Online Appendix to "Evaluating Industry Impacts and Externalities of the US National Park System"

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1 Summary statistics

Table A.1: Summary statistics of log(employment) over time, NP designation sample

Variable	Mean	Std. dev.	10%	50%	90%	N
1975						
Overall	9.899	1.535	7.971	9.783	12.136	188
Construction	6.974	1.52	5.107	6.894	9.136	187
Mining	4.503	1.96	2.062	4.486	6.851	180
Farm	6.733	1.021	5.497	6.745	7.875	184
1985						
Overall	10.147	1.569	8.248	10.058	12.422	188
Construction	7.278	1.632	5.281	7.319	9.623	184
Mining	4.803	1.979	2.398	4.852	7.176	179
Farm	6.728	0.948	5.577	6.712	7.827	184
1995						
Overall	10.397	1.55	8.497	10.292	12.704	188
Construction	7.55	1.651	5.452	7.635	9.695	183
Mining	4.907	1.574	2.833	5.166	6.638	156
Farm	6.641	0.997	5.455	6.653	7.794	184
2005						
Overall	10.566	1.583	8.565	10.46	12.923	188
Construction	8.044	1.472	6.001	8.009	9.99	181
Mining	4.827	1.719	2.562	5.001	6.908	130
Farm	6.578	0.998	5.311	6.542	7.789	184
2015						
Overall	10.632	1.606	8.595	10.509	13.028	188
Construction	7.821	1.526	5.978	7.78	10.035	180
Mining	5.712	1.513	3.367	5.889	7.478	134
Farm	6.657	1.017	5.438	6.604	8	184

Notes: Summary statistics of the BEA employment variables for selected years in the NP designation regressions. Observations are parks over time. We aggregate county-level data to the park level as described in the paper.

Table A.2: Summary statistics of log(employment) over time, park openings sample

Variable	Mean	Std. dev.	10%	50%	90%	N
1975						
Overall	9.095	1.285	7.622	8.978	10.769	2703
Construction	5.991	1.432	4.277	5.931	7.792	2664
Mining	3.827	2.01	1.099	3.85	6.405	2300
Farm	6.838	0.882	5.724	6.959	7.759	2680
1985						
Overall	9.246	1.343	7.695	9.137	11.012	2703
Construction	6.196	1.481	4.431	6.105	8.12	2644
Mining	3.92	2.238	0	3.912	6.853	2501
Farm	6.741	0.809	5.749	6.828	7.608	2680
1995						
Overall	9.409	1.391	7.792	9.297	11.222	2703
Construction	6.445	1.556	4.554	6.423	8.399	2614
Mining	4.25	1.789	1.792	4.277	6.562	1873
Farm	6.601	0.825	5.597	6.686	7.485	2680
2005						
Overall	9.491	1.452	7.787	9.363	11.436	2703
Construction	6.892	1.478	5.1	6.817	8.842	2442
Mining	4.187	1.997	1.609	4.443	6.683	1490
Farm	6.434	0.821	5.455	6.502	7.328	2680
2015						
Overall	9.531	1.473	7.816	9.388	11.521	2703
Construction	6.789	1.448	5.088	6.696	8.717	2436
Mining	5.028	1.852	2.89	5.147	7.401	1502
Farm	6.423	0.829	5.447	6.485	7.304	2680

Notes: Summary statistics of the BEA employment variables for selected years in the park opening regressions. Observations are counties or parks (groups of counties) over time. We aggregate county-level data to the park level as described in the paper.

Table A.3: Summary statistics of log(income) over time, NP designation sample

Variable	Mean	Std. dev.	10%	50%	90%	N
1975						
Overall	12.731	1.654	10.736	12.576	15.062	188
Hotel	7.786	1.691	5.547	7.964	9.946	169
Retail	10.577	1.642	8.543	10.533	12.918	187
Construction	10.106	1.593	8.283	10.02	12.411	187
Mining	8.258	1.867	5.693	8.212	10.733	180
Forestry	7.094	1.612	5.193	7.009	9.157	183
Farm	8.471	1.29	6.974	8.454	10.233	184
1985						
Overall	12.905	1.726	10.714	12.836	15.423	188
Hotel	8.294	1.694	5.998	8.281	10.513	163
Retail	10.709	1.717	8.549	10.647	13.166	188
Construction	10.209	1.771	8.034	10.187	12.677	184
Mining	8.246	1.915	5.854	8.081	10.73	179
Forestry	8.078	1.68	6.223	7.824	10.324	182
Farm	8.472	1.557	6.678	8.378	10.472	169
1995						
Overall	13.175	1.75	11.089	13.07	15.761	188
Hotel	8.315	1.906	5.855	8.469	10.643	179
Retail	10.968	1.744	8.739	10.957	13.331	188
Construction	10.449	1.816	8.247	10.539	12.831	183
Mining	7.573	2.287	4.237	8.101	10.096	153
Forestry	8.78	1.668	6.708	8.52	11.022	173
Farm	8.964	1.5	7.088	8.872	10.815	163
2005						
Overall	13.487	1.767	11.275	13.368	16.096	188
Hotel	8.734	1.804	6.5	8.742	10.922	177
Retail	11.383	1.665	9.167	11.451	13.773	178
Construction	11.049	1.692	8.947	11.026	13.312	181
Mining	7.71	2.368	4.562	7.94	10.309	127
Forestry	8.771	1.512	7.305	8.489	10.796	110
Farm	9.444	1.565	7.862	9.453	11.36	174
2015						
Overall	13.596	1.756	11.328	13.484	16.235	188
Hotel	8.952	1.819	6.635	9.072	11.054	180
Retail	11.421	1.629	9.152	11.423	13.769	179
Construction	10.915	1.705	8.814	10.754	13.18	180
Mining	7.869	2.487	4.268	8.144	10.773	126
Forestry	8.981	1.471	7.471	8.646	11.067	118
Farm	9.659	1.661	7.699	9.587	11.79	170

Notes: Summary statistics of the BEA employment variables for selected years in the NP designation regressions. Observations are parks over time. We aggregate county-level data to the park level as described in the paper.

