Data Scoping: US Census, Urban Institute, Willamette University

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Overview

Main idea: Explore the response in local level (state or lower) public spending/revenue to fluctuations in production in extractive industries (ideally coal and oil).

Motivation: Determine level of impact of a green transition on local level public well-being. Could conversely be extended to evaluate the potentially positive impacts of the increased presence of green industries.

Potential research questions:

1. (How) is local-level (state or lower-level) public expenditure impacted by shocks or fluctuations in fossil fuel production?
2. What are the relative elasticities/resilience of expenditure categories to local production shocks?

Intended data: The US Census Bureau maintains its Annual Survey of State and Local Government Finances. "This survey is the only source of nationwide, comprehensive local government finance information. It provides statistics on revenue, expenditure, debt, and assets for the 50 states and D.C." The data is also available in totals for local (sum of the following), county, municipal, township, special district, and school district levels.

Questions:

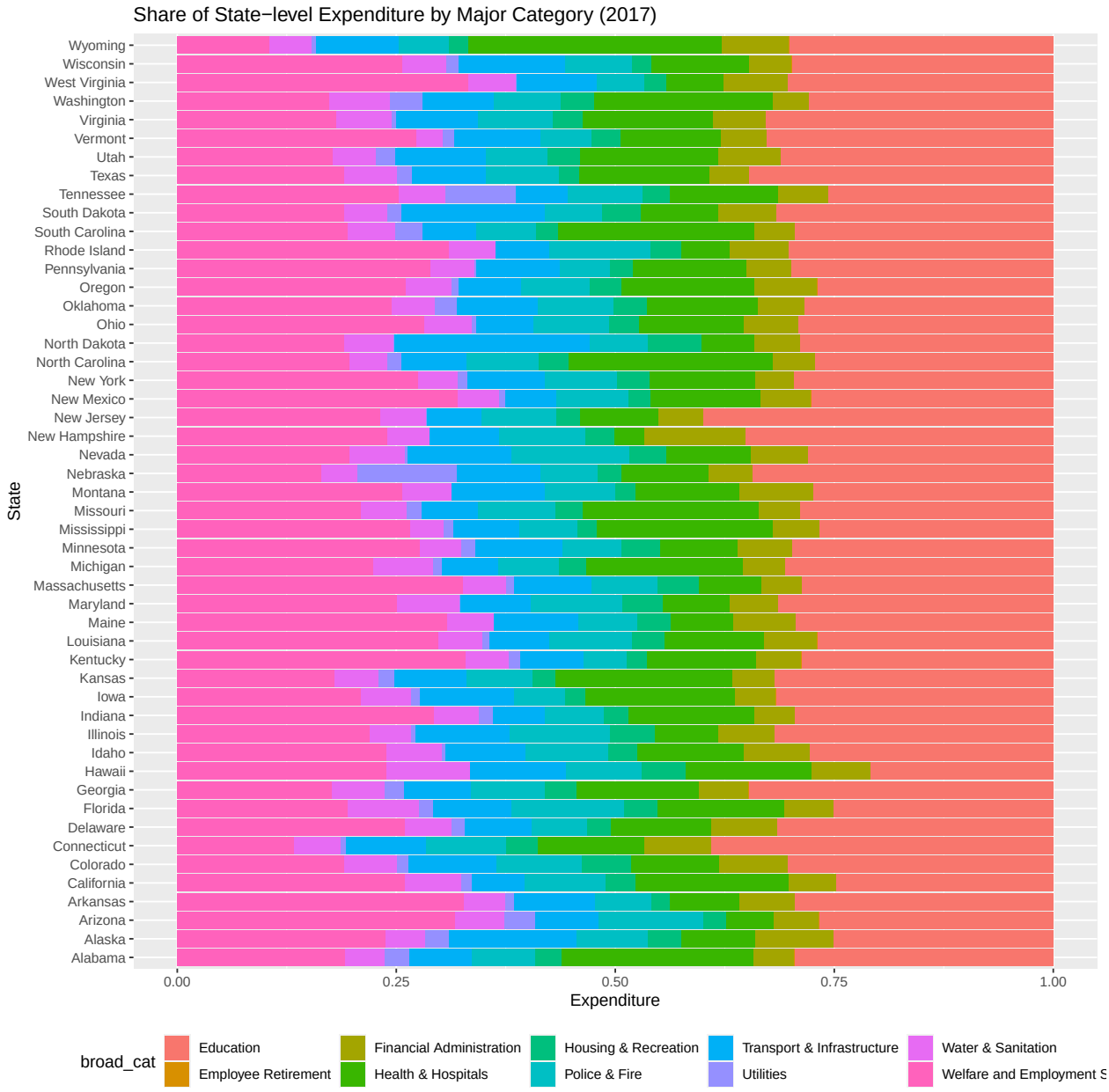
- Treatment variable (1): A "simple" method might be to use existing indicators similar to the one used in the Working Paper on coal decline (change in the number of active mines). The Energy Information Administration records the geographical location of relevant energy infrastructure. My plan is to explore this data to see what is available and relevant. The precise geo-location is very useful but precision will of course depend on the ultimate scale of the outcome variable (state, local, lower).
- Treatment variable (2) In my DPhil proposal I suggested to compare different metrics for measuring "regional decline" to identify the best indicator(s) for modeling regional decline. Not sure where to start though. . . . I am imagining this will require a dive into regional economics literature and empirical studies on regional decline. Also might require a cataloguing of empirical studies to see what is most commonly used?
- Concerns about the expenditure data:
  - I am still sifting through the county-level data. I have secured state-level data although I suspect that state-level examination is too distant from local production that a lower-level unit of observation is required.
  - As with the coal working paper, I am always stumped when it comes to "determining an effect" under the condition of limited data. I think it is important to measure and ask these questions. . . but is the data insufficient? And is this a reason to drop this question overall?

