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The Fiscal Impacts of Energy: Perspectives from local governments in the Mountain West, USA

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ABSTRACT

Over the past two decades, the U.S. energy sector has undergone significant transition. Coal— historically the primary power source for the U.S. economy—has declined markedly in both production and consumption. Renewables like wind and solar have become much more economically viable in recent years. However, perhaps the most dramatic change has been the drastic increase in oil and gas production since the mid-2000s, due largely to the convergence of unconventional technologies like hydraulic fracturing and directional drilling. The changing energy system presents both opportunities and challenges for local governments, especially those in rural areas that face unique fiscal struggles. In this paper, we present results of a survey of local policy actors in the Mountain West states of Colorado and Utah. Policy actors assessed the fiscal and public service impacts of different types of energy development and we tie these survey responses to spatial energy development data. Results imply that policy actors have nuanced views of all types of energy, though fossil fuels (especially coal) are generally seen as more fiscally beneficial than renewables. Generally, the spatial proximity of a type of energy development has only a weak relationship with perceived fiscal and public service costs and benefits.

1. Introduction

Energy production has long been the cornerstone of many rural economies in the U.S., but the distributed nature of new energy technologies provides novels opportunities for communities struggling to meet their fiscal needs. In particular, the increasing deployment of renewable energy and unconventional oil and gas extraction has changed the spatial logic of the energy system, with energy production occurring in a more geographically diffuse fashion, and often in closer proximity to existing communities. Indeed, local political leaders and related stakeholders often tout the economic impacts of energy development, even when those impacts are relatively ambiguous (Silva and Crowe, 2015; Mayer 2016; Ladd, 2014).

The literature on the relationship between the changing energy systems and the economic well-being of communities is only emerging, though a series of papers have considering the local economic implications of unconventional oil and gas extraction. Early studies, often relying on input-output models, generally found large positive effects, though Kinnaman (2011) urges that these studies should be interpreted cautiously given their methodological problems. More recent research using large datasets and econometric methods have documented the economic impacts of oil and gas development, typically using county-level data. Weber (2012) reports that natural gas production modestly raised employment and income in Colorado, Texas, and Wyoming—Lee (2015) and Tunstall (2015) note similar effects in rural Texas. Relying on the synthetic control method, Munasib and Rickman (2015) documented large employment growth in North Dakota but modest to null employment growth in Arkansas. In the Marcellus Shale region, unconventional oil and gas extraction likely increased employment, but those jobs were concentrated in the oil and gas industry, indicating limited multiplier effects (Paredes et al., 2015; Komarek, 2016; Cosgrove et al., 2015). Importantly, unconventional oil and gas extraction will likely not reduce rural poverty (Mayer et al., 2017) nor will it likely reverse the human capital flight and population loss challenges facing rural places, at least in the long run (Mayer et al., 2018; Rickman et al., 2017). Overall, oil and gas development improves some aspects of local economies while possibly have little effect on others, while potentially generating crime and engendering a loss of local amenities (Bartik et al., 2016).

Although oil and gas extraction will probably not create an economic renaissance in struggling rural areas, it may provide important revenue for cash-strapped governments, though there is a paucity of quality data on this topic (Newell and Raimi, 2018). State level financial data is generally more comprehensive, with several states applying severance taxes to oil and gas development. Most severance tax revenue is deposited in state general funds, with some proportion

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redirected to local governments (Newell and Raimi 2018a; Headwaters, 2014). Property taxes are often the cornerstone of local finances, though the methodologies for determining the value of oil and gas property vary substantially from place to place. Other sources of revenue for local governments are leasing public lands to energy firms, sales taxes paid by workers and redistributed state severance taxes. As with other revenue sources, there is a lack of data at the sub-state level—Newell and Raimi (2018a) explain that there is simply no comprehensive, data for how energy development impacts local governments, though some aggregated local data is available at the state level (Newell and Raimi, 2018b). Haggerty and Haggerty (2015) note that both oil and gas development and wind energy don't necessary lead to increased revenue in host communities because of state tax incentives.

Some types of energy development—particularly unconventional oil and gas extraction—can also create problems for local government finances by straining transportation infrastructure, water resources, and generating social ills such as increased crime (James and Smith, 2017). The magnitude of these effects is not well-characterized, but in at least some situations the revenue generated by local energy production cannot cover its costs (Headwaters, 2014) and communities that host related facilities—such as pipelines—may see negative economic impacts (Simons et al., 2017). Newell and Raimi (2018a) relied on qualitative interviews with local government officials, their results suggest that the fiscal benefits of local oil and gas drilling typically outweigh the costs. Marchand and Weber (2017) find that schools systems in the shale region of Texas primarily used new tax revenue from natural gas operations to pay down debt and improve their facilities—indeed, standardized test scores actually declined during the gas boom. Thus, oil and gas development appears to offer both costs and benefits for local governments.

