The Economic Impact of Wind Power Development

Economics Honors Thesis

Sam Smith

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Jonathan Hughes - Economics - Thesis Advisor
Martin Boileau - Economics
Paul Komor- Environmental Studies

Abstract

Wind power is the fastest growing renewable energy source in the United States. Existing empirical studies on the economic impact of wind power development have primarily relied on case studies and input-output models, which have limitations. This study instead uses a linear fixed effects model to estimate the county level effects of wind power in the Great Plains region of the United States from 2005 to 2012. This study finds a significant positive correlation between installed wind capacity and per capita personal income and median household income. The correlation between wind power and employment per capita is statistically significant and positive in some models. The spillover effects into other industries are investigated by evaluating the change in employment in the sectors of construction, manufacturing, retail, services, and utilities. The three industry employment models generally find a positive correlation between installed wind capacity and employment in construction, retail, and utilities, and a negative correlation with employment in services.

Executive Summary

The Great Plains region of the United States has sustained wind which is highly suitable for the generation of electricity by wind turbines. Because of this, wind power may be an energy source with potential to replace fossil fuels. However, the potentially beneficial economic effects of wind power installation have yet to be studied in depth. This research investigates the economic effects of wind power at the county level in the Great Plains region of the United States from 2005 to 2012.

There are several reasons why wind power may provide local economic benefits. Major wind power development may allow rural areas to increase job retention and diversify their economy. Wind farms create direct local employment during both the construction and operation phases. Wind farms could provide a boost in tax revenue to local governments. Lease payments for land use could benefit local landowners. Reategui and Tegen (2011) predict that wind farms create spillover effects as well. The influx of money from the installation of wind power moves throughout the economy in a series of resulting transactions, creating growth and employment in a number of other sectors indirectly.

Previous research on this topic includes case studies and simulated predictions relying on input-output models. The most compelling analysis to date is Brown *et al.* (2012), who use econometric analysis to estimate the economic effects of wind development, instrumenting for project placement with wind power potential. My analysis uses fixed effects models to estimate the relationship between installed wind power capacity in megawatts (MW) per capita and a number of outcome variables at the county level. These include per capita income, per capita employment, and median household income. The models estimate the relationship between MW per capita of installed capacity and employment per capita in the industries of construction, manufacturing, retail, services, and utilities. This allows for the estimation of any spillover effects resulting from wind power into other sectors of the economy.

The results indicate that the installation of wind power is positively correlated with a number of economic outcomes. The state fixed effects model estimates that an increase of one MW per capita is correlated with an increase in per capita income of $12,719 and per capita employment of 0.21. The county fixed effects model estimates that an increase of one MW per capita is correlated with an increase in median household income of $3,330.

The primary industry employment model estimates that an increase of one MW per capita is correlated with an increase of 0.02 retail jobs per capita and 0.01 utility jobs per capita. However, it is also correlated with a decrease of 0.02 jobs in services. Investigating the effects of wind capacity dependent on a county's population generally confirms these findings, but also estimates a positive correlation with construction employment per capita for the most populous counties. The final model estimates the effect of wind power on industry employment dependent on a county's overall employment per capita. This model estimates a small negative correlation between wind power and employment per capita in utilities and construction when overall employment per capita is low, and a small positive correlation when employment per capita is high. These correlations are statistically significant, but small in magnitude. It is likely that the lack of an instrumental variable for the placement of wind power reduces the accuracy of the employment estimations, as previous research has shown.

Literature Review

Case studies of individual wind power installations are one of the two common methods used to analyze the economic impacts of wind development. Examples include GAO (2004) and Pedden (2006). Brown *et al.* (2012) summarize the problems associated with case studies. Case studies often rely on data reported by project managers who may misreport this data to overstate the benefits of the project. Case studies primarily focus on the direct impacts of the project, in terms of economic activities directly involved in the construction and maintenance of the project. This leaves out other indirect effects, leading the projects' full impact to be understated. Because a case study focuses on only one wind installation, there is a serious concern that it may not be representative of wind projects in general.

