

The effect of wind power investments on rural labor markets.

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Overview

Economists have increasingly come to recognise that a large swath of the US population has been left out of the benefits of the last several decades of economic growth in the form of poor job prospects, stagnant wages and decreasing income mobility. This trend has been ascribed to increased automation and mechanisation, outsourcing to countries with cheaper labor costs, and lack of critical skills among the labor force. In a related trend, Case and Deaton (2016) document the dramatic reversal of health and morbidity outcomes among the working class, which are driven by substantial increases in deaths of despair: Drug overdoses, suicides and alcohol-related disease.

While metro areas have not been immune to these trends, rural areas and small towns tend to have an over-representation of the demographics that have been most effected: non-hispanic white, middle aged, working class, and no college degree. Rural areas and small towns were particularly hard hit in the most recent recession and experienced steeper falls in both employment and wages.

But amidst a dearth of investments and deteriorating job possibilities in rural and small-metro counties, a bright spot has been investments in wind turbines and wind farms. The cost of wind power fell by 75 percent between 1984 and 2014 and is cost competitive in most locations in the US without subsidies (Trancik, 2015). Wind power has then moved from being a niche and highly subsidised generation found mostly in rich states, to a competitive form of power generation that now makes up a significant portion of generation in states with substantial rural areas such as Iowa, South Dakota, Texas, and Wyoming. Decreasing costs and wider penetration has also meant that the wind power industry is playing a growing role in the US labor market as a whole. The U.S. Department of Energy (DOE) estimates that as of 2015, the wind power industry supported approximately 50,000 jobs. The DOE further extrapolates that if wind power penetration continues to grow, the industry could support up to 600,000 jobs by 2050.

In contrast to traditional power plants, that tend to be relatively compact and are generally located close to population centres, modern land-based wind turbines are often over 80 meters tall with blade-lengths of over 100 meters. Out of spatial necessity, investments in wind turbines tend to happen away from large population centres.

Investments in wind power will of course have an impact on economic growth and lead to job creation in both the manufacturing, installation and maintenance of the turbines. They will also generate revenues for land-owners who either lease land for wind turbines or own the turbines directly, sometimes through a cooperative structure. However, it is ex-ante unclear how and to what extent these economic effects influence the local labor market.

Conceivably, it may make sense to employ skilled labor from outside the county hosting a wind power plant for both the initial build-out as well as subsequent maintenance and repair. Because wind turbine maintenance and repair is a skilled occupation, even if an in-county job is created, it is not clear to what extent this would be a net-increase in employment as opposed to a worker moving from one position to another.

The role that leasing payments or profits from the sale of electricity has on local labor markets is also ex-ante unclear. Agricultural land is to a growing extent held by corporations or individuals who are not located in the same county or even state. The income from wind turbines in the county may, in many cases, end up flowing completely out of the county.

Methods

I use data from the Energy Information Agency form 860 on all wind power installations over 1 MW in the United States and match it with data on quarterly wage and employment data from the Bureau of Labor Statistics Quarterly Census to empirically estimate the effect of wind power investments on wages and net-employment in rural counties.

To a certain extent, wind power investment decisions can be seen as an exogenous variable. The most important factor in the profitability of a wind farm is the average wind speed of a location. However, there remains good reason to believe that labor market outcomes and investment in wind power could be partly endogenously determined. On the margin, counties more likely to attract wind power projects could, for example have the necessary transmission infrastructure in place, or have local governments that are more investment friendly, with stream-lined processes for permits and approvals. These unobserved variables could also be correlated with labor market outcomes.

Therefore, to identify the effects of the wind power investment I use a panel of data with 30 quarterly observations on labor market outcomes for every county in the United States. Intercepts and both deterministic and stochastic trends are allowed to vary by county. I then compare outcomes before and after a wind power investment, both measured as a temporary jump and permanent shift. These parameters are also allowed to vary by county. In turn, these county parameters are themselves modelled together with relevant county-level variables. An average effect is then estimated through a common distribution for the county parameters with associated meta-parameters. From this multilevel structure, I can estimate an average treatment effect of wind power investment across counties while allowing for varying intercepts and trends by county. The multilevel model also has the attractive feature of automatic shrinkage of county coefficients through partial pooling. The model is fit using Bayesian Markov-Chain Monte Carlo (MCMC) simulation.

Results

The results indicate that wind power investments have no significant effect on employment in rural counties. However, a significant effect on wages is found. A 200 megawatt (MW) wind farm--approximately the capacity of 60 modern turbines--leads to a median permanent increase in wages of 2.5 percent in rural counties. No significant corresponding effect could be found in metro counties.

Conclusions

Wind power has traditionally received subsidies--in the form of federal tax credits as well as various state and local incentives. Environmental and climate externalities are often given as the justification for such subsidies and other policy instruments meant to encourage wind power and other renewable energy sources. This article informs renewable energy policy by suggesting a distributive effect of wind power policy. Claims that wind power will lead to significant job gains in struggling rural areas do not appear to have strong support in the data, though wind power investments do appear to press up wages.

The case of wind turbines can also inform broader issues and questions in labor markets. The results of this research are consistent, though not exclusively so, with a skills-based explanation of the weak rural US labor market. When a lack of a skilled work force is the constraining factor, new job opportunities due to an exogenous placement of a wind farm would be expected to have limited effects on the number of employed, while still pressing up wages.