Table A.4: Summary statistics of log(income) over time, park openings sample

Variable	Mean	Std. dev.	10%	50%	90%	N
1975						
Overall	11.842	1.403	10.253	11.695	13.657	2703
Hotel	5.874	2.267	2.922	5.913	8.739	2029
Retail	9.608	1.448	7.967	9.494	11.466	2689
Construction	8.998	1.553	7.148	8.91	10.985	2664
Mining	7.301	1.969	4.868	7.202	9.979	2299
Forestry	6.259	1.382	4.625	6.246	7.954	2548
Farm	8.517	1.299	6.874	8.654	10.025	2622
1985						
Overall	11.906	1.509	10.152	11.769	13.84	2702
Hotel	7.129	1.884	4.868	7.108	9.468	1302
Retail	9.603	1.574	7.76	9.529	11.61	2698
Construction	8.982	1.677	6.933	8.893	11.17	2644
Mining	7.118	2.195	4.175	7.091	10.055	2497
Forestry	7.136	1.402	5.533	7.095	8.865	2592
Farm	8.591	1.433	6.823	8.799	10.126	2412
1995						
Overall	12.077	1.579	10.235	11.947	14.103	2702
Hotel	6.309	2.366	3.044	6.464	9.242	2033
Retail	9.729	1.673	7.739	9.669	11.887	2693
Construction	9.215	1.743	7.061	9.188	11.425	2614
Mining	6.83	2.392	3.407	7.08	9.774	1732
Forestry	7.75	1.493	6.001	7.656	9.672	2193
Farm	8.7	1.452	6.818	8.87	10.308	2309
2005						
Overall	12.329	1.581	10.5	12.171	14.46	2703
Hotel	6.888	2.434	3.713	7.048	9.63	1926
Retail	10.269	1.65	8.19	10.228	12.426	2142
Construction	9.735	1.696	7.693	9.627	11.963	2442
Mining	6.998	2.77	3.044	7.53	10.192	1385
Forestry	8.294	1.19	6.993	8.206	9.694	1064
Farm	9.372	1.346	7.702	9.557	10.818	2548
2015						
Overall	12.415	1.592	10.553	12.244	14.57	2702
Hotel	7.282	2.255	4.728	7.335	9.967	1864
Retail	10.285	1.661	8.194	10.219	12.488	2168
Construction	9.836	1.603	7.949	9.719	11.979	2436
Mining	7.103	3.015	2.395	7.703	10.612	1411
Forestry	8.702	1.167	7.416	8.594	10.164	1114
Farm	9.351	1.561	7.398	9.461	11.1	2253

Notes: Summary statistics of the BEA income variables for selected years in the park opening regressions. Observations are counties or parks (groups of counties) over time. We aggregate county-level data to the park level as described in the paper.