The other common approach in the existing literature is to simulate effects using input-output analysis. Reategui and Tegen (2011) use an input-output method to project the impact of five wind energy projects in Texas with a total capacity of 1,000 megawatts (MW). Their analysis uses the Jobs and Economic Development Impact model. This approach predicts economic outcomes using the spending on inputs used for installation and operation combined with multiplier effects between industries and consumption patterns. The study predicts that 1,000 MW of wind power development creates 2,100 full time jobs in Texas during the construction phase and 240 permanent jobs during the operation phase. The predictions suggest that these projects generated $260 million in economic activity during construction, of which labor accounts for $55 million and induced activities contributed $65 million. Additionally, the projects support $35 million in annual economic activity during operation.

Though input-output models are currently the most common method used to analyze the economic impact of wind power development, they have limitations. Brown *et al.* (2012) summarize these problems as well. These models only generate an estimated prediction of the effects, rather than analyze the observed effects. Input output analysis is only as accurate as the industry linkage multipliers, which come from outside sources. This approach also relies on several strong simplifying assumptions. Input-output analysis assumes all industrial inputs and factors of production are used in fixed proportions. It also assumes that the supply of these inputs respond perfectly elastically to increases in demand, with no increase in production cost or prices. These assumptions may not be realistic for wind power development, and could result in less accurate estimates.

Brown *et al.* (2012) use econometric analysis of real data to estimate the economic effects of wind development, avoiding the limitations associated with both case studies and input-output models. They estimate the effects of wind power on the local economies of 1009 counties in the Great Plains region of the United States from 2000 to 2008. The study estimates the change in annual per capita income and the per capita employment rate in US counties that received a wind development project. Because the placement of wind development may be endogenous to regional economic performance or other factors, the study instruments for project placement using county wind power potential. The results indicate that an increase of one MW of wind power per capita increases per capita income in the county by $11,150. Additionally, they find that each MW of installed wind capacity created a net gain of 0.48 jobs. However, without the instrumental variable, they do not find a statistically significant correlation between MW per capita and per capita employment.

In related research, Weber (2012) investigates the local economic impacts of the natural gas boom created by the development of hydraulic fracturing. The study analyzes the county level effects in Texas, Wyoming, and Colorado. The study instruments for the location of gas booms with the percent of the county located above an unconventional gas rock formation. They use a triple differences approach to control for differing growth trends between boom and non-boom counties prior to the boom. They find that a million dollars of gas production created 2.35 jobs for the county. Every million dollars of gas production created $91,000 of new wage and salary income, representing a 2.6% increase. Median household income increased by $1,976 in a boom county, or a 0.59% increase. This is significantly less than the 2.6% overall increase, suggesting that the income gains were skewed toward wealthier households.

Black *et al.* (2005) closely examine the labor market outcomes resulting from the coal boom and bust in the Appalachia region in the 1970s. They use a difference in differences approach to estimate the spillover effects of the coal boom, comparing counties that had large coal deposits to counties that did not. They find that total employment grew 2% faster in treatment counties during the boom period. They estimate that non-mining employment grew 0.7% faster in treatment counties during the boom as well. During the boom, non-mining sector wages are estimated to have increased 5.8% on average. They investigate impact on the construction, retail, services, and manufacturing sectors, finding that employment increased in the construction and service sectors. They estimate that each additional mining job created 0.174 local sector jobs and essentially no traded sector jobs.

This paper examines the effects of major wind power installation in the same region studied by Brown *et al.* (2012). This study contributes to the literature by using fixed effects models to investigate a more diverse variety of outcomes. This paper estimates the magnitude of spillover effects into the local economy, similar to Black *et al.* (2005).

Data and Methodology

This study focuses on the effects of wind power at the county level in the Great Plains region of the United States from 2005 to 2012. The sample includes the states of Colorado, Iowa, Kansas, Minnesota, Montana, North Dakota, Nebraska, New Mexico, Oklahoma, South Dakota, Texas, and Wyoming due to their geographic proximity, similar wind potential, and high installed wind power capacity. The first two regressions are run with both the full sample and only counties below the 95th percentile for population. This is done to see if focusing on the less populous areas where the majority of wind turbines are located affects the results. Populous urban centers may add noise to the data, drowning out the effects of wind power.