The data cleaning process of the raw US Census Bureau data has proven more tricky than expected so I am now scoping two data tracks simultaneously:

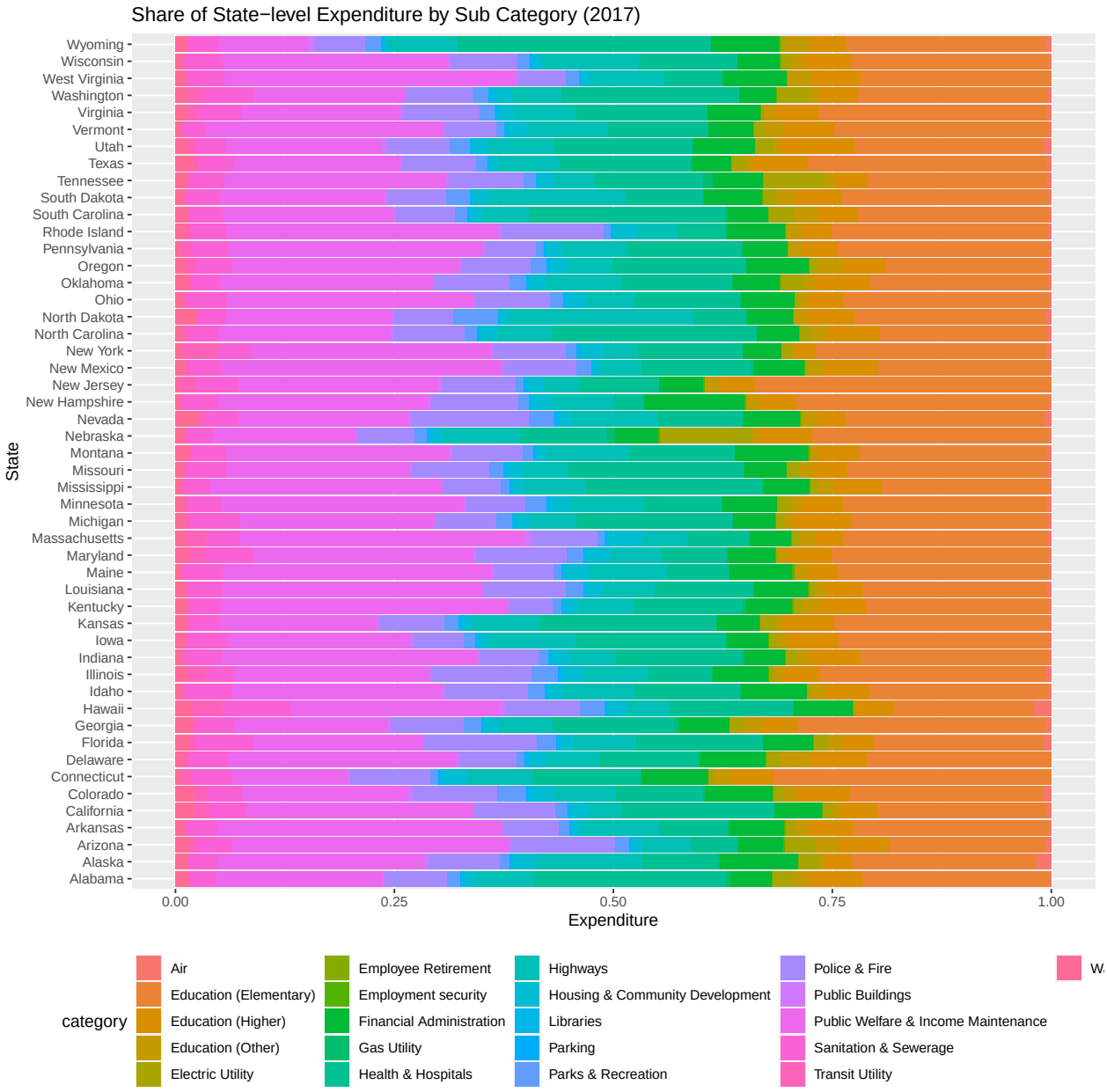
- State-level: I have moved on to data available from the Urban Institute which combines the above data with additional data from the US Bureau of Economic Analysis and US Bureau of Labor Statistics. This data is available at a national and state level (ie. local level expenditure is aggregated to the state level estimates) meaning that detail is lost at more granular spatial levels. The below charts and data is from this dataset.
- County-level: The Urban Institute points to data aggregated by Willamette University. This is what I am currently working on as they have helpfully aggregated across counties allowing me to explore the county-level data.

