

Visualizing the Statewide Impact of a Revenue-Neutral Carbon Tax

Background

Problem

How can we help voters decide on a complex state carbon tax policy?

- Policy impacts many variables across a large geographic region
- Policy sections include interlinked mathematical calculations, leading to complexity

Motivation

To improve policy transparency and help foster informed decision-making in political processes:

- Show estimates of the policy impacts over a wide variety of households
- Provide estimates in terms voters can understand
- Enable policy analysts get a holistic picture of the estimated policy outcomes

Previous Work

Revenue Neutral Carbon Tax Calculator
For Households

- Sales Tax Savings
- Working Families Rebate (WFR)
- Gasoline and Diesel Usage
- Air Travel
- Home Energy Usage

Is your utility bill split among several people? (Choose "Yes" if, for example, you have one or more roommates; choose "No" if, for example, you live in a single-family house or a single-family apartment) [Yes] [No]

What is your zipcode: [98323] [Submit]

Choose your electric utility (if your utility is not listed, first check that your zipcode is correct, and then contact us at carbon@cs.washington.edu) [Tacoma Power]

Do you know your home energy usage in units of therms, kWh, etc. (from utility bills or another source)? [Yes] [No]

How is your home heated?
 Natural gas
 Fuel oil
 Electricity
 Wood or wood pellets
 Other (don't know (we will assume you use natural gas))

How much purchased energy do you think your home uses compared to an average house in Washington (2000 sq ft, 3 bedrooms, etc)? Enter this as a percentage. For example, if your home uses half the energy of an average home, enter "50". If your home uses twice the energy of an average home, enter "200".

[100] % [Submit]

We estimate that your household would spend this much more due to carbon taxes on fossil fuel sources for home energy:

Natural gas:	\$87	per year
Fuel oil:	\$0	per year
Electricity:	\$8	per year
Total:	\$105	per year

• Summary of Results

Approach

Exploratory data visualization

- Many interacting data encodings
- Allowing for broad comparison and detailed fact finding in a high-dimensional space with roll-up and drill-down features
- Filters enable users to find data about households similar to their own
- High data-resolution with tooltips for more detail

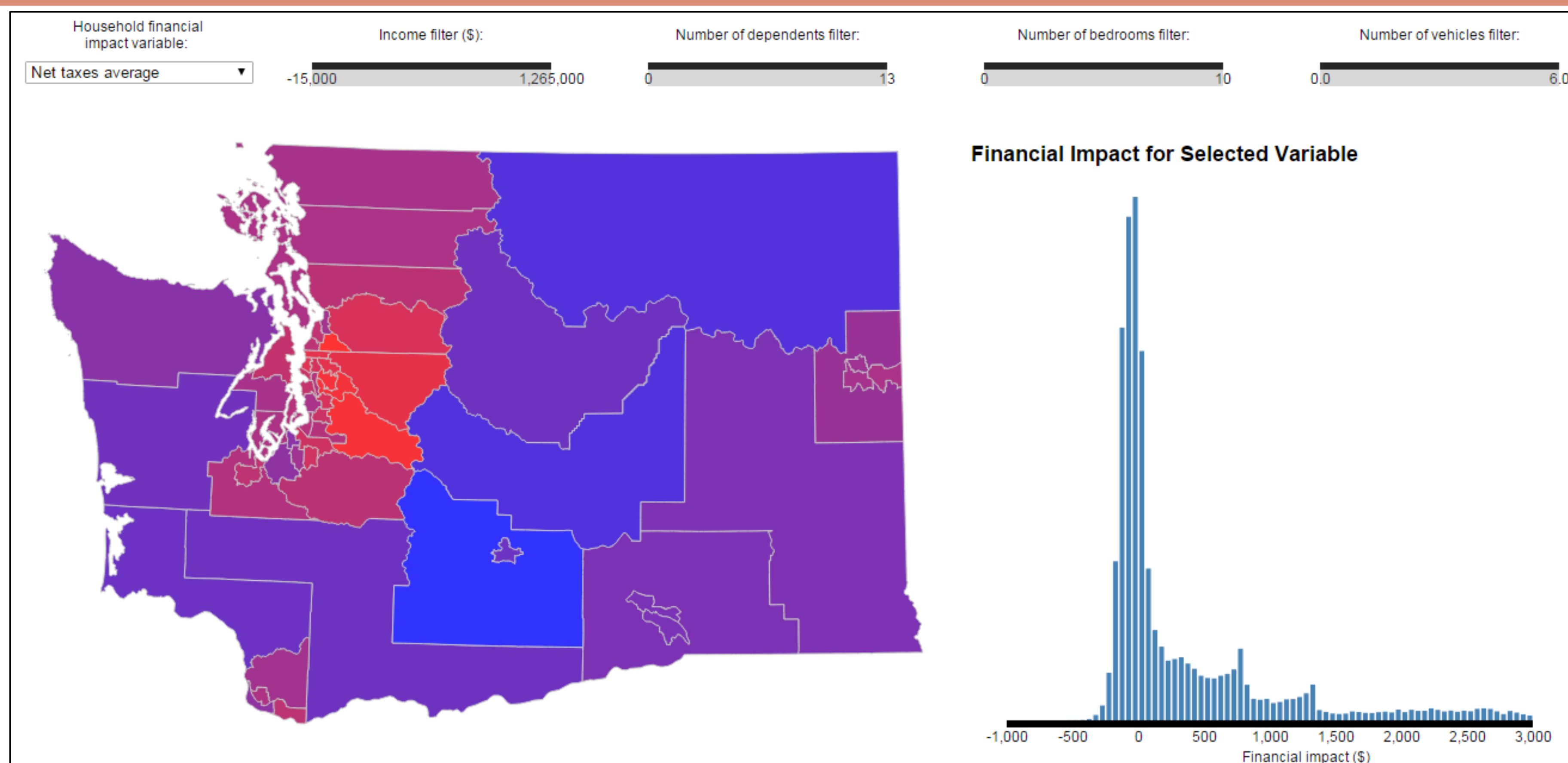
Drawing on many different datasets

- Achieving a holistic representation of the impacts requires integrating many data sources
 - Public Use Microdata Samples (PUMS)
 - Residential energy consumption, utility fuel mix, consumer expenditures, etc.
- Localized data is very difficult to obtain
 - Approximations from statistical findings serve as a very rough stand-in

Results



Results



Project webpage: <http://cse512-15s.github.io/fp-jbare-kaul10-lizehang-nanand/>

Future Work

Current Issues

- Incomplete and missing data
- Use of approximations in calculating placeholders for missing data
- Un-intuitiveness of some interactions

Future Work

- Obtaining better datasets (if they exist), or refining the approximation techniques
- Improving the interactions among the three main components
- Improving data encodings (e.g. color, but maintain color deficiency accessibility)
- Adding helpful transitions
- Increasing execution speed
- Evaluation with users