The central explanatory variable of this study is installed wind power capacity at the county level. The US Energy Information Administration publishes data for this variable. Only around 10% of counties receive wind power throughout the period of study. Because of this, the mean MW per capita is 0.003 for the full sample, but it is a much higher 0.03 for counties with wind power. Of the counties that do have some amount of installed wind power, the mean capacity is 160 MW. Table 1 details the statistics for wind power.

Table 1: Wind Power Statistics	All Counties		Counties with Wind Power	
	Mean	Standard Deviation	Mean	Standard Deviation
Wind Capacity (MW)	18.1282	88.448	160.167	214.054
MW per capita	0.003656	0.042551	.032519	.12146

The data for the main outcome variables comes from a number of sources. Data on per capita income and population are published by the Bureau of Economic Analysis. County total employment statistics come from the Bureau of Labor Statistics. Data on the median household income and employment by industry comes from the United States Census Bureau. Table 2 below displays the difference in these variables between counties with and without wind power. The mean population for counties without wind power is 52,212. This is significantly higher than the mean population for counties with wind power, which is only 31,856. The median county population for the full sample is only 12,014, showing how much more populous urban counties are than most. A notable difference between counties with and without wind power is that counties without wind power have higher employment per capita in retail and services.

Besides these differences, the statistics are fairly similar for both groups. This study investigates the years 2005 to 2012 for per capita income, employment per capita, and median household income. Employment per capita by industry is studied for the years 2005 to 2011.

Table 2: Descriptive Statistics	Counties without Wind Power		Counties with Wind Power	
	Mean	Standard Deviation	Mean	Standard Deviation
Population	52212.1	198252	31856.1	57992.2
Per capita personal income	35177.7	9153.64	38294.7	8484.72
Employment per capita	0.491184	0.076346	0.511054	0.070174
Median household income	42290.8	9797.52	43831.7	7721.61
Construction employment per capita	0.017816	0.022848	0.017315	0.015376
Manufacturing employment per capita	0.067661	0.209501	0.057548	0.095976
Retail employment per capita	0.096948	0.418217	0.062762	0.189363
Professional, scientific, and technical services employment per capita	0.025594	0.154866	0.012982	0.054214
Accommodation and food services employment per capita	0.068441	0.299811	0.043816	0.178239
Total services employment per capita	0.094932	0.436831	0.057331	0.229858
Utilities employment per capita	0.006207	0.019902	0.003582	0.005377

Five fixed effects models are used to analyze the local economic effects of wind power development at the county level. The first model is as follows:

$$\text{Model 1:}\quad Y_{ct} = \beta_1 W_{ct} + \varepsilon_t + \varepsilon_s + \varepsilon$$

$\beta_1 W_{ct}$ is the MW of installed wind power per capita in county c in year t. β_1 shows the correlation of an increase of 1 MW of wind power per capita with the outcome variable. ε_t is a fixed effect for year t. ε_s is a fixed effect for the state of county c, in order to control for time invariant effects characteristic of each state. ε is an error term. The outcome variables, Y_{ct}, for this model are per capita income, median household income, and employment per capita.

The second model is very similar, but uses a county fixed effect instead of a state fixed effect:

$$\text{Model 2:}\ \ Y_{ct} = \beta_1 W_{ct} + \varepsilon_t + \varepsilon_c + \varepsilon$$

$\beta_1 W_{ct}$ is the MW of installed wind power per capita in county c in year t. ε_t is again a fixed effect for year t. ε_s is a fixed effect for each county c. ε is an error term. Model 2 investigates the same outcome variables as Model 1.

The third model investigates the relationship between wind capacity and employment per capita in specific industries at the county level. This model is as follows:

$$\text{Model 3:}\ \ Y_{ct} = \beta_1 W_{ct} + \beta_2 M_{ct} + \varepsilon_t + \varepsilon_c + \varepsilon$$

$\beta_1 W_{ct}$ is the MW of installed wind power per capita in county c in year t. $\beta_2 M_{ct}$ is total employment per capita for county c in year t, in order to control for overall county employment trends. ε_t is a fixed effect for year t. ε_s is a fixed effect for each county c. ε is an error term. The outcome variables for this model are employment per capita in construction, manufacturing, retail, professional services, accommodation and food services, total services, and utilities. Total service employment is defined as the combination of professional and food and accommodation services. This model allows for the estimation of the employment effects of wind power into both the industries it directly impacts, namely construction and utilities, as well as any indirect spillover effects into unrelated industries.

