POLITICS, ECONOMICS, AND FEDERAL LAND DESIGNATION: ASSESSING THE ECONOMIC IMPACT OF LAND PROTECTION— GRAND STAIRCASE-ESCALANTE NATIONAL MONUMENT

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ABSTRACT

Many local government officials bemoan the formal protection of public lands as taking off the table a variety of economic activities that could help bolster local economies. In contrast some have found evidence that indicate that designations may be positively correlated with economic indicators. We investigate the conflicting beliefs regarding the economic impacts of federal conservation designations through statistical analysis of economic conditions using panel data to compare two counties housing the sizable Grand Staircase-Escalante National Monument (GSENM) to a set of counties matched on economic and demographic criteria. Our statistical analysis of economic conditions shows that after controlling for federal transfers, the Grand Staircase-Escalante National Monument designation reduced the decade-to-decade growth in total nonfarm payrolls by an estimated $146 million, and had no statistically significant effect on per capita income or tax receipts.

INTRODUCTION

In 2008, Utah State Representative Aaron Tilton sponsored House Joint Resolution 10 in the Utah State Legislature encouraging the United States Congress "not to designate new Utah wilderness areas". HJR 10 specifically demanded that Congress not designate any additional Wilderness areas in Utah without the unanimous consent of the Utah Congressional Delegation and reaffirmed "the [Utah] Legislature's strong support for continued public access and multiple use regarding public lands" (HJR 10 2008 1). In support of this position, the resolution asserts that Utah relies on public lands for a variety of economic activities including "oil and natural gas development, mining, outdoor recreation and other multiple uses, rights of way for transportation, waterlines, electric transmission, and telecommunication lines" (HJR 10 2008 2). Each of these activities fuel Utah's economy and grow the State's tax base. Removing them from the table of available options is predicted to spell economic trouble for Utah's economy.

In direct contrast to this view, some have alleged that large federal land holdings and protected areas such as Wilderness may attract a different population than in private land counties and thereby may help generate economic growth. The Sonoran Institute recently noted:

> ... The presence of public lands is good for the economy. Personal income, adjusted for inflation, grows faster in counties with significant percentages of their land base in public ownership. What's more, counties with protected lands—land set aside for conservation—show an even more marked increase in personal income.

In this paper, we investigate the conflicting belief regarding the economic impacts of federal conservation designations through statistical analysis of economic conditions using panel data to compare two counties housing the sizable Grand Staircase-Escalante National Monument to a set of counties matched on economic and demographic criteria.[1] Our statistical analysis of economic conditions shows that after controlling for federal transfers, we find that the Grand Staircase-Escalante National Monument designation reduced the decade-to-decade growth in total nonfarm payrolls by an estimated $146 million, and no statistically significant effect on per capita income or tax receipts.

THE IMPACT OF FEDERALLY DESIGNATED LANDS

As noted in the introduction, many local government officials bemoan the designation of protected areas as taking off the table a variety of economic activities that could help bolster local economies. In truth, the academic literature investigating the impact of protected area on counties is somewhat sparse. Some of the existing literature represents a critique of the efficiency of the Federal Government as land manager (see generally Anderson, Smith and Simmons 1999) and the expansive use of protected lands as a land management tool in departure from original congressional intent (Osterle 1997).

More directly on point, some of the existing research seems to support at least part of the claim that protected lands detrimentally impact local economies. Although their findings largely find limited long-term economic detriment to local economies, Rudzitis and Johnson (2000) find that federally protected Wilderness does shut down access to resources traditionally used for extractive economic activities. These losses may be somewhat offset by an increase in service sector activities, but the service sector jobs generally pay less than the lost extractive jobs. Although not quite as restrictive as Wilderness, National Parks remove much of the ability of local resource users to develop

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[1]While the scope of this paper is limited to the economic impacts of one specific Wilderness designation, this effort represents the beginning phase of a more expansive study exploring how Wilderness and other federally protected lands impact the economies of rural counties and the quality of life of individuals who live therein. Through our research, we hope to shed light on a number of important questions identified in existing literature including whether there are long-term economic benefits from Wilderness designation, whether there are population impacts of Wilderness Designation, and whether Wilderness Counties offer greater quality of life than Non-Wilderness Counties.

extractive industries in the protected area. Some assume that the negative impacts of Wilderness are largely identical to National Monument designations as the effective restrictions on the designated lands are similar.

