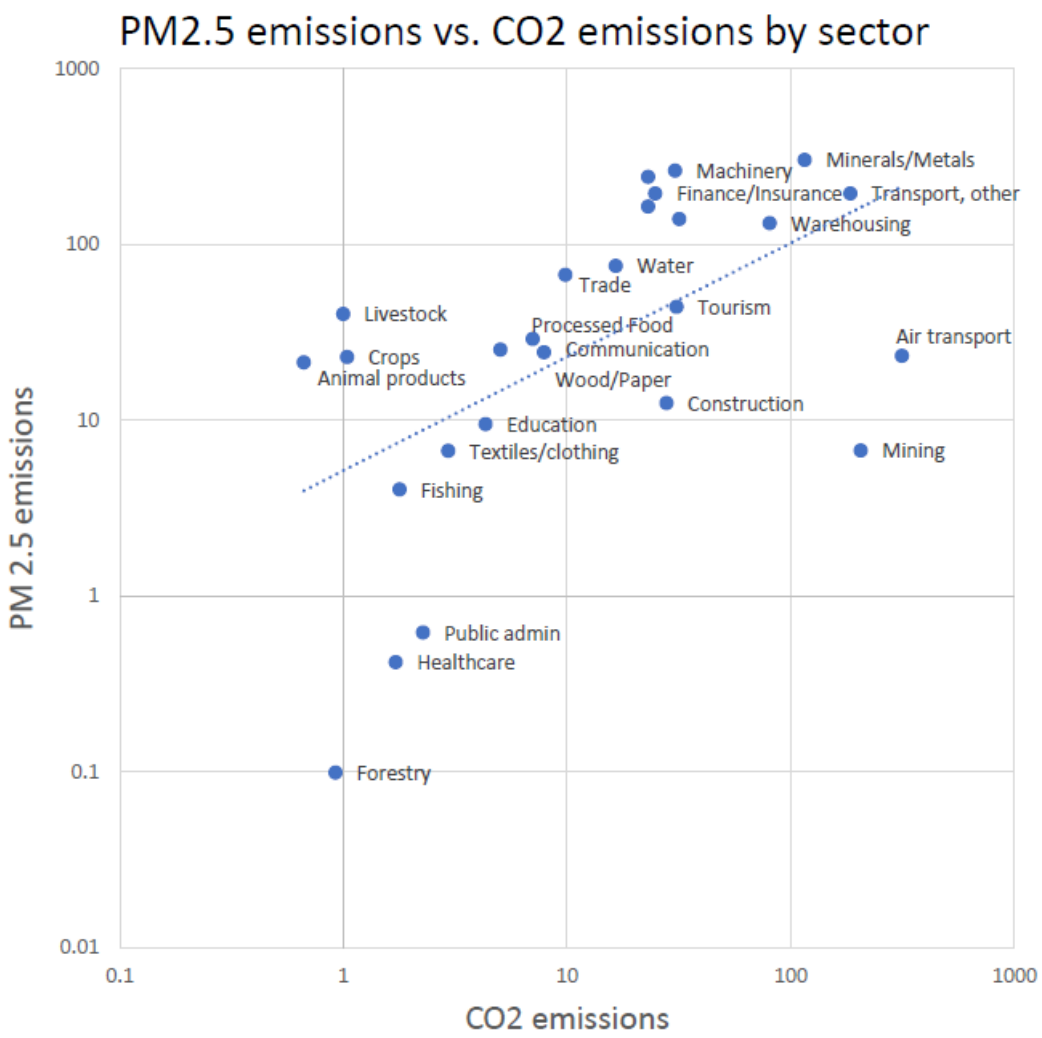


Source: Bruegel 2021

Health benefits GHG vs $PM_{2.5}$

- $PM_{2.5}$ and GHG multipliers correlation ≈ 80%
  - $PM_{2.5}$ claims about 7 million lives each year

- Reduced deforestation lowers incidence of Emerging Infectious Diseases



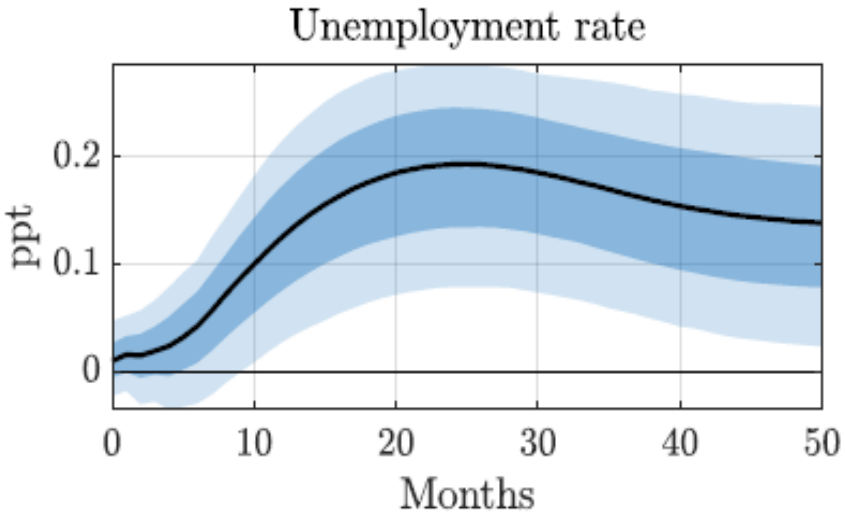
Source GTAP data base, World Bank

Investment needs – estimates converge around 2 - 4% of GDP between 2030-2040

- Excess savings ≈ $40 trillion in global economy (put to better use)
- Boost to demand
- Developing economies – leap-frog technology choices

Distributional issues

- Regressive impacts through price effects and employment effects



Source: Kanzig 2021 - UK all households on LHS, UK low-income households on RHS

Agriculture accounts for - 25% GHGs, most forest loss, most water consumed,……

Three stylized facts:

1. Developing countries agricultural **productivity** (TFP) **about half** that of rich countries, but **largest employer**
2. Agricultural commodity growth through **extensification** (i.e. habitat conversion)
3. Developing countries **yields will decline 30 – 50%** due to climate change

- *Need to feed an extra 2 billion people,* ***without destroying the resource base***

Policy, institutions and global coordination

- Policy distortions that promote **maladaptation** and subsidize (explicit or implicit) externalities
  - Political economy of policy reform challenging

- Much work showing **globally coordinated actions** can lower costs dramatically
  - Global cooperation not assured
  - Institutional design and mandates

Conclusions

- Transition is **feasible**, but **non-trivial** and calls for good policy.

- "**Low hanging" options** still remain - health, technology and outright wastage (e.g. subsidies for deforestation, beef, rice, fossil fuels)).

- Better understanding the magnitude and distribution of impacts can help address adverse consequences through policies….and tackling **political economy challenges**.