The fourth model conditions the effects of wind power on the county's population. This investigates whether there is a relationship between population and the economic effects of wind power. This model uses the same outcome variables as Model 3.

$$\text{Model 4: } Y_{ct} = \beta_1 M_{ct} + \beta_2 P_{25} W_{ct} + \beta_3 P_{50} W_{ct} + \beta_4 P_{75} W_{ct} + \beta_5 P_{90} W_{ct} + \beta_6 P_{100} W_{ct} + \varepsilon_t + \varepsilon_c + \varepsilon$$

$\beta_1 M_{ct}$ is total employment per capita for county c in year t. P_{25} is a dummy variable indicating that the county is in the 25th percentile or below for population. P_{50} is a dummy variable indicating that the county is above the 25th percentile for population, but less than or equal to the 50th percentile. P_{75} is a dummy variable indicating that the county is between the 50th percentile and the 75th percentile for population. P_{90} is a dummy indicating the county is between the 75th and 90th percentiles, while P_{100} is a dummy indicating that the county is above the 90th percentile for population. These dummy variables are interacted with $W_{ct,}$ wind capacity in MW per capita for county c in year t. The beta coefficient for each interaction term represents the correlation between an increase of one MW per capita and the outcome variable for counties in this percentile range for population. ε_t is a fixed effect for year t. ε_s is a fixed effect for each county c. ε is an error term.

The final model conditions the effects of wind power on county employment per capita. This allows for a more revealing estimation of how wind power interacts with overall employment trends to affect employment in a particular industry.

$$\text{Model 5: } Y_{ct} = \beta_1 E_1 W_{ct} + \beta_2 E_2 W_{ct} + \beta_3 E_3 W_{ct} + \beta_4 E_4 W_{ct} + \varepsilon_t + \varepsilon_c + \varepsilon$$

E_1 is a dummy variable indicating that county c is at or below the 25th percentile for employment per capita. E_2 indicates the county is in the second quartile, E_3 indicates it is in the third, and E_4 indicates it is in the top quartile. These dummy variables are also interacted with $W_{ct,}$ wind capacity in MW per capita for county c in year t. This allows the estimated correlation between wind power and the outcome variable to vary with employment per capita. ε_t is a fixed effect for year t. ε_s is a fixed effect for each county c. ε is an error term.

Ideally, this study would use an instrumental variable for the placement of wind power. Previous research has shown that the placement of wind power may be endogenous to the economic outcome variables of interest. A county may be more likely to receive wind power because it is already performing poorly or strongly economically. This introduces reverse causality between the independent variable, wind capacity, and the dependent variables, biasing the estimated correlation coefficients of wind power. An instrumental variable, such as county wind power potential, would be a solution to this problem. Unfortunately no appropriate data was available at this time, and this study must do without an instrumental variable.

Results and Interpretation

The results for Model 1, using a state fixed effect, indicate that the installation of wind power is positively correlated with a number of economic outcomes. The results can be seen in Table 3. An increase of one MW per capita is correlated with an increase in per capita personal income of $12,719.84 and an increase in employment per capita of 0.2114405. The sample is then limited to counties below the 95th percentile for population, to see if excluding major urban centers changes the estimates. The results are fairly similar. With the limited sample, an increase of one MW per capita is correlated with an increase in per capita personal income of $13,179.93 and an increase in employment per capita of 0.2099404. The model does not find a statistically significant correlation with median household income with either sample.

Table 3: Model 1	Full Sample			Below 95th percentile for population		
Outcome Variables	Coefficient of MW per capita	P-Value	R^2	Coefficient of MW per capita	P-Value	R^2
Per capita personal income	12719.84	0.000***	0.336	13179.93	0.000***	0.3565
	(1143.719)			(1253.536)		
Employment per capita	0.2114405	0.000***	0.1968	0.2099404	0.000***	0.1908
	(0.0158795)			(0.0157995)		
Median household income	-929.1461	0.433	0.2028	469.5386	0.641	0.2187
	(1141.105)			(979.579)		

(Standard errors are robust.)

