The Initial Incidence of a Carbon Tax across Income Groups

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September 22, 2015

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Background

- Carbon pricing is widely viewed as the most cost-effective way to reduce greenhouse gas emissions
- Incidence of carbon pricing is important: equity and politics
- Both the efficiency and distributional consequences of carbon pricing depend crucially on how the collected revenue is used

Overview

- Looks at incidence of carbon tax and use of tax revenue, across income groups and geography
- Links an overlapping-generations (OLG) model to a microsimulation model
- Looks at initial incidence: short run effect (but from a fully dynamic model)
- Focuses on cost side: estimates leave out benefits of reducing pollution emissions

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Roadmap

- Model structure and data
- Policy changes
- Incidence by income quintile
- Conclusions
- Future work

Model Structure

- OLG model of the U.S. (Carbone et al., 2012) provides price and aggregate quantity changes for consumer goods and sources of income
- Microsimulation model measures how those changes affect households at different income levels and in different locations

Incidence Model Data

- State-level income shares: National Income and Product Accounts
- Income shares by income quintile: CBO's estimates (based on tax returns and CPS)
- Quintile expenditure shares, state expenditure shares for non-energy goods: Consumer Expenditure Survey
- State expenditure shares for energy goods: State Energy Data System

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Policy Changes

- We look at three simple cases built around a $30 per ton carbon tax (constant in real terms)
  - Capital Tax Recycling
  - Labor Tax Recycling
  - Lump-Sum Rebate
- All policy changes are immediate, permanent changes
- Real net present value of government services, transfers, and deficits held constant

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Mean Household Welfare Change (2012 dollars)

	Capital Recycling	Labor Recycling	Lump-Sum Rebate
Energy Goods	-$530	-$543	-$540
Other Goods	$529	$543	$539
Sources of Income	-$290	-$406	-$865
Total	**-$291**	**-$407**	**-$866**