2 The impact of parks on mining, forestry, and farming

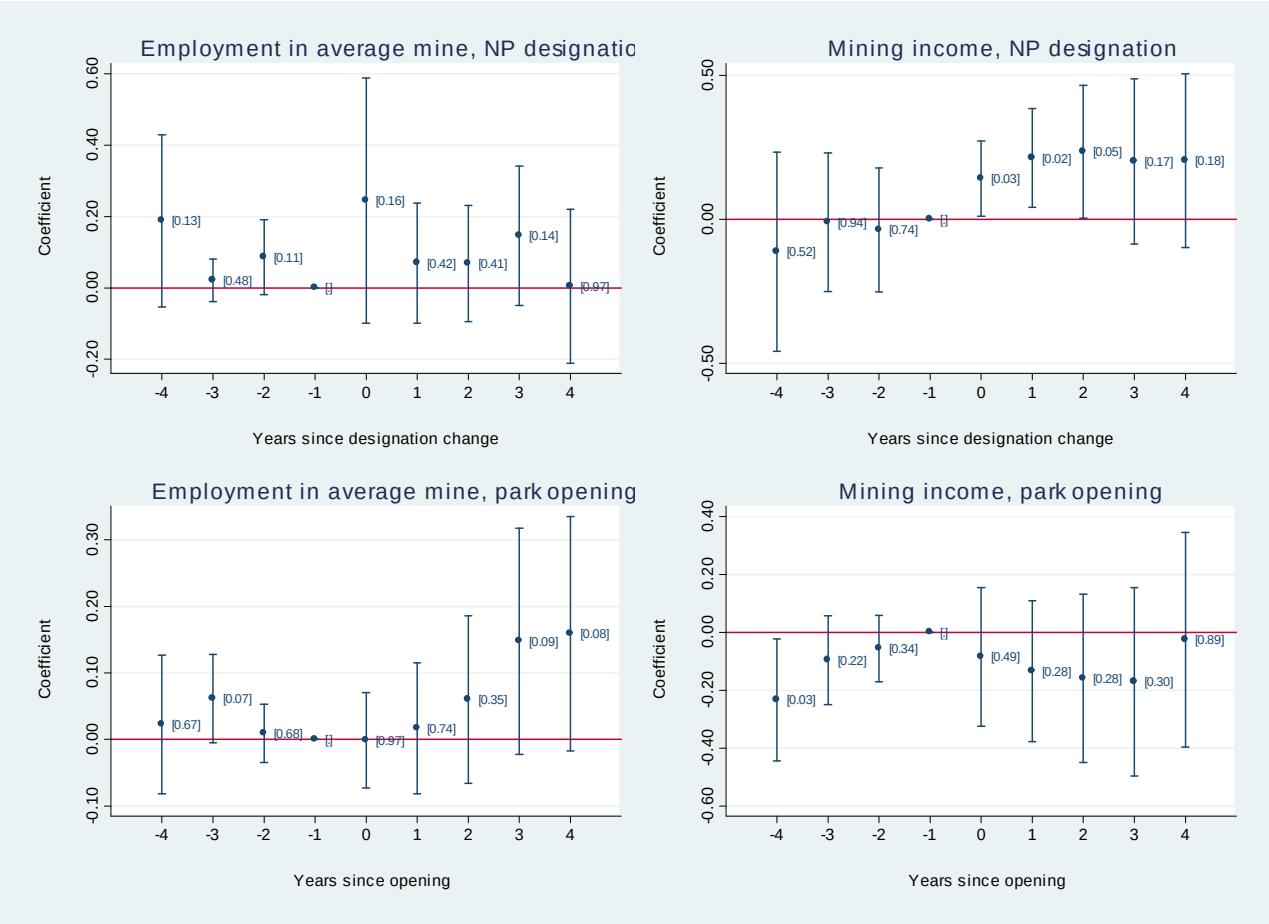

Figure A.5: The impact of parks on the mining sector, additional results

Event study coefficient estimates for the impact of NP designation or park opening on log employment in the average mine in the county (using the mine-level data) and log income in the mining industry (using the BEA data). Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. The mine-level data begins in 1983. N = 6122, 7397, 73899, 88603.

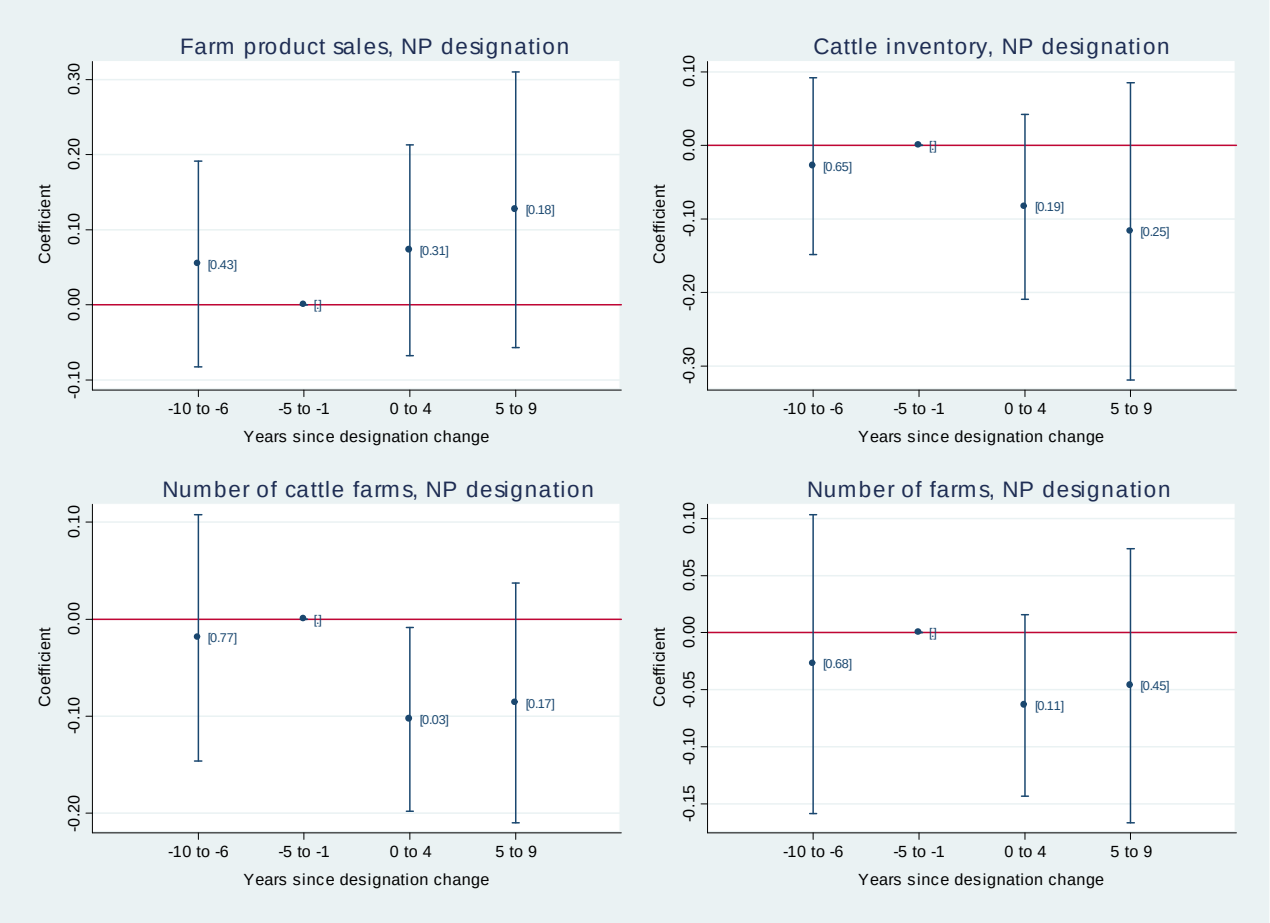

Figure A.6: NP designation and farms

Event study coefficient estimates for the impact of NP designation on farm product sales, cattle inventory, cattle farms, and the number of all farms (all in logs). Because this data from the USDA Census of Agriculture is only available every 5 years, we combine multiple pre and post periods. Estimates are relative to the period 1-5 years before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years: 1974-2017. N = 1844, 1828, 1859, 1860.