The duration of these impacts is somewhat unknown. Power (1991), for instance, conducts a case study examining the stringent rules in place protecting the ecosystem surrounding the Greater Yellowstone Area. He finds that extraction based industries have diminished over time and have been replaced by economic activities specifically dependent on preservation including tourism, permanent relocation to be closer to the natural amenities offered, recreational homes and cabins, and retirement. These results raise the question of whether there may be temporal effects on local economies within the designation of protected lands that merit further investigation.

Other studies find no negative relationship, and some results indicate that designations may have been positively correlated with economic indicators. Duffy-Deno (1998), for instance, finds no evidence that employment at a county level is adversely effected by the presence of federal protected lands. Rasker (2006) rejects the notion that federal land ownership negatively impacts counties. Using correlation and regression models to investigate how different management of public lands (including protected lands) impacts local counties' economies, he finds that public lands are associated with higher personal income tax levels in rural areas.

Holmes and Hecox (2004) similarly find a positive relationship between economic growth and publicly protected lands. Through studying 113 rural counties, 43% of which contain public lands, the authors find that there is a significant positive correlation between the percent of land designated as federally protected Wilderness and population, income, and employment growth. They also find that growth of investment income and nonfarm self-employment income are correlated with presence of wilderness. Lorah and Southwick (2003) similarly find positive impacts of protected lands. Using county level data, the authors calculate the proportion of protected lands occurring within 50 miles of the center of the county. Applying this metric, the researchers find that the protection of these lands is positively correlated with high population growth and high employment and income growth.

Wilderness designations may also trigger demographic shifts, providing an amenity that could attract new immigrants or keep people from leaving an area. This preference for Wilderness could potentially offer diverse economic opportunities and growth. Although Duffy-Deno (1998) finds no significant relationship between federally designated Wilderness and population, a variety of studies find a positive relationship. Rudzitis and Johansen (1991), use a survey of 2670 residents of wilderness counties to measure public opinion regarding public lands including Wilderness lands. They found that 53% moved to an area at least partially because of the presence of wild-lands, 81% felt wilderness was important and 65% were against mineral or energy development in such areas. This finding indicates that protected areas may create conditions that foster economic opportunities in addition to extractive uses. Shumway and Otterstram (2001) similarly find migration patterns toward counties with protected areas.

THEORY SKETCH

Our evaluation focuses on one of the most basic assertion presented by proponents of protected land designation, including those who advocated the creation of the GSENM, that protection of physical lands should over time increase economic prosperity in communities where the protected land is located. This theory parallels other approaches that generally focus on the consumptive extraction of resources as an engine of economic growth, but is broader in that it allows for growth from non-extractive sources, known is the literature as an area's amenities (Deller, Tsai, Marcouiller, & English, 2003).

The amenities theory of economic development asserts that by observing the change in economic activity as extractive industries declined due to the increasing marginal costs of extraction a clear pattern can be identified where,

> Instead natural amenities, desirable lifestyles and a relatively high quality of life, give some communities an advantage in attracting and benefitting from tourists, retirees, footloose entrepreneurs … environmental amenities … act as a catalyst in the transformation of stagnating extractive economies into diversified, relatively competitive amenity economies. (Lorah P. A., 2000)

These assertions claim that future economic development for many rural counties can be found in attracting new residents and tourists thus creating new economic opportunities as these new individuals interact in the community. (Rudzitis & Johansen, 1989) These assertions make good economic sense: as more tourists and residents are attracted to an area they bring with them resources that can be used to improve economic conditions generally, so long as those arriving bring resources with them. In the theory it is an area's amenities that draw residents and tourists, so the preservation of natural amenities has the long-term economic benefit of drawing traffic and resources to an area.