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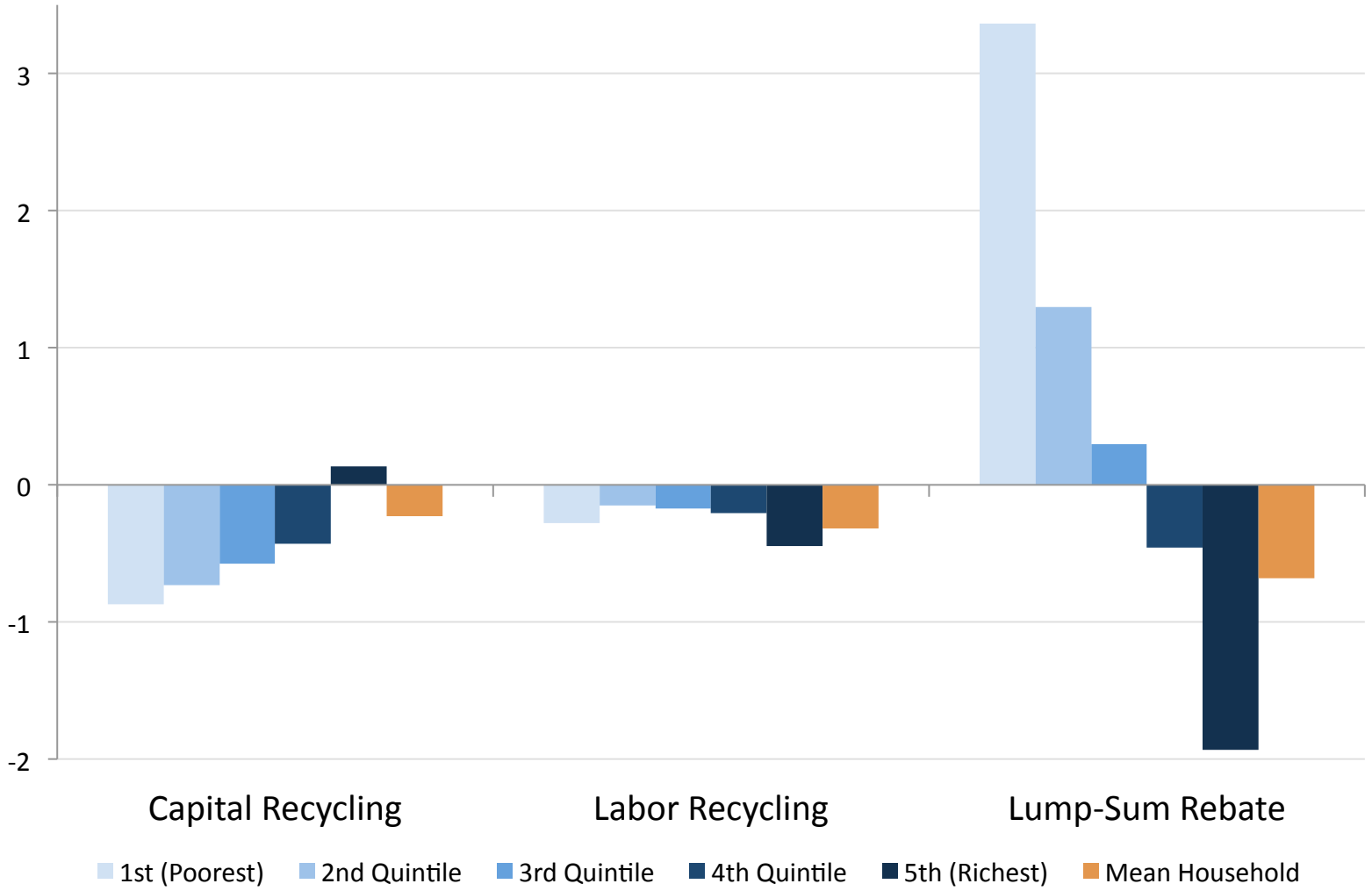
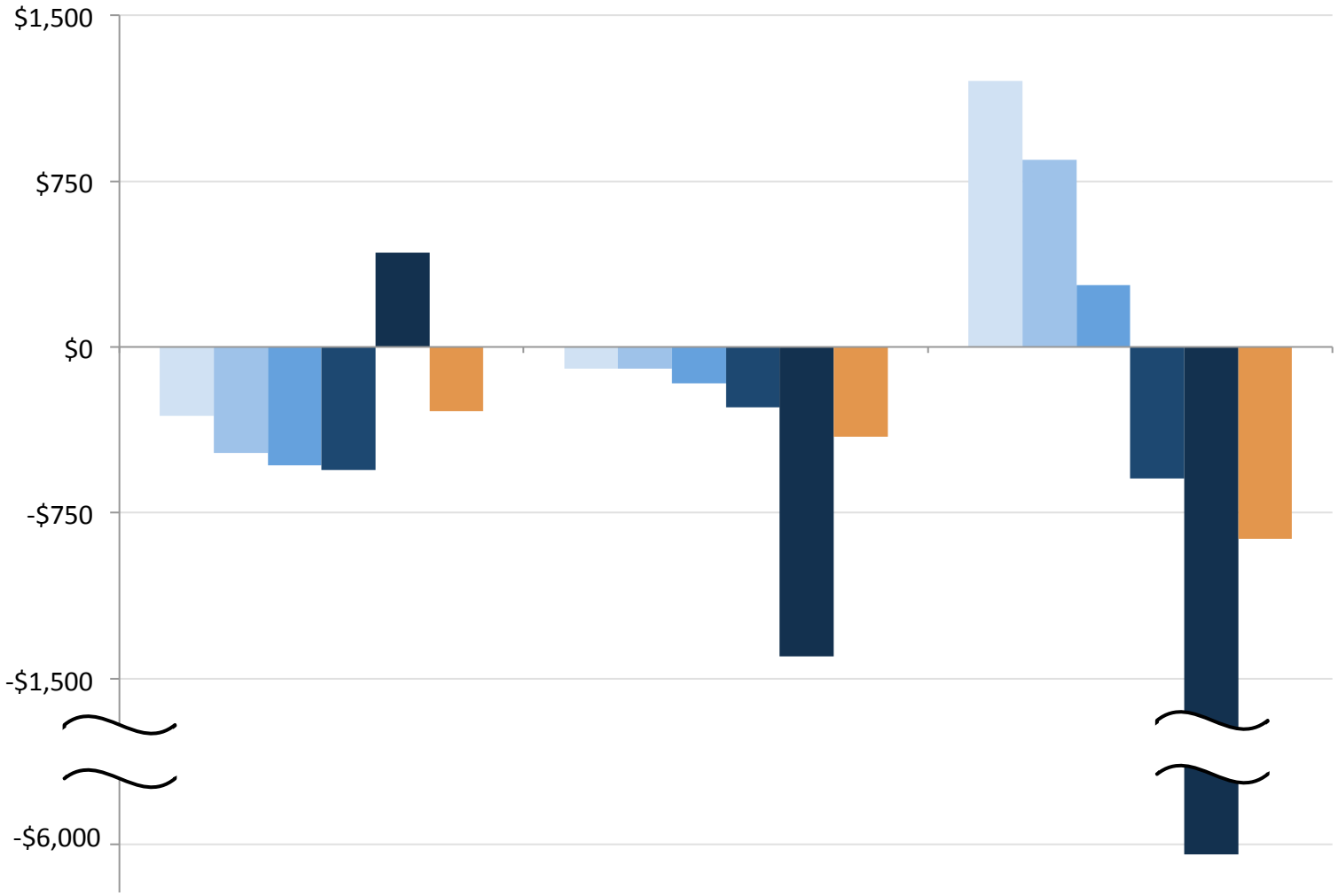
Middle Quintile Household