Urban Institute: State-level expenditure

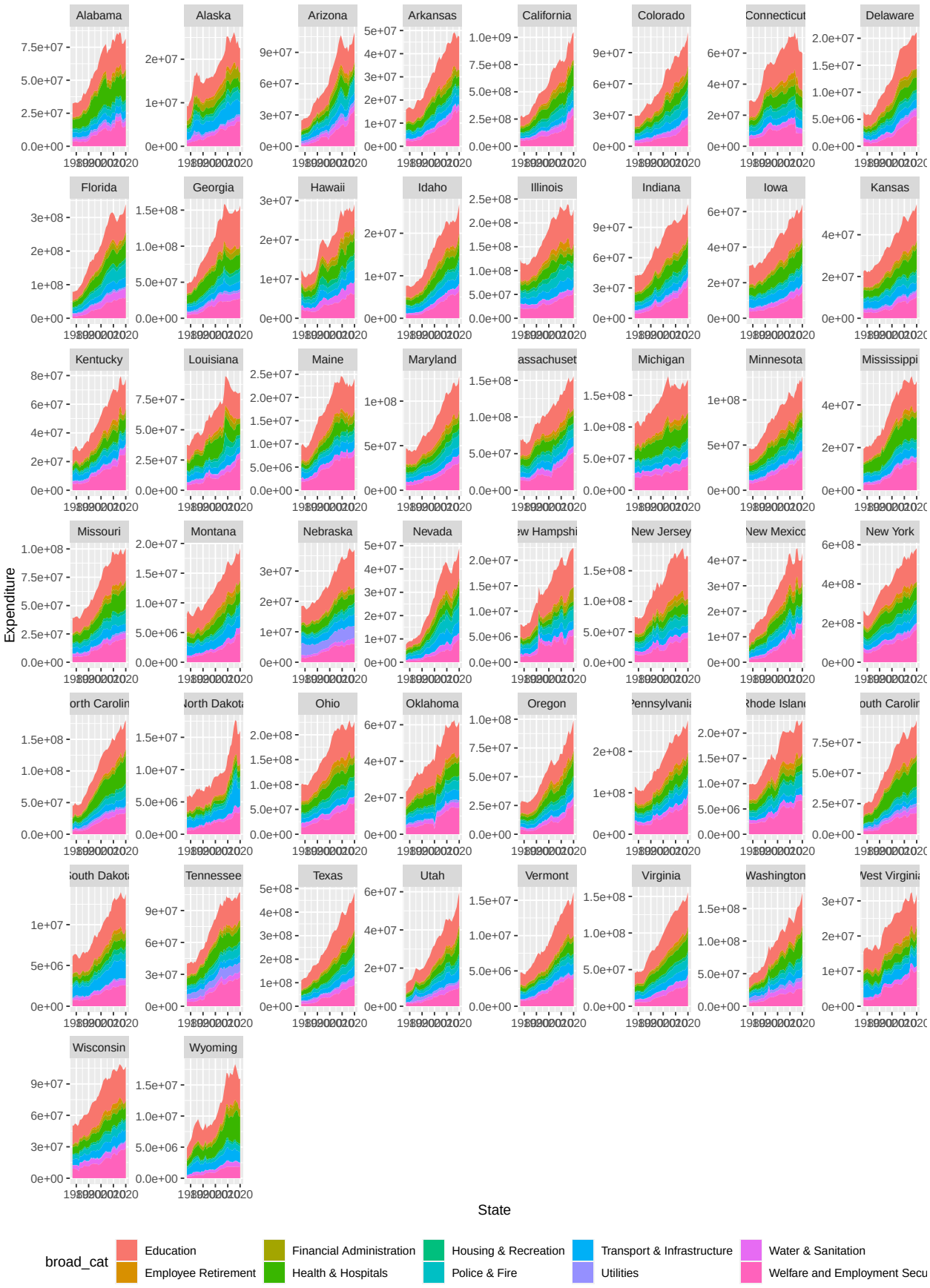
The following data shows the sum of all expenditure within a state by all levels of government below and including the state government. Education and Welfare & Employment Security are the largest expenditure items across the board.



The following plot shows the same public expenditure values but further sub-categorised. Within education, elementary education makes up majority of the expenditure. Within Welfare & Income Maintenance, welfare payment expenses outnumbers unemployment security benefits.



Data is available from 1977 to 2020. Below values are reported in 2020 USD..


Alabama
Alaska
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
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Oklahoma
Oregon
Tennessee
Texas
Utah
Vermont
Virginia
Washington
Wisconsin
Wyoming
Expenditure
State
broad_cat
Education
Employee Retirement
Financial Administration
Health & Hospitals
Housing & Recreation
Police & Fire
Transport & Infrastructure
Utilities
Water & Sanitation
Welfare and Employment Secu

Time trends