What then are these amenities? A number of studies have asserted that natural lands are one of the chief amenities that draw resources to an amenity based economy. For example, in 2006 the Sonoran Institute commissioned a large-scale report that looked at rural western counties, and concluded that the protection of land in those counties contributes directly to an increase in economic prosperity, operationalized as the real wages of by residents. (The Sonoran Institute, 2006) Unfortunately, this report used only correlated data to identify potential relationships, and did not publically release the methodology of the report nor the root data.

Scholars including Loomis, Richardson, and Lorah have conducted a number of studies that attempt to tease out the economic effects of wilderness designation on local communities. (Loomis & Richardson, 2001) (Lorah P. A., 2000) These authors conclude that the designation of wilderness in rural areas has a net positive effect on the economic wellbeing of both the community at large and the individual citizen. A number

of scholars have challenged the methodology of these studies, which have primarily relied on correlation and expenditure data to make these claims and suggest that other models would be more appropriate in identifying the effects of wilderness. (Keith & Fawson, 1995) (Dawson, Blahna, & Keith, 1993)

In short the literature suggests a relationship should exist between wilderness designation and economic prosperity, but empirical work has found mixed results. The central hypothesis of this study is that the designation of the Grand Stair Case Escalante National Monument had a significant effect on the economic conditions of Kane and Garfield counties.

THE GRAND STAIRCASE-ESCALANTE NATIONAL MONUMENT

Beginning in the late 1800s, the U.S. Government began setting aside swaths of land under varying degrees of protection. These efforts resulted in the establishment of National Parks in 1887 with the creation of Yellowstone National Park and with the creation of National Forests beginning in 1891 through the establishment of the Yellowstone Timberland Reserve (now the Shoshone National Forest). The identified statutory purposes of each of these types of land reservations anticipated some degree of human usage. Parks were designated as places where individuals could visit to recreate in nature's grandeur. National Forests were set aside to conserve timber resources for future use.

A new type of protection was enabled in 1906 through the creation of the Antiquities Act. The Act grew out of the primary concern over protecting archeological artifacts in the Southwestern United States (Coggins et al 1993). However, the Act's language was significantly broader. The Act states:

> The President of the United States is authorized, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and may reserve as a part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected (16 U.S.C.A. § 431).

The earliest use of the Act followed in 1906 with the declaration of Devils Tower, a unique geological formation in Northeastern Wyoming, as the nation's first National Monument. Despite the language of the Act establishing the protection of "the smallest area compatible with the proper care and management of the objects to be protected," Presidents have regularly used the Act to set aside large areas. For instance, President Theodore Roosevelt used the Act to designate some 270,000 acres as a National Monument in the Grand Canyon. The Act was also used by President Franklin Roosevelt to declare 220,000 acres of area around the Grand Tetons as a National Monument in

1943. President Carter designated 56 million acres of Alaskan land as National Monuments in 1978.

President Clinton designated the Grand Staircase-Escalante National Monument in 1996. The Monument spans nearly 1.9 million acres in south-central Utah along the Arizona border. The Monument resides completely within Utah and, as can be seen in Figure 1 below, occupies the majority of Kane County and much of Garfield County. Each of these counties already contained a vast majority of public land. Much of this land had been placed in protected status. Bryce Canyon National Park, for instance, straddles Kane and Garfield Counties. Capitol Reef National Park crosses into eastern Garfield County, and much of Southern Kane County contains the Glen Canyon Dam National Recreation Area.

