Discussion:

Understanding the Inequality and Welfare Impacts of Carbon Tax (Fried, Novan & Peterman, 2022)

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Overview

Basic Idea

- What does the paper do?
    - **Question:** Optimal reimbursement of a carbon tax
    - **Method:** OLG with energy in prod and cons
    - **Optimal Mix:** $(\alpha) \downarrow$ Capital tax, $(1 - \alpha) \uparrow$ Progress. of labor tax $(\alpha = .64)$
        - *Double Dividend Hypothesis*

Two birds, one stone?

Figure: Fix both inequality and avoid climate disaster?

Model Overview: Off-the-shelf elements

- Agents (OLG)
  - Born, start work at 20, retire at 65, die
  - Time separable CRRA preferences: Consumption & leisure
  - Stochastic labor productivity (Kaplan; 2012)

- Firms
  - CRS production (labor, capital, energy)

- Government
  - Piecewise linear benefit system
  - Distortionary capital tax
  - Tractable (2 Params) progressive labor tax (Heathcote et al.; 2017)

Model Overview: Custom ingredients

- Energy in production: $Y_t = F_y(K_t, N_t, E_t)$, $E_t = F_e(K_t, N_t)$

- Energy in consumption: $\tilde{c}_{i,j,t} = c_{i,j,t}^{\gamma} \left(e_{i,j,t}^c - \bar{e} \right)^{1-\gamma}$

- Carbon tax: $\tau^c = 0.26$

- Recycling options (...)

Two birds, one stone?

Table 1: Distribution and Welfare Effects

	Capital tax	Labor tax	Lump sum	Income progress.	Labor progress.	Optimal
CEV	−0.27	−0.54	−0.64	−0.92	**-0.13**	**-0.11**
%Δwelfare Gini	−0.0	0.1	−1.1	−2.4	−3.7	−2.4
%Δcapital	1.8	−1.8	−3.4	−5.7	−3.8	−0.5
%Δenergy	−30.3	−31.4	−32.0	−32.9	−32.4	−31.2
%Δoutput	0.6	−0.4	−1.1	−2.0	−1.6	−0.4

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Summary: Caveats

- Some caveats
  - No transitions
  - No innovation
  - No environmental externalities
  - Only heterogeneity: Life cycle & Productivity & Non-homotheticity
  - No endogenous skill acquisition

- Can we abstract from them for questions about optimal rebatement?

Summary: Caveats

- Some caveats
    - No transitions ✓
    - No innovation (Fried; 2018) ✓
    - No environmental externalities ✓
    - Only heterogeneity: Life cycle & Productivity & Non-homotheticity **X**
    - No endogenous skill acquisition **X** (Heathcote et al.; 2017, 2020)

Comment 1: Different to optimal taxation problems?

- Two rebatement options:
    - Reduce distortions (Chamley; 1986; Judd; 1985)
    - Promote redistribution (but limit distortions) (Heathcote et al.; 2017)

- Effieciency versus equity:
    - (-) Distort incentives to provide labor & accumulate skills
    - (+) Smooth marginal utilities across states

- Heathcote et al. (2017): Observed progressivity close to optimal.
    - Assuming: Productive gov't exp, endogenous skill investment, poverty

Comment 1: Different to optimal taxation problems?

- What's different here?
    - Presence of a pigouvian tax $+$ heterogeneity $+$ non-homotheticity

- It's not clear:
    - What's optimal rebatement **w/out** a pigouvian tax?
    - What's optimal rebatement **with** a pigouvian tax?

- Suggestion:
    - Rebate gov't windfall **w/out** pigouvian tax as baseline
    - Δ **with** a pigouvian tax

Comment 2: Spatial heterogeneity?

- Different states/cities have different exposure to a carbon tax

  - **Supply:** Carbon intensity of energy mix
  - **Demand:** Heterogeneity in heating, transport etc.

- Important margin of heterogeneity?

Spatial heterogeneity of carbon intensity in energy production

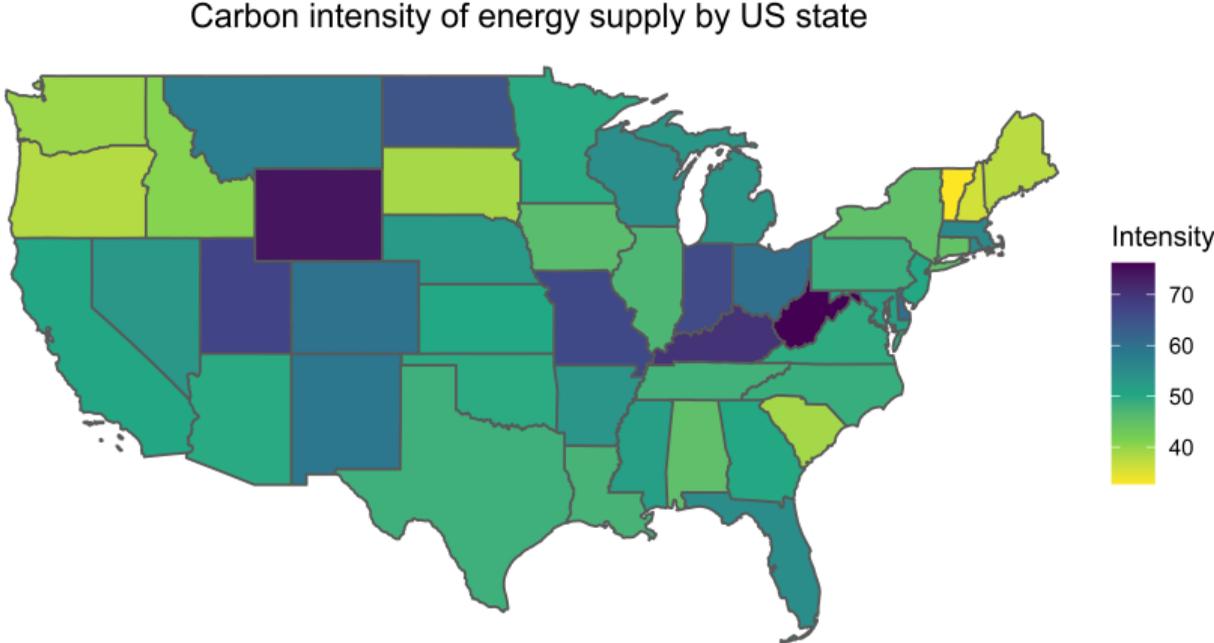Carbon intensity of energy supply by US state

