Homework in Climate Economics: Household Production, Carbon Emissions, and Climate Policy

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In a Nutshell: the Paper in One Slide

Motivation, Main Message and Results

- Energy use from home production accounts for around 40% of aggregate emissions in the US.
  - Literature: Focus of climate policies on firm production, innovation.
  - Inflation Reduction Act: 60 billion of USD in subsidies for energy-savings equipment.
- **Main message**: Households are motivated to reduce emissions (both because of financial and environmental factors), carefully designed subsidies can help them achieve that.
- **Main findings**:
  - Survey: Household motivation for purchasing energy-saving equipment.
  - Model: Large cost-savings and emission reductions from household subsidies to energy-saving equipment.

The Mechanism

A subsidy to clean equipment affects emissions through three channels:

- Cross-technology substitution effect
  - Households use the clean technology for more tasks
- Cross-task substitution effect
  - Household substitute from dirty-technology tasks to clean-technology tasks
- Home-production effect
  - Households substitute from consumption to home production

Main Comments

- Spillovers and General Equilibrium Effects
- Welfare and Costs
- Other comments

Spillovers and General Equilibrium Effects /1

Aggregate Emissions

- The focus of the paper is on the emissions coming from home production ($\approx$ 40% of aggregate emissions in the US).
- In the model, households do not internalize the emissions coming from firm production.
- A subsidy to clean equipment increases the demand for the production of this equipment $\Longrightarrow$ potential increase in emissions from these industries.

Spillovers and General Equilibrium Effects /1

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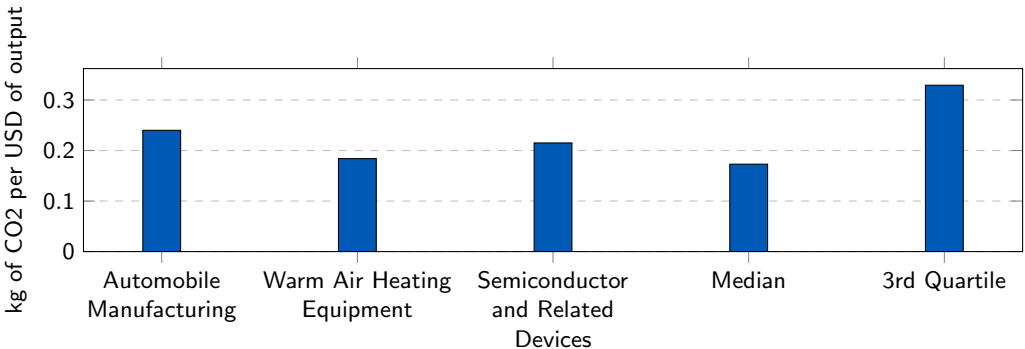

Source: U.S. EPA Office of Research and Development

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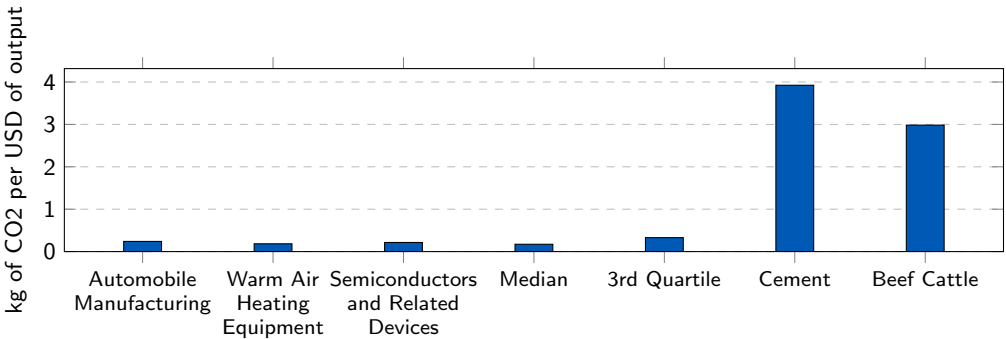

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Spillovers and General Equilibrium Effects /2

Production

- In the model, neither clean nor dirty equipment uses energy in the production (or other dirty equipment).
- In reality, even the sectors producing "clean" technologies use "dirty" energy for production.

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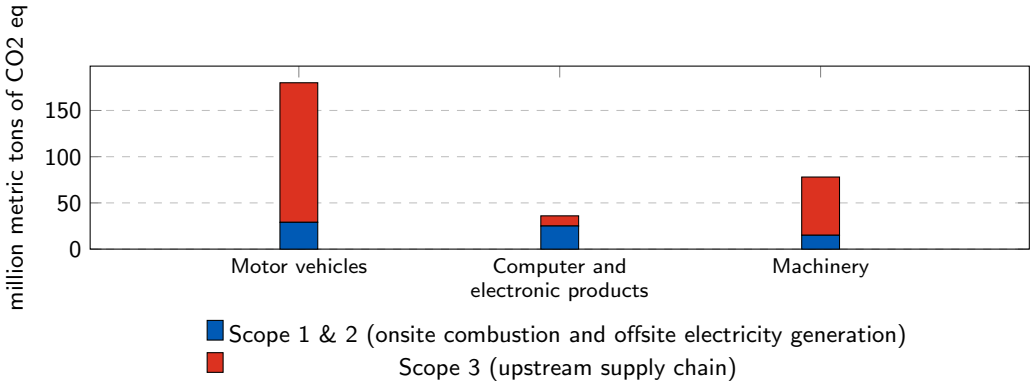

Source: Industrial Efficiency & Decarbonization Office, U.S. Department of Energy

Spillovers and General Equilibrium Effects /3

Prices

- The effects of the subsidies in the model are analyzed by comparing household emissions at different steady states.
  - What happens to prices in these new steady-states? Higher demand for clean technologies increases their price?
  - How costly is the transition to the new steady-state?
  - Do the subsidies generate "greenflation"?

Welfare and Costs

- Most climate policies are said to be regressive, hurting households at the bottom of the income distribution.
- What the welfare consequences of the subsidies?
  - Households re-optimize to new consumption and home production levels - potentially lower utility from consumption and home production but higher from lower emissions?
  - Lower purchasing power for households because of higher taxes?

Other Comments/Questions

- What is the composition of household emissions based on equipment they use (cars vs. heating vs. lights)?
- Changes over time? Are households using less dirty technologies or are dirty technologies less dirty?

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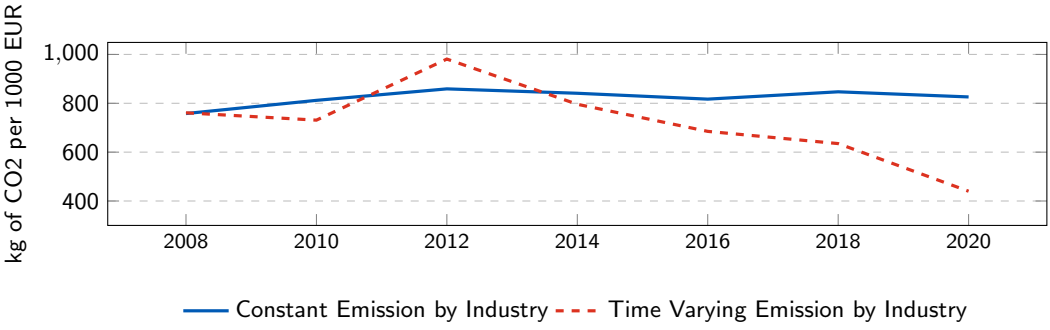

Source: Basso, Dimakou, Pidkuyko (2023)

Conclusions

- Very interesting paper!
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Thank You!