I will illustrate what these coefficients mean in practical terms using the results from the full sample. An increase of one MW per capita is actually a very large increase in terms of total MW, given a reasonable county population. The mean county with wind power has 160 MW, so let's assume a standard wind farm has a capacity of 160 MW. The median county has a population of 12,014. Therefore, if a county with the median population received a wind project of the mean size, this would result in an increase of .0133 MW per capita. This translates to an increase in county per capita income of $169.40. This corresponds to an increase in county employment per capita of .0028, or an increase of 33 jobs.

The results for Model 2, using a county fixed effect instead of a state fixed effect, are quite different than those for Model 1. This study focuses on county level effects, so Model 2 is preferred over Model 1. The results can be seen in Table 4 below. Model 2 estimates that an increase of one MW per capita is correlated with an increase in per capita personal income of $5,850.229 and an increase in median household income of $3,330.29. The correlation with employment per capita is no longer statistically significant. Again, the results are very similar even when the most populous counties are excluded from the sample. The increase in per capita income is about twice the increase in median household income. This suggests that the income gains from wind power are skewed towards the wealthier half of the population.

Table 4: Model 2	Full Sample			Below 95th percentile for population		
Outcome Variables	Coefficient of MW per capita	P-Value	R^2	Coefficient of MW per capita	P-Value	R^2
Per capita personal income	5850.229	0.003***	0.2193	5618.929	0.003***	0.2318
	(1936.002)			(1863.385)		
Employment per capita	0.0364697	0.128	0.0061	0.0345522	0.144	0.0061
	(0.0239575)			(0.0236586)		
Median household income	3330.29	0.085 *	0.0707	3218.322	0.092 *	0.0823
	(1935.304)			(1911.102)		

(Standard errors are robust.)

The results for Model 3 estimate that the relationship between wind power and employment is positive for some industries and actually negative for others. An increase of one MW per capita of wind power is correlated with an increase of 0.01 in utilities employment per capita. This is intuitively a direct effect, as the installation of wind power directly creates jobs in the utilities sector. The model suggests a small spillover effect into retail, as the coefficient for retail employment per capita is 0.02. The relationship between MW per capita and accommodation and food services employment per capita is actually -0.01. An increase of one MW per capita is correlated with a decrease in total services employment of 0.02. These correlations likely reflect the fact that the more rural counties that receive wind farms have lower employment per capita in services to start. It is very unlikely that this indicates that wind farms actually cause a loss of jobs in services. The other correlation coefficients are not statistically significant. These results are shown in Table 5 below. The fact that the coefficients are so small is likely a result of the lack of an instrumental variable.

Table 5: Model 3

Outcome Variable	Coefficient of MW per capita	P-value	Coefficient of Employment per capita	P-Value	R^2
Construction employment per capita	0.0377001	0.148	0.0703428	0.000***	0.0569
	(0.0260462)		(0.0089599)		
Manufacturing employment per capita	-0.1307622	0.348	0.0261752	0.443	0.0018
	(0.139268)		(0.0341229)		
Retail employment per capita	0.0215614	0.026**	0.0300087	0.085*	0.0042
	(0.0096683)		(0.0174003)		
Professional, scientific, and technical services employment per capita	-0.0021871	0.372	0.0117265	0.381	0.0045
	(0.0024486)		(0.0133994)		
Accommodation and food services employment per capita	-0.0178529	0.088*	0.0521092	0.007***	0.0097
	(0.0104564)		(0.0192079)		
Total services employment per capita	-0.0230433	0.013**	0.0622176	0.002***	0.009
	(0.0093238)		(0.0196208)		
Utilities Employment per capita	0.0112857	0.000***	0.0052098	0.181	0.0042
	(0.0013616)		(0.0038917)		

(Standard errors are robust and clustered at the county.)