Figure: kilograms of energy-related carbon dioxide per million Btu; Source: EIA 2022

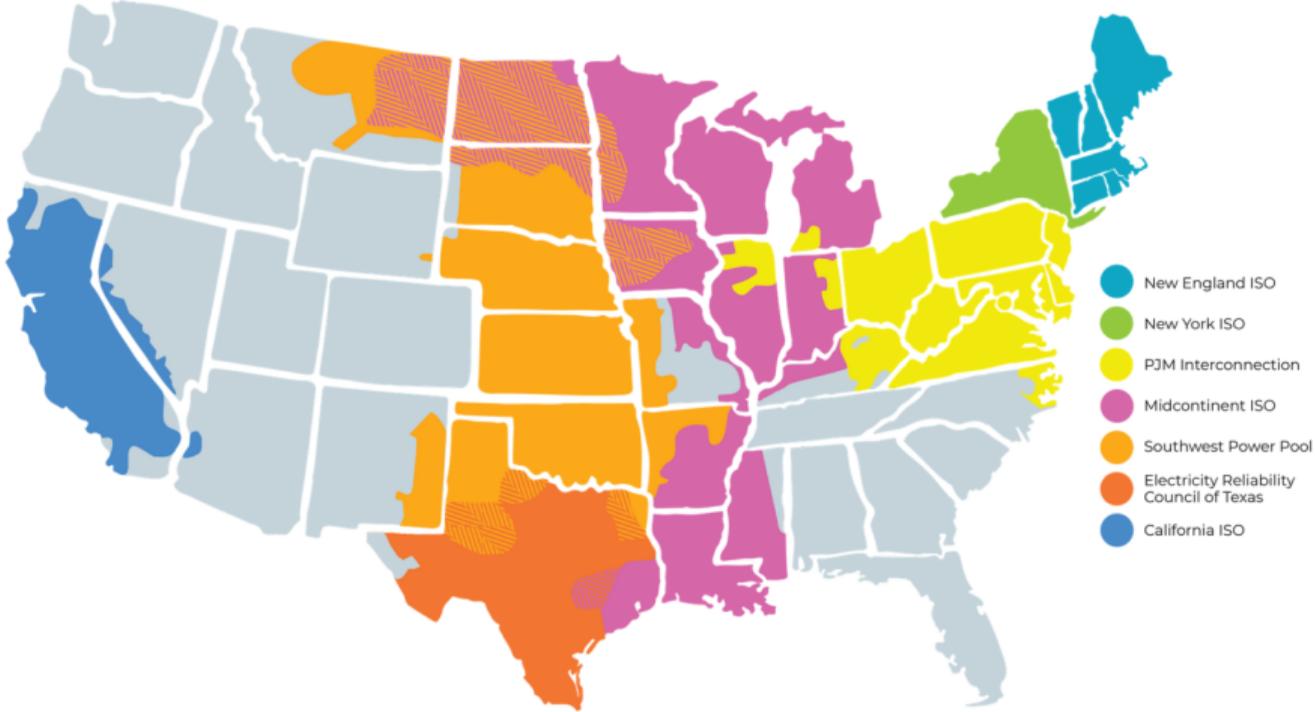# Spatial heterogeneity of carbon intensity in energy production

Figure: Segmentation of wholesale electricity market in the US

Comment 2: Spatial heterogeneity?

- Should the unequal spatial effect of a carbon tax be addressed?
    - It depends.

- Some more thoughts on this:
    - Classic optimal taxation trade-off: Equity vs Efficiency
        - Decrease dispersion of marginal utility
        - Decrease in incentive to move away from wasteful locations (Spatial relocation margin)
    - First best: Better electricity grid.

Smaller Comments

- Non-homotheticity: Stone Geary preferences
  - Vanishing income effects? (Comin et al.; 2021)

- Why not earmark the revenue for green subsidies? Carbon capture? Better grid?

- Political economy considerations probably binding

Conclusion

- Would love to see more discussion on:
    - Optimal rebatement: Driven by carbon tax or independent of it?
    - Which heterogeneity should be included? Endogenous skill acquisition? Spatial energy heterogeneity?

- Great research agenda!

- Super interesting and enjoyed reading it!

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