FIGURE 1

(Bureau of Land Management 2009)

Located in a geologically diverse region, the GSENM houses considerable mineral deposits. The area contains an estimated 62 billion tons of coal—estimated to be worth hundreds of billions of dollars. The area also contains large oil deposits, estimated at around 270 million barrels of oil. In the early 1990s, Andalex Resources Company, a Dutch based coal mining company, had acquired permits to mine coal from the area. Conoco Oil, PacifiCorp, and various other companies had also acquired permission to develop mineral extraction activities in the area.

In making the announcement, President Clinton alluded to the vast mineral deposits found within the Grand Staircase. He stated, "[m]ining jobs are good jobs, and mining is important to our national economy and to our national security. But we can't have mines everywhere, and we shouldn't have mines that threaten our national treasures" (1996 1787). The national treasures contained in the Grand Staircase identified by the President included the area's aesthetic quality, geology, archeological

artifacts, fossils, biology, and its history. Each of these items provides recreational opportunities for explorers and research opportunities for geologists, archeologists, biologists, and historians.

The Grand Staircase-Escalante National Monument became the largest National Monument in the United States. Due to its size, the President established a new management regime for the park. Although all National Monuments up to that date had been managed by the National Park Service, the determination was made that the Grand Staircase would remain under the management of the Bureau of Land Management.

ECONOMETRIC ANALYSIS

Our central question is whether or not the designation of the GSENM had a measurable effect on the economic conditions within Garfield and Kane counties.

As mentioned above, competing theories predict both negative and positive effects for the presence of protected lands. Empirical work also yields mixed results. Much of existent work on the economic impact of wilderness has relied on cross sectional data, and in doing so provides a snapshot of the correlative effects of wilderness and economic development. The limitation of this analysis is that conservation designations, particularly Wilderness, occur in counties with particular geographic characteristics, most notably and obviously the presence of large areas of undeveloped land. These characteristics may act as a confounding variable, muddling static cross-sectional analysis. Time series analysis provides a better picture of whether or not land conservation policy affects economic outcomes in a rural county. We want to identify whether the *designation* has contributed to or inhibited the local economies, not whether the *characteristics that lead to designation* determine economic outcomes.

Data

Using data from the Bureau of Labor Statistics and the U.S. Census Bureau, we compiled cross-sectional time-series data (commonly known as panel data) for a subset of U.S. counties. We selected the counties using propensity score matching based on economic and demographic criteria, pairing Kane and Garfield counties with their 100 closest matches. These two sets were then combined and duplicates removed, yielding a final frame of 187 counties. We use data for the decennial years when available, mirroring the largest data sets collected by the Census Bureau. One of our dependent variables, Tax Receipts, comes from the BLS and is only available in particular years, so 1992 and 2002 data are presented in lieu of decennial data. The next section provides a brief overview of the variables of interest.

Introduction of Variables

We use three variables as proxies for economic outcomes. Table 1 presents summary statistics for each of these variables. For each indicator, Kane County outperforms Garfield county in both observation years. Garfield County is in the first

quartile of the dataset for each variable, and Kane falls in the interquartile range. Per capita income, the first of our indicators, is a standard measure of economic well-being. Our second proxy for economic well-being is Total Non-farm Payroll. This variable has the advantage of not being a direct function of the institutional arrangements that exist. (That is not to say it is not an indirect function of those institutions.) Further it is a measure that speaks directly to the economic situation of individuals. This measure is not a perfect proxy, and does not capture the capital investment, out of county workers, or most importantly retirees that do not receive payroll.

Table 1
Summary Statistics for Dependent Variables

Variables →	Per Capita Income		Nonfarm Payroll		Tax Receipts	
Year →	1990	2000	1990	2000	1990	2000
Mean	15,524	22,793	812.9	1441.2	38.2	63.4
Standard Deviation	3,274	5,588	1217.0	2163.4	43.6	73.4
First Quartile	13,076	19,945	116.7	205.5	11.1	17.9
Median	15,348	21,881	363.0	628.1	23.8	39.1
Third Quartile	17,155	24,841	965.9	1783.7	44.1	71.9
Garfield County	12,313	18,323	90.2	214.7	10.5	22.7
Kane County	13,104	21,637	98.9	253.8	14.2	28.9

Per capita income is in dollars.
Nonfarm payroll and tax receipts are in millions of dollars.