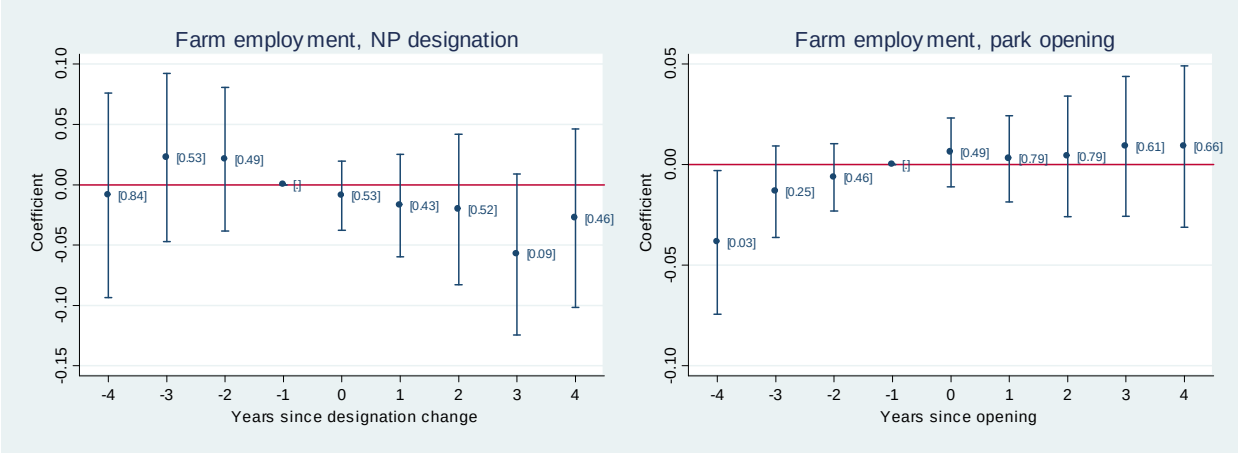

Figure A.7: The impact of parks on farm employment

Event study coefficient estimates for the impact of NP designation or park opening. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8832, 128635.

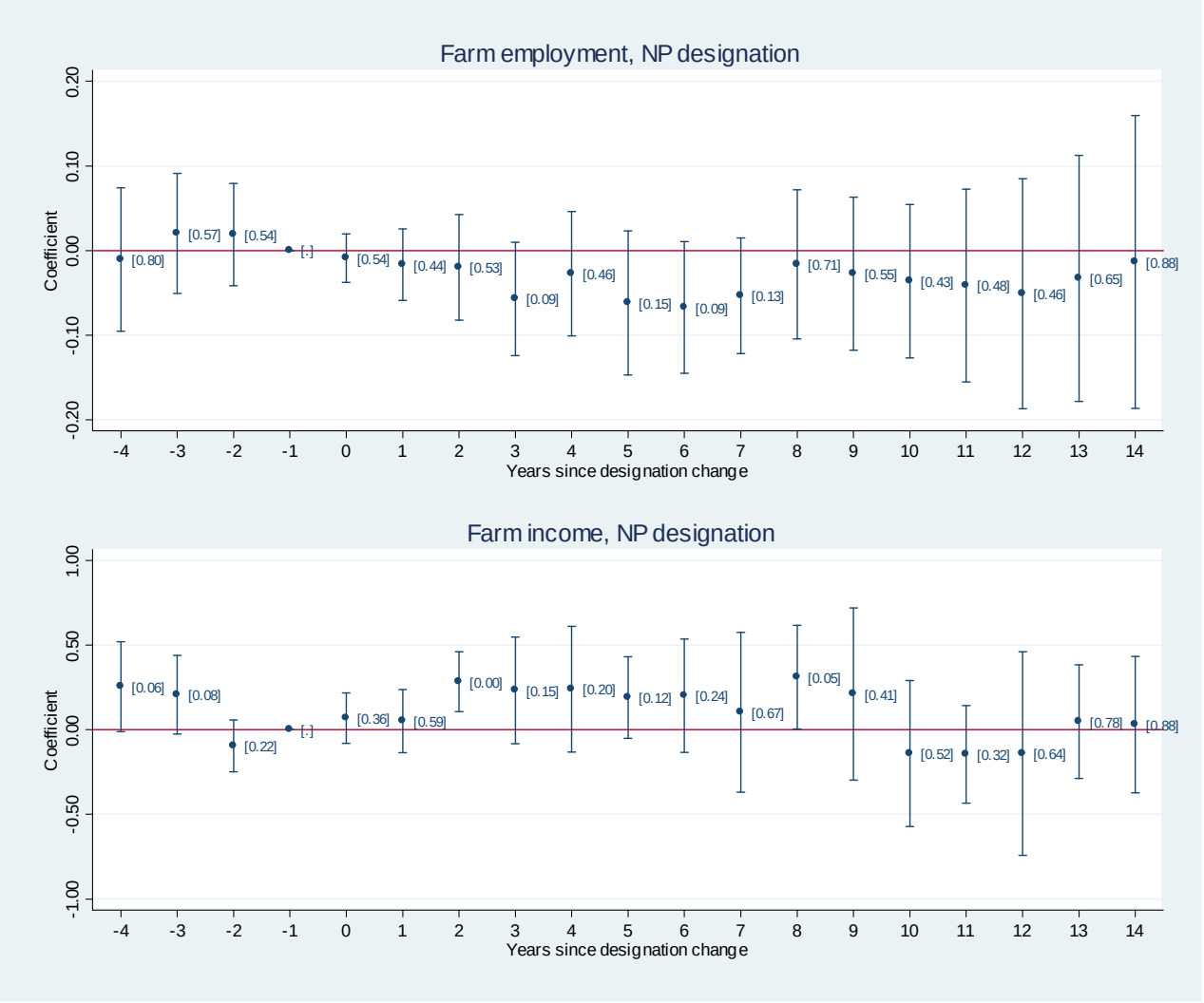

Figure A.8: The impact of NP designation on farm employment and income in the long run

Event study coefficient estimates for the impact of NP designation on farm employment and income. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8832, 8297.

3 Economic impacts of large park expansions

As an alternative measure of increased conservation, we use our acreage data to study the impact of large additions to a park's area.