	Capital Recycling	Labor Recycling	Lump-Sum Rebate
Energy Goods	-$521	-$534	-$531
Other Goods	$479	$490	$481
Sources of Income	-$489	-$120	$329
Total	**-$534**	**-$163**	**$279**

Incidence by Income Quintile (% of income)



Incidence by Income Quintile (2012 dollars)



Energy Good Price Changes Are Regressive

Change in Welfare from Energy Good Prices, % of Income

	1st (Poorest)	2nd Quintile	3rd Quintile	4th Quintile	5th (Richest)	Mean Household
Capital Recycling	-1.04	-0.70	-0.56	-0.46	-0.22	-0.42
Labor Recycling	-1.06	-0.72	-0.57	-0.47	-0.23	-0.43
Lump-Sum Rebate	-1.05	-0.71	-0.57	-0.47	-0.23	-0.42

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Use of Revenue Drives Sources-Side Incidence

Change in Welfare from Income Sources, % of Income

	1st (Poorest)	2nd Quintile	3rd Quintile	4th Quintile	5th (Richest)	Mean Household
Capital Recycling	-0.64	-0.63	-0.53	-0.43	0.08	-0.23
Labor Recycling	-0.03	-0.04	-0.13	-0.21	-0.51	-0.32
Lump-Sum Rebate	3.57	1.39	0.35	-0.45	-2.00	-0.68

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Conclusions and Caveats

- Carbon tax by itself is regressive, but use of revenue has much bigger effect
- Key caveats:
  - Labor not differentiated by skill level
  - National markets for all goods (except electricity)
  - Full employment
  - Immediate incidence only
  - Leaves out benefits of reducing emissions

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Next Steps

- Consider longer-term incidence
- Link to other dynamic general-equilibrium models
  - Goulder-Hafstead E3 model (more tax detail)
  - New model that incorporates involuntary unemployment
- Consider policies that change path of deficits

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