Our final dependent variable, Total Tax Receipts, has a number of advantages: the data is likely largely complete, and in general local governments are required by state and federal statute to correctly report tax receipts, this reality provides some confidence in the data that self-reporting or estimations of economic activity do not provide. This dependent variable, however, is also not a perfect proxy; and there are significant institutional differences across states, regions, and often counties themselves about how, when, and why taxes may be collected. These differences are highly likely to be important predictors of tax receipts, and will exist in our model as omitted variables.

Although none of these variables are perfect proxies for economic development or growth, analyzing each variable through cross-section time-series regressions should provide us with an idea of how the GSENM designation affected Garfield and Kane counties' performance over the time period compared to other counties without the designation.

Our variable of interest is a dummy for the presence of the GSENM, treating the 1994 designation as treatment. We follow the literature as a guide for inclusion of our control variables, including important demographic, geographic, and economic

indicators. A full list of the dependent variables is available in Table 1. Table 2 shows summary statistics for selected variables as well as Garfield and Kane counties' position relative to the rest of the comparison set.

Table 2
Summary Statistics for Selected Control Variables

Variable →	Area	Unemployment Rate		High School Graduates	
Year →	na	1990	2000	1990	2000
Mean	1755	6.0	4.3	74.0	80.6
Standard Deviation	1410	6.3	1.8	7.4	7.3
First Quartile	756	3.3	1.8	70.1	46.6
Median	1206	4.9	4.0	74.8	82.1
Third Quartile	2462	7.3	5.2	79.1	86.2
Garfield County	5175	9.2	6.8	79.9	85.8
Kane County	3992	5.9	3.8	82.5	86.4

Area is in square miles.
Unemployment rate is as a percent of the labor force.
High school graduates is as a percent of the adult population.

We see that Kane and Garfield counties are large for the group. Kane County closely follows the mean for both years in unemployment, while Garfield County experienced higher than usual unemployment. Both counties have a high percentage of high school graduates for the comparison group, each very near the cutoff for the third quartile in the comparison year.

Methodology

We include a dummy variable for the presence of the GSENM. For Kane and Garfield counties, this variable appears in only in the year 2000. Using these two counties as a treatment group, we fit a cross-sectional time series model with fixed county effects. Although we utilize a battery of control variables, a host of unobserved variables affected the decision to designate GSENM, such as the area's unique geography. Fixed county effects control for the unobserved characteristics that remain constant over time. We make use of heteroscedasticity-robust standard errors, as we do not anticipate independence of the error term.

Presentation of Results

Table 3 presents the results of the regression on per capita income, total non-farm payroll, and total tax receipts. We do not find sufficient evidence to reject the null hypothesis of no effect for the designation on total per capita income or total tax

receipts, but we do observe a statistically and economically significant estimated loss of $146,560,000 in decade-to-decade growth in nonfarm payrolls. Recall from Table 1 that there was still significant growth in this economic indicator in the treatment counties, so this negative estimate means there was less growth than anticipated given the other characteristics. There is marginally insignificant evidence of an increase in per capita income. These two results are not incompatible; one possible scenario is that the designation led to a net outflow of below average income individuals, leading to a significant decrease in nonfarm payrolls but an increase in the average incomes. This is only one of many plausible explanations.