To allow for the fact that some parks may experience multiple events (multiple expansions), we extend specification (1) in the paper to

$$Y_{pt} = \sum_{j=-4, j\neq -1}^{4} \beta_j \sum_k \mathbf{1}(\tau_{pt}^k = j) + \widetilde{\beta}_5 \sum_k \mathbf{1}(\tau_{pt}^k \geq 5) + \widetilde{\beta}_{-5} \sum_k \mathbf{1}(\tau_{pt}^k \leq -5) \qquad (1)$$
$$+\boldsymbol{\gamma}\mathbf{X}_{pt} + \delta_p + \lambda_t + \varepsilon_{pt}.$$

Here τ_{pt}^k denotes time since the kth occurrence of the event. Assuming that the path of the effects is the same for a given park over time (for example, that the marginal effect of being 2 years after the first event is the same as the marginal effect of being 2 years after the second event) allows us to sum the $\mathbf{1}(\tau_{pt}^k = j)$ indicators and estimate a single coefficient β_j for each j. See Schmidheiny and Siegloch (2019) for a review of the different event study specifications used in the literature.

Figure A.9 shows the cumulative distribution of year-to-year additions in our sample, measured as the fraction of the current park's area that was added since the previous year (for example, 0.5 on the horizontal axis indicates a doubling in size since the previous year). The figure shows all parks as well as excluding the smallest parks (under 10 acres) - the two distributions are nearly identical. As can be seen, approximately 10% of all additions account for a fifth or more of the park's current area. A natural break in the distribution is visible at 60%, we therefore use this threshold to define "large" expansions.

For comparison with the effects of the first two treatments reported in Szabó and Ujhelyi (2023), Figure A.10 first shows the results from estimating Eqn. (1) for visitors, park budgets, total employment and income. Point estimates for visitors are suggestive of a positive effect but none of the coefficients are statistically significant. Estimates for park budgets show a similar pattern. For employment, we see a statistically significant increase of 1.5% in the year of the expansion, but the effect disappears by year 3. There are larger gains for income, with the year of the expansion resulting in a 2.5% increase, which is maintained in years 1-3. Here too the gains seem to largely dissipate after year 4.

Overall, these patterns appear consistent with the narrative in Szabó and Ujhelyi (2023). Park expansions have some positive economic impacts. Any increase in visitors is weaker than those for NP designation, and correspondingly the economic impacts are also weaker. To check if the estimates are sensitive to the 60% threshold, we present results for 50, 70,

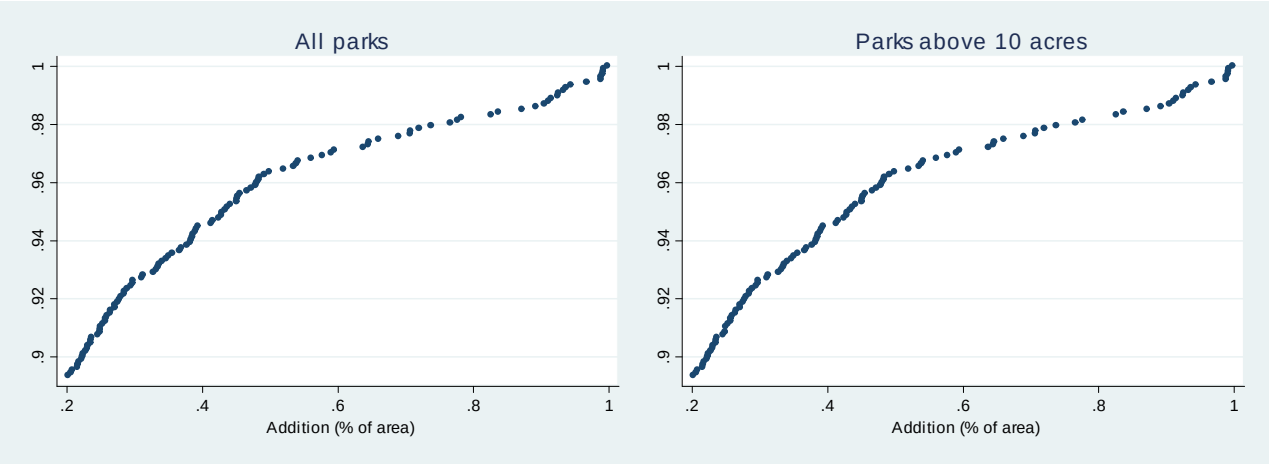

Figure A.9: Cumulative distribution of area additions

CDF of area additions in the sample for all parks (left) and parks with an average size of at least 10 acres over time (right). Additions are measured as the fraction of the park's area that was added since the previous year. 173 of the 188 parks (169 of the 183 parks larger than 10 acres) experienced some addition. Only additions above 20 percent are shown on the graph.

and 80% thresholds on Figure A.11 and A.12. In general, the higher the threshold, the more pronounced the effects are. This is exactly what one would expect if these large expansions of parks represent economically meaningful changes.

For park expansions, it is possible to provide some results for years earlier than 1970. Although annual data on county outcomes is not available for this period, we can use the decennial census to obtain information on employment. On Figure A.13, we present estimates using county employment in 1940, 1950, and 1960, as well as the number of park visitors, for the impact of 19 large park expansions over this period.[1] We find similar impacts on visitors and employment: both are suggestive of an increase following park expansions, but both increases appear temporary.

Investigating specific industries shows significant increases in income in the forestry sector (Figure A.14): we find a sustained 15-20% increase in income. To interpret this result, recall that although some aspects of increased conservation may be costly for the forestry sector, others, such as increased demand for forest management services, are likely to be beneficial. The estimates suggest that for large expansions to already existing parks, the benefits outweigh the costs for the industry as a whole.

[1] It is not possible to do this with the NP designation treatment because even if we include the 1930 census, we only have 1 observation in the 5 years before a treatment in the entire period before 1970.