Model 4 allows the effect of an increase of one MW per capita to vary based on the county's population. Table 6, attached at the end of the paper, documents these results. The estimated coefficients from these regressions do vary significantly with population. The correlation between MW per capita and construction employment per capita is only significant for the most populous counties. This coefficient is a practically large 1.411069. That the coefficient is so large makes sense, as an increase of a full MW per capita for the most populous counties would entail a massive increase in total MW. This large coefficient likely reflects the fact that construction employment per capita is higher in urban areas. An increase of one MW per capita is correlated with an increase in retail employment per capita of 0.02 for the least populous counties. This suggests that the spillover effect from wind power is largest in retail when the county economy as a whole is small. The correlation with professional services is only statistically significant for counties in the 75th to 90th percentile range. This coefficient is a large -0.36. The correlation is a negative 0.01 for total service employment per capita for the least populous counties. This correlation is -0.32 for the 75th to 90th percentile range, reflecting the large negative coefficient for professional services in this population range. The coefficient for utilities employment per capita is 0.01 for the least populous counties and is statistically significant at the 1% level. However, for the most populous counties, this coefficient is actually -0.18, likely reflecting the fact that utility employment per capita is much lower for major urban centers due to the high population. These results largely confirm the results from Model 3, but estimate how population influences those prior results.

The final model allows the relationships between county wind capacity and industry employment per capita to vary based on overall county employment per capita. The results, attached in Table 7 at the end of the paper, estimate that these relationships do vary depending on county economic performance. The bottom quartile of counties in terms of employment per capita have only negative statistically significant correlations. For these counties, the coefficient for construction employment per capita is -0.04, while it is -0.05 for utilities. The correlations for these same industries are positive for in the top quartile, however. For counties in the top quartile, the coefficient of MW per capita is 0.04 for construction employment per capita and 0.01 for utility employment per capita. Wind power directly creates employment in both these industries. These results estimate that the industry employment per capita is lower when the overall employment per capita is lower. It appears the opposite is true as well. For counties in the third quartile, an increase of one MW per capita is correlated with a 0.07 increase in retail employment per capita. This correlation is 0.01 for the top quartile. These estimates suggest that wind power has a larger economic effect on retail in counties that are performing stronger economically. In the top quartile of counties, the correlation of wind power is -0.02 for both accommodation and food services per capita and total services per capita. This suggests that counties that are performing stronger economically and have high service employment per capita are less likely to receive wind power. The other correlation coefficients are not statistically significant. Overall, these results suggest that the industry employment effects of wind power are correlated with overall county employment.

Conclusions

This study departs from the existing literature of case studies and input-output analysis, instead using a linear fixed effects model to estimate the economic impact of wind power development. The results show that the installation of wind power has a significant, positive correlation of considerable magnitude with per capita income. The correlation with median household income is also considerable, but is smaller than the effect on per capita income, suggesting that the benefits of wind power largely go to the wealthier half of the population. Together, these results suggest that wind power does have the potential to foster local economic development.

The effects of wind power on employment are less clear. Only the state fixed effect model estimates that wind power has a statistically significant relationship with overall employment per capita. The relationship between wind power and construction employment per capita appears to only be positive for populous counties and counties with high overall employment per capita. None of the models estimate a significant relationship between wind power and manufacturing employment per capita. This is consistent with expectations, as the installation of wind power would only generate local demand, and manufacturing produces primarily traded goods. The models estimate that wind power has a positive correlation with retail employment per capita for rural counties and counties with high employment per capita. The relationship between wind power and service employment per capita is negative in all cases, suggesting that counties with high service employment per capita are less likely to receive wind power. The correlation between wind power and utility employment per capita is positive for rural counties and counties with high employment per capita, but negative for urban counties and counties with low employment per capita. The results of these models suggest that wind power may generate small positive spillover effects. The accuracy of the employment models was doubtlessly limited by the lack of an instrumental variable. Previous research without an instrumental variable did not find any statistically significant correlation between wind power and employment.

Future research on the economic impact of wind power development has great potential. The same outcome variables as the present study could be reexamined with the use of an instrumental variable. This would likely yield results with superior accuracy. However, it could also be the case that wind power has not yet achieved a sufficient scale to induce substantial spillover effects. If greater quantities of wind power are installed in the future, the effects should be reexamined in order to determine if there are spillover effects associated with greater scale.

Finally, this research only examines the effects of the installation and operation of wind power. However, the majority of the costs and jobs associated with wind power are associated with the manufacturing of components. A complete study into the economic effects of wind power could also examine the effects farther up the supply chain. Overall, it appears that wind power has promising potential to displace fossil fuels, while at the same time providing local economic benefits.