Table 3, Panel A
Time Series Regressions Fitting Per Capita Income

Independent Variable	Estimate	Robust SE	p-value
GSNME	2153.	1110.	.054
Infant Death Rate	-46.9	33.0	.158
Population Rank	-0.0084	0.0059	.158
Land Area	205.47	453.11	.450
Percent White	0.0000758	0.00244	.975
% Growth in HH from Previous Decade	7.86	27.84	.280
Birth Rate	-205.19	157.24	.194
Death Rate	270.16	201.93	.183
% HS Graduates	712.4	64.1	.000**
School Enrollment	-0.326	0.588	.581
% Population Growth from Previous Decade	-18.83	18.68	.315
Unemployment Rate	-1.52	1.58	.338
Federal Expenditure	0.0114	0.003	.000
Crime Rate	62.	34.59	.075
Social Security Recipients	0.759	0.63	.230
Local Government Employees	0.00475	0.00355	.182

The directions of our control variables generally follow intuition, while others warrant further discussion. Counter-intuitive results are likely a result of our particular sampling frame, but may also represent co-linearity between certain control variables. Our analysis suggests that land area has a negative effect on tax receipts. Given the sampling frame of propensity-score matched counties, this result is sensible. Over the entire universe of US counties we anticipate the effect of land size will be quadratic, increasing these aggregate indicators as county size increases until a certain point due to population effects, above which the effect of rural counties will being outweighing population effects and increased size will decrease aggregate indicators. If this is the case, among our sampling frame we may only be seeing this rural county effect, where a county's land size is negatively correlated with aggregate economic indicators. The

model estimates that percent white has a negative and statistically significant downward effect on tax receipts, although the effect is only marginally economically significant. For rural counties, it may be that the counties that attract non-white immigrant populations are those with job opportunities. If this were the case, we would expect to see increased diversity in locations with better economic opportunities. Percent household growth, percent high school graduates, school enrollment, federal expenditure, and Social Security recipients are all signed consistently with intuition where statistically significant.

Table 3, Panel B
Time Series Regressions Fitting Non-Farm Payroll

Independent Variable	Estimate	Robust SE	p-value
GSNME	-14656.36	5562.88	.009**
Infant Death Rate	80.48	184.62	.663
Population Rank	-0.085	0.134	.526
Land Area	18963.9	11841.65	.111
Percent White	-0.031	0.02	.127
% Growth in HH from Previous Decade	44.57	242.44	.854
Birth Rate	4293.24	1310.0	.001**
Death Rate	1089.71	1151.94	.346
% HS Graduates	2587.64	946.83	.007**
School Enrollment	18.57	7.21	.011*
% Population Growth from Previous Decade	-26.03	223.27	.907
Unemployment Rate	19.93	16.08	.217
Federal Expenditure	0.443	0.239	.066
Crime Rate	171.85	94.46	.070
Social Security Recipients	61.56	13.74	0.000**
Local Government Employees	0.003	0.064	.961

The majority of the counterintuitive findings are likely the result of our particular sampling frame. We use these as a proxy controls for several demographic effects (suggesting some level of bias in these control estimates) in our attempt to isolate the effect of the GSENM designation while maintaining a parsimonious econometric model. We leave to other researchers to tease out the specific effect of demographic indicators, and do not assert that these coefficients are appropriate for interpreting the relationship between these rates and economic indicators.

Table 3, Panel C:
Time Series Regressions Fitting Tax Receipts

Independent Variable	Estimate	Robust SE	p-value
GSNME	-218.73	1661.2	0.895
Infant Death Rate	-74.77	63.56	0.241
Population Rank	-0.0122	0.0134	0.364
Land Area	-4970.3	2202.71	0.025*
Percent White	-0.0300	0.0097	0.002**
% Growth in HH from Previous Decade	244.81	93.87	0.010**
Birth Rate	-293.49	571.19	0.608
Death Rate	253.98	376.29	0.501
% HS Graduates	803.3	2.71	0.000**
School Enrollment	8.99	3.21	0.006**
% Population Growth from Previous Decade	-130.18	53.87	0.017*
Unemployment Rate	-12.55	16.07	0.436
Federal Expenditure	0.166	0.0645	0.011*
Crime Rate	87.7	69.	0.205
Social Security Recipients	13.65	4.55	0.003**
Local Government Employees	-0.0422	0.0270	0.121

ANALYSIS AND CONCLUSION

The importance of economic development to those concerned about rural counties cannot be overstated, the extractive industries that have for so long been the life blood of these communities are under increasing pressure as reserves are depleted, cheaper alternatives are developed, and imported extractive resources compete in the market place. It is the nature of protected lands that they inhibit the development of these extractive industries, but some argue that protected lands provide the economic benefit of attracting tourists, triggering demographic shifts to the county, and promoting an amenity-based economy as opposed to a traditional extractive economy.