The local economic implications of coal mining and related activities have also received extensive study, although as with the oil and gas literature cited above these studies tend to rely on county-level indicators of economic well-being such as employment or poverty rates, not local government finances per se. As with the literature on unconventional oil and gas, these studies paint a mixed picture. Betz et al. (2015) find in the 2000–2010 period, counties that hosted coal production tend to have fare slightly better economically, but this effect does not hold in the 1990–2000 period and varies across indicators. In related studies, Partridge et al. (2013) and Lobao et al. (2016) similarly report that coal mining heightened poverty in central Appalachia in the 1990s, but reduced county poverty rates in the 2000s. Because of externalized costs and subsidies, coal might have a net negative effect on state-level finances (Farren and Partridge, 2015). In our review of the literature, we were unable to locate any analyses that used granular data for local finances to understand coal's fiscal implications, though evidence suggests that residents of regions that host coal mining tend to view it as a fiscal boon for their area (Bell and York, 2010; Blaacker et al., 2012; Lewin, 2017).

Like other energy sources, the effects of renewables like wind and solar are mixed and nuanced. Wind and solar energy are associated with job growth, but primarily during the construction phase (Lantz, 2008; Reategui and Hendrickson, 2011). Research finds increased revenue to schools in rural areas with significant wind activity (Castleberry and Greene, 2017) though the long-term employment effects of wind are likely modest (De Silva et al., 2016). Although the states of the American West are blessed with ample wind and solar resources, further deployment of renewables will not necessarily lead to a larger tax revenue base (Haggerty et al., 2014). In the next section, we describe the methods and data analysis.

2. Data, measures and methods

Data was gathered in October and November of 2017 via an online survey of local policy actors in Colorado and Utah, the Qualtrics platform provided hosting for the survey. Developing a comprehensive sample of local policy actors presented several unique challenges. We relied on taxation documents from both states to create a comprehensive list of cities, towns, counties and other municipal units. The second stage of this process involved collecting contact information from the websites of local governments identified at the first stage. Because we sought to collect our data via an online survey, we gathered email addresses from these websites. Unfortunately, a small minority of city and county websites did not provide email addresses for their staff and elected officials (about 2%), and a few did not provide any contact information at all. These tended to be rural locales with small populations. When possible, we contacted administrative staff at these locations to assemble email addresses. Generally, this process proved fruitless. Another small subset of counties did not provide direct emails for staff and elected officials, but instead relied on online contact forms—the research team submitted an anonymous link to the survey via these forms.

Policy actors sampled included various elected officials such as mayors, county commissioners, city council members, treasury officials and related staff like city managers. The sample also included planning and community/ economic development staff but excluded first responders (e.g. law enforcement and fire staff) except those whose role likely involved planning and budgeting activities—such as fire or police chiefs. In total, we gathered 2224 emails, though 18 were duplicates and 14 were non-deliverable. The duplicates and non-deliverable email addresses were the result of erroneous information on county and city websites.

Each email address received a maximum of six contact attempts. Four-hundred and seventy-six policy actors initiated the survey, but only 313 completed the survey. Roughly 90% of the incompletes did not answer a single question. We suspect that some policy actors clicked upon the survey accidently, or perhaps read the introduction page and decided not to complete the survey. Using the largest figure for the number of completions (n = 476), the response rate per AAPOR definition 1 was 21.71%. Using the more conservative estimate for the number of completions (n = 313), that response rate was 14.27%. Some policy actors mentioned in private emails that they were conducting re-election campaigns and had no free time to take a survey. We suspect that the response rate would have been higher if data collection did not occur simultaneous to many local elections. Typically, studies of local policy actors have used similar sized samples, although some have used mixed-mode approaches that produced higher response rates (e.g. Crowe et al., 2015; Elgin, 2014).

2.1. Data analysis

Given that the purpose of this paper is to capture local policy actors' views of the fiscal and public service impacts of different types of local energy development, our research approach is primarily exploratory and descriptive. First, we present results from quantitative survey questions wherein respondents were asked if they had any of the following types of energy development in their local area: natural gas drilling, oil drilling, solar power, wind turbines, coal mining or another type of energy production—in the case of the latter, respondents could name another type of energy in an open-ended question, though few chose this option. Note that neither Colorado nor Utah has operational nuclear power plants, though both states have been home to uranium extraction. Ninety-four local policy actors indicated that they did not have energy development in their local area, and were excluded from subsequent analysis.

The survey instrument then directed respondents to a series of questions based upon what type of energy development they stated existed in their local area. Then, for each type of energy development, policy actors were asked about positive and negative impacts. Using likert-type response scales, local policy actors were asked if a given type of energy development provided more financial resources to improve schools, more resources to improve local infrastructure, and more