Table 6: Model 4													
Outcome Variable	Employment per capita	P-Value	P25W	P-Value	P50W	P-Value	P75W	P-Value	P90W	P-Value	P100W	P-Value	R^2
Construction employment per capita	0.070771	0	0.0391097	0.134	-0.111798	0.281	0.0059934	0.832	0.2606038	0.457	1.411069	0	0.0581
	(0.0089929)		(0.0260964)		(0.1036571)		(0.0282126)		(0.3501071)		(0.38676)		
Manufacturing employment per capita	0.026197	0.443	-0.15466	0.348	-0.0244713	0.843	0.0463229	0.319	0.5279495	0.167	-0.07001	0.94	0.0015
	(0.0341631)		(0.1647279)		(0.1236458)		(0.0465188)		(0.3820639)		(0.928147)		
Retail employment per capita	0.0299197	0.086	0.0212586	0.034	0.0594986	0.162	0.0032993	0.911	-0.100589	0.413	0.262596	0.458	0.0041
	(0.0174059)		(0.0100099)		(0.042567)		(0.0293766)		(0.1228522)		(0.353692)		
Professional, scientific, and technical services employment per capita	0.0120991	0.367	-0.0007391	0.646	-0.1894885	0.299	-0.0435926	0.121	-0.3695307	0.033	-0.99975	0.321	0.0044
	(0.0134195)		(0.0016091)		(0.1825369)		(0.0281365)		(0.1735976)		(1.006609)		
Accommodation and food services employment per capita	0.0521606	0.007	-0.0175632	0.107	-0.0412724	0.243	-0.0114233	0.745	0.0308353	0.859	-0.1853	0.729	0.0097
	(0.0192563)		(0.0109019)		(0.0353872)		(0.0351598)		(0.173752)		(0.53421)		
Total services employment per capita	0.0626865	0.001	-0.0192643	0.071	-0.2267501	0.217	-0.0516071	0.204	-0.3295193	0.005	-1.20625	0.277	0.0095
	(0.0196616)		(0.0106886)		(0.1836746)		(0.0406533)		(0.1163211)		(1.109188)		
Utilities Employment per capita	0.00526	0.177	0.0114412	0	-0.0134983	0.367	-0.001214	0.903	-0.0426846	0.229	-0.18999	0.086	0.0047
	(0.0039004)		(0.0012913)		(0.0149539)		(0.0100071)		(0.0355077)		(0.110834)		

(Standard errors are robust and clustered at the county.)

Table 7: Model 5									
Outcome Variable	25th Employment per capita	P-Value	50th Employment per capita	P-Value	75th Employment per capita	P-Value	100th Employment per capita	P-Value	R^2
Construction employment per capita	-0.0445358	0.023**	-0.027604	0.162	-0.0165766	0.303	0.0454344	0.088*	0.0082
	(0.0195639)		(0.0197229)		(0.016086)		(0.0266456)		
Manufacturing employment per capita	-1.018109	0.138	-0.5013774	0.205	-0.1530706	0.284	0.0050992	0.908	0
	(0.685676)		(0.3954176)		(0.1428353)		(0.0438949)		
Retail employment per capita	-0.0051567	0.948	0.0862299	0.116	0.0792452	0.086*	0.0174516	0.07*	0
	(0.0797833)		(0.0548252)		(0.0460864)		(0.0096267)		
Professional, scientific, and technical services employment per capita	-0.0572888	0.15	0.0068917	0.837	-0.0434916	0.33	-0.0012841	0.452	0.0001
	(0.0398094)		(0.0333978)		(0.0446342)		(0.0017079)		
Accommodation and food services employment per capita	0.0653464	0.256	0.0747836	0.431	0.0159057	0.777	-0.0234957	0.004***	0
	(0.0574687)		(0.095008)		(0.0560813)		(0.0081344)		
Total services employment per capita	0.01084	0.875	0.0791119	0.529	-0.0436476	0.615	-0.0278279	0***	0
	(0.0688603)		(0.1257391)		(0.0868031)		(0.0058065)		
Utilities Employment per capita	-0.05163	0.05**	-0.0087421	0.368	-0.0133932	0.35	0.0120087	0***	0.0004
	(0.026325)		(0.0097025)		(0.0143174)		(0.0010169)		

(Standard errors are robust and clustered at the county.)

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