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Econometrics

Homework 7

Murray, Brian C., Maureen L. Cropper, Francisco C. de la Chesnaye, and John M. Reilly. 2014. "How Effective Are US Renewable Energy Subsidies in Cutting Greenhouse Gases?" *American Economic Review* 104 (5): 569–74
DOI: 10.1257/aer.104.5.569

Like most of my articles so far, this one is over ten years old, so I can compare old research to newer research in the articles I have saved. This paper aims to answer whether U.S. renewable energy subsidies actually reduce greenhouse gas emissions. Such subsidies include tax credits for wind, solar, and biofuels. The study uses two large-scale publicly documented simulation models from the U.S. Energy Information Administration:

1. NEMS-NAS energy economy model for electricity sector subsidies
2. FAPRI-MU agricultural and biofuel model for fuel and land use impacts

The models are not fully publicly accessible, and the paper doesn't use econometric regressions. Instead, it uses counterfactual simulation techniques that compare modeled emissions under existing subsidies to scenarios where subsidies are removed, to estimate the impact of tax credits on greenhouse gas emissions. The result was similar to a previous paper where subsidies for wind and solar energy were shown to reduce emissions, but by only a small amount. However, biofuel subsidies ended up increasing greenhouse gas emissions. This is due to land-use changes to grow crops and biofuel subsidies make fuel cheaper, meaning people will drive more.

Fell, Harrison, and Daniel T. Kaffine. 2018. "The Fall of Coal: Joint Impacts of Fuel Prices and Renewables on Generation and Emissions." *American Economic Journal: Economic Policy* 10 (2): 90–116.
DOI: 10.1257/pol. 20150321

This article looks at why coal-generated electricity declined so quickly, crediting the effects of cheap natural gas and growing wind power. There's use of micro-level data from several major electricity markets, such as: ERCOT, PJM, MISO, SPP, EPA CEMS emission data, etc… This allowed the author to build a very rich data set after combining all of these publicly available sources. The main question being answered is how much of the decline in coal use is due to fuel prices or renewable energy generation. This article comes up with a slightly different outcome compared to the other papers, where wind has become much more effective at replacing coal when natural gas prices are low.