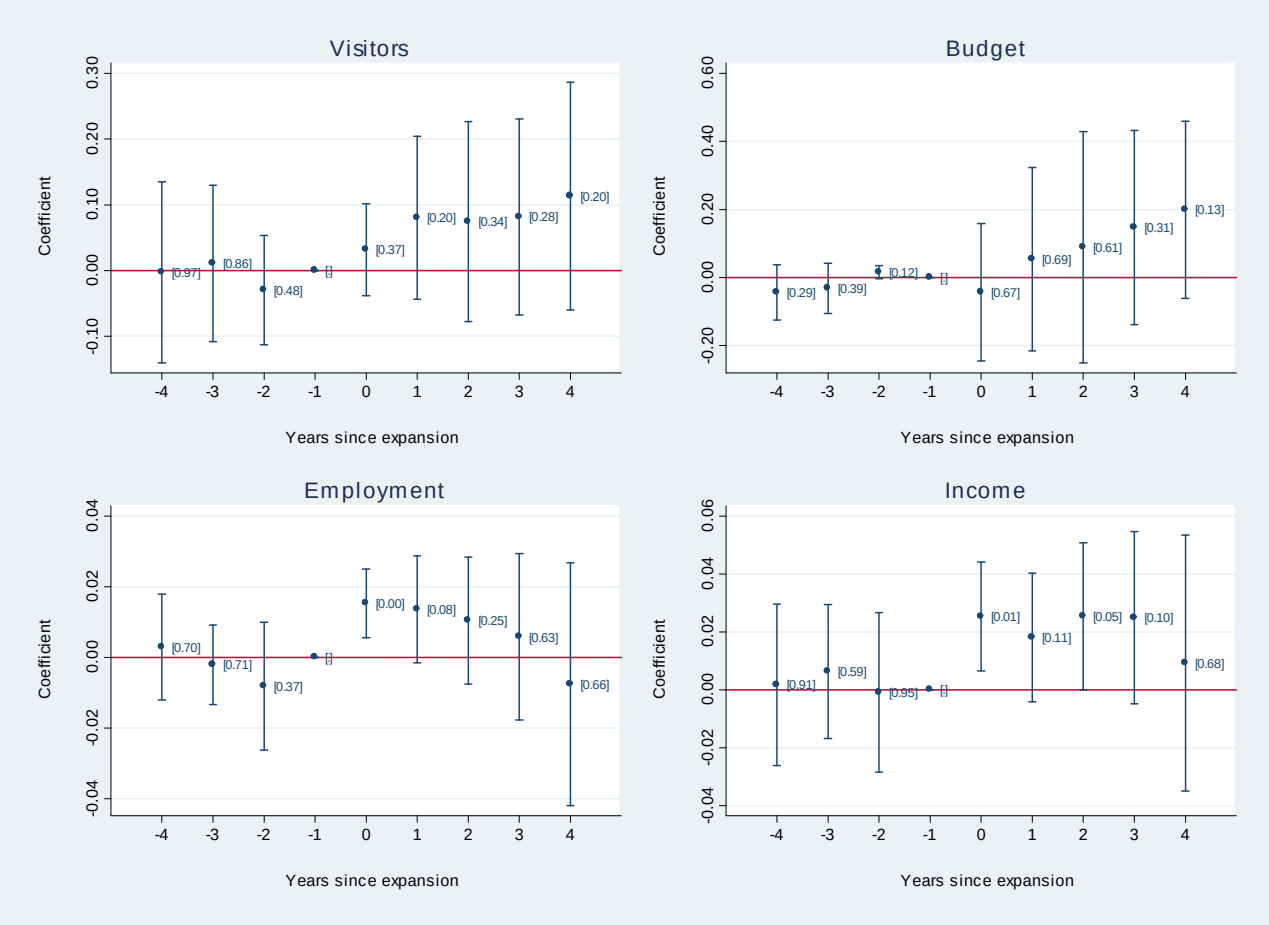

Figure A.10: The impact of park expansions

Event study coefficient estimates for the impact of park expansions. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8925, 8612, 9017, 9017.

To probe the validity of this interpretation, on Figure A.15 we look at the number of establishments in the logging sector as well as the broader forestry sector (using the Census Bureau's County Business Patterns dataset). The estimates confirm that these respond differently to park expansions: while the number of establishments in the forestry sector shows some increase, the number of logging establishments stays the same or declines. This provides support for the interpretation above, where parts of the forestry sector that rely less on resource extraction benefit from the expansion of parks.

