Discussion:

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

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Overview

1. Paper Summary

2. Two Comments
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: $\tilde{c}_{i,j,t} = c_{i,j,t}^{\gamma} \left( e_{i,j,t} - \bar{e} \right)^{1-\gamma}$

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

- Recycling options (...
Two birds, one stone?

Table 1: Distribution and Welfare Effects

<table>
<thead>
<tr>
<th></th>
<th>Capital tax</th>
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<th>Lump sum</th>
<th>Income progress.</th>
<th>Labor progress.</th>
<th>Optimal</th>
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<tbody>
<tr>
<td>CEV</td>
<td>-0.27</td>
<td>-0.54</td>
<td>-0.64</td>
<td>-0.92</td>
<td>-0.13</td>
<td>-0.11</td>
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<tr>
<td>%Δwelfare Gini</td>
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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 ✗
  - No endogenous skill acquisition ✗ (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)

- Efficiency 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 \textit{w/out} a pigouvian tax?
  - What’s optimal rebatement \textit{with} a pigouvian tax?

- Suggestion:
  - Rebate gov’t windfall \textit{w/out} pigouvian tax as baseline
  - $\Delta \textit{with} a pigouvian tax$
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

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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