Our findings do not support the claim that increased land protection leads to increased economic activity. Although there is insufficient evidence to make a definitive statement about whether or not the designation had a statistically significant effect on two of our three economic indicators (per capita income and tax receipts), we do find a both statistically and economically significant 'lost' $146.5 million in total nonfarm payroll growth in Kane and Garfield counties.

Those that claim that we can have our cake and eat it to, with conservation-driven protection designation also improving economic conditions, have failed to evaluate and

understand the data fully – we do not find evidence supporting that claim, and find some evidence to the contrary. The use of panel data and time-series analysis gives us a better picture concerning the effect of land designations. Otherwise, the unobserved characteristics leading to particular land designations may be driving the empirical results, as opposed to the policy itself.

Our results have several limitations. First, our "treatment" group consists only of two contiguous counties in the deserts of southern Utah. Having such a small treatment group can lead to biased estimator results. Unfortunately, the Census Bureau and Bureau of Labor Statistics do not perform counts or provide estimates for most of our control variables for inter-censal years. Re-running our model with additional pre- and post-designation observations would solve these potential problems with bias. In the event that reliable estimates become available for these years, the inclusion of these data will address the problem of biased estimates.

Further, the designation of the GSENM significantly changed the landscape of economic opportunities in these counties, with large proportions of the counties entering very high levels of protection. Perhaps more modest designations of land could provide a county the economic benefit of providing additional amenities without precluding the same proportion of development of extractive industries, potentially leading to a positive net effect. Our analysis only deals with the designation of a high proportion of the county's land, obscuring those possible effects. Further research using time-series models with panel data testing the economic effect of land designations for a broader sample of selections will address this problem of external validity. Including a continuous measure of lands in the highest levels of protection could test for whether or not the proportion of land designated effects economic outcomes, perhaps including a quadratic term to test for some 'optimal' level of protected lands. Here we run into a similar problem as above, that some counties have large areas of land warranting designation, and others have very little.

We also note that the three economic indicators we used do not necessarily represent the final word on whether or not the GSENM was good or not for the counties of Kane and Garfield counties. It may be that the effects take decades to realize, or that there are other demographic and economic indicators affected in a way that our analysis does not take into account. IRS, state income tax data, building permit data, or additional demographic indicators would paint a much more complete picture. Our analysis is constrained by the data available to us, but when or if additional data becomes available, we can deepen our understanding of these counties' economies and therefore how the economy has changed after the GSENM designation.

Using the natural features many rural counties have as a way to leverage economic development is still a potentially valuable undertaking, particularly when we consider that local officials and citizens generally have very little say over the management and designation of their public lands, as evidenced by the dissatisfaction of many Utah residents regarding the GSENM. In the presence of Wilderness, a National Park or National Monument, it is likely in a county's best interest to develop its amenity

offering, as it cannot control or undo federal land designations. Further, state and county-level designation of an area for recreation may be a way for a county to improve its economic conditions. Nothing in this study precludes the wisdom of amenity development for individual counties. Rather, the findings of this study indicate that we cannot say with confidence that increased protection leads to better economic outcomes; indeed, we find some evidence to the contrary. Removing the option of extractive industry development from a county's economic portfolio can only allow that county to make a second-best decision as the county now has a restricted choice set. If preserving land from extractive development were the best option for a county, we would expect to see more counties favoring this approach absent federal designation.

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