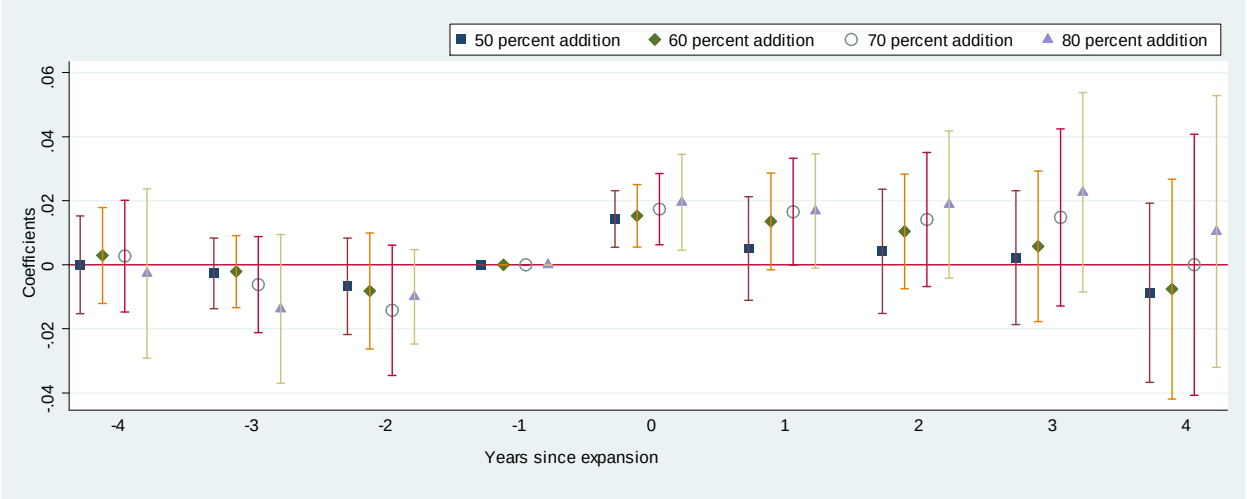

Figure A.11: Park expansions and employment, robustness

Event study coefficient estimates for the impact of park expansions on log employment, using different thresholds for the size of the area addition. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals.

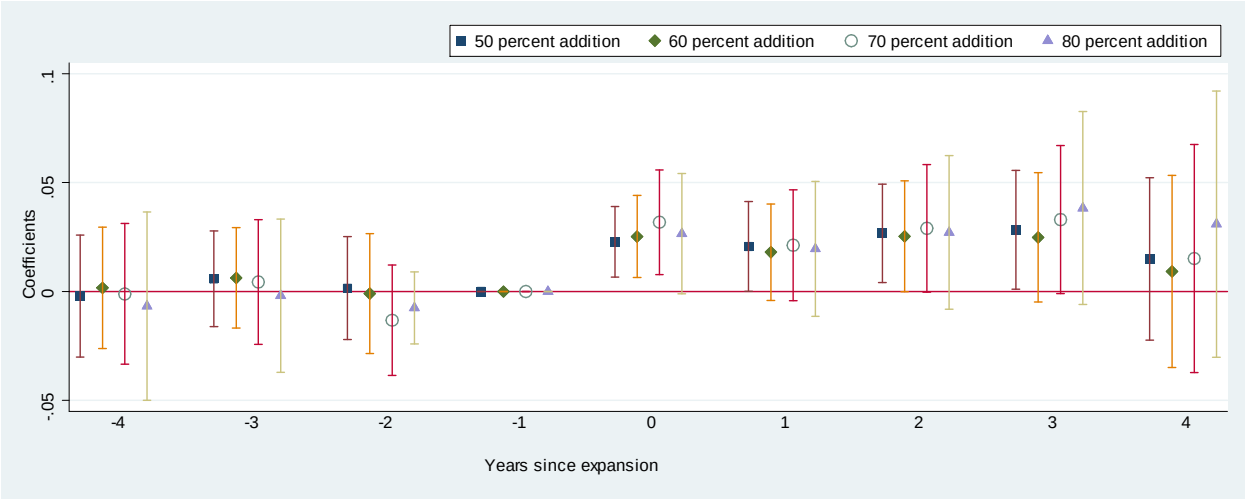

Figure A.12: Park expansions and income, robustness

Event study coefficient estimates for the impact of park expansions on log income, using different thresholds for the size of the area addition. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals.

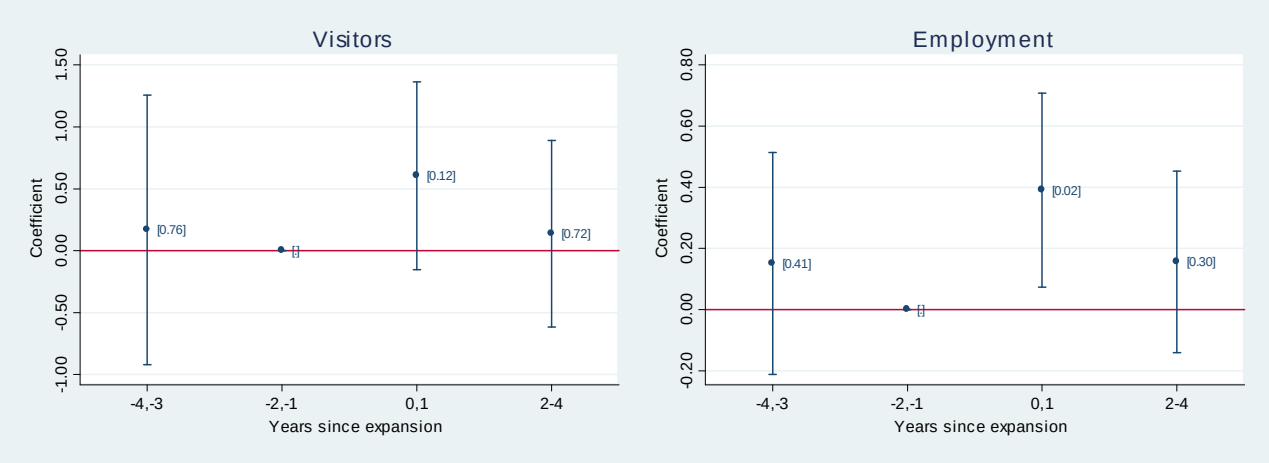

Figure A.13: The impact of park expansions, 1940-1960

Event study coefficient estimates for the impact of large park expansions on log visitors and employment. The outcomes are measured in Census years (1940, 1950, 1960). We combine multiple pre and post periods, and estimates are relative to the period 1-2 years before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 325.