Standard linear time trends evaluated in state-fixed effects panel linear regression model from 1977 to 2020. Ordered by slope/coefficient estimate (ascending).

outcome_var	Estimate	Std. Error	t value	sig
Employment Security	-1062.2238	91.87715	-11.561349	***
Parking	520.0361	44.99569	11.557463	***
Gas Utility	1709.6437	264.55213	6.462408	***
Public Buildings	4173.7859	199.03639	20.969964	***
Libraries	8726.6235	259.60892	33.614497	***
Air	11899.7788	485.61644	24.504481	***
Electric Utility	20421.1028	1341.38652	15.223876	***
Education Other	26374.1350	919.34409	28.687991	***
Parks Recreation	30491.6414	979.06371	31.143674	***
Housing Community Development	45083.9526	1814.20990	24.850461	***
Employee Retirement	74253.7467	5126.08746	14.485462	***
Sanitation Sewerage	80710.3177	3015.01059	26.769497	***
Education Higher	98685.8551	2941.43813	33.550206	***
Highways	99671.9426	3388.46690	29.415056	***
Financial Administration	114195.6012	3700.24804	30.861607	***
Police Fire	186892.0055	6196.35424	30.161608	***
Health Hospitals	261534.6864	11145.73256	23.465006	***
Education Elementary	465540.3141	14427.79847	32.266899	***
Public Welfare Income Maintenance	588113.4676	18658.82117	31.519326	***