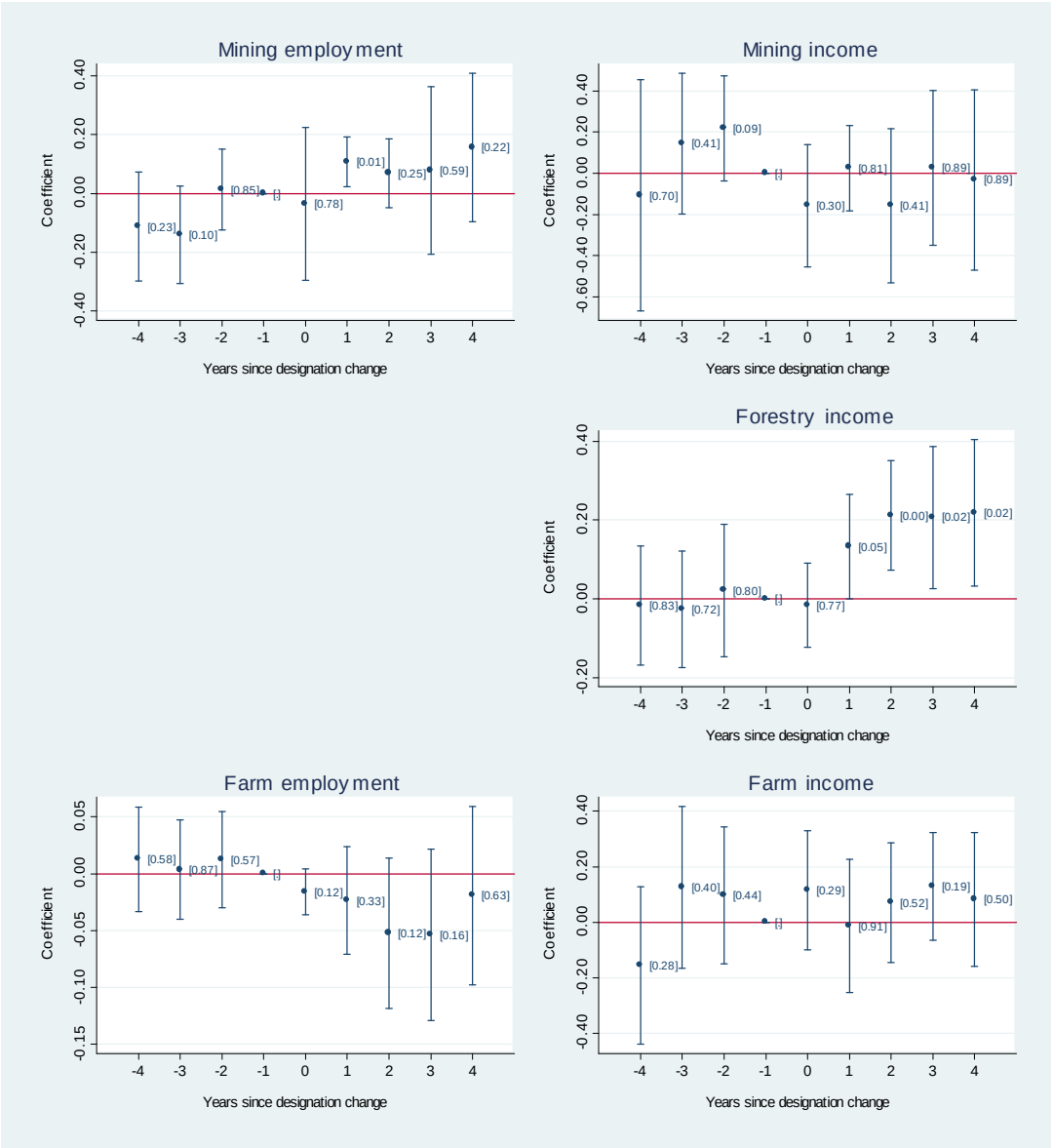

Figure A.14: The impact of park expansions on the mining, forestry, and farming sectors

Event study coefficient estimates for the impact of park expansions on log employment and income in the construction industry. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 7540, 7370, 6434, 8825, 8286.

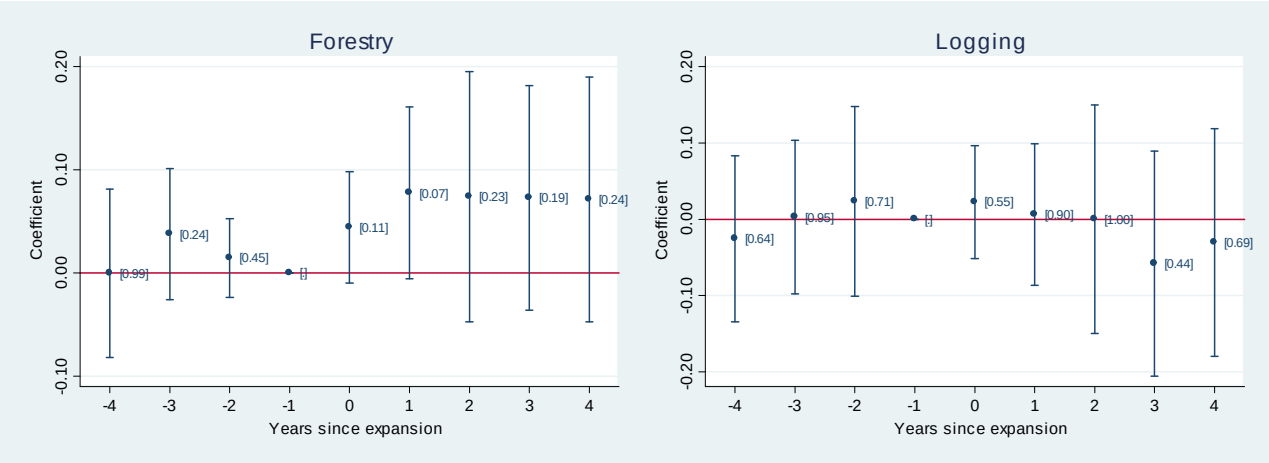

Figure A.15: The impact of park expansions on the number of establishments in the forestry sector

Event study coefficient estimates for the impact of park expansions on log number of establishments in the forestry sector (using the same sector definition as in the main analysis) and in the logging industry. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years: 1974-2016. N = 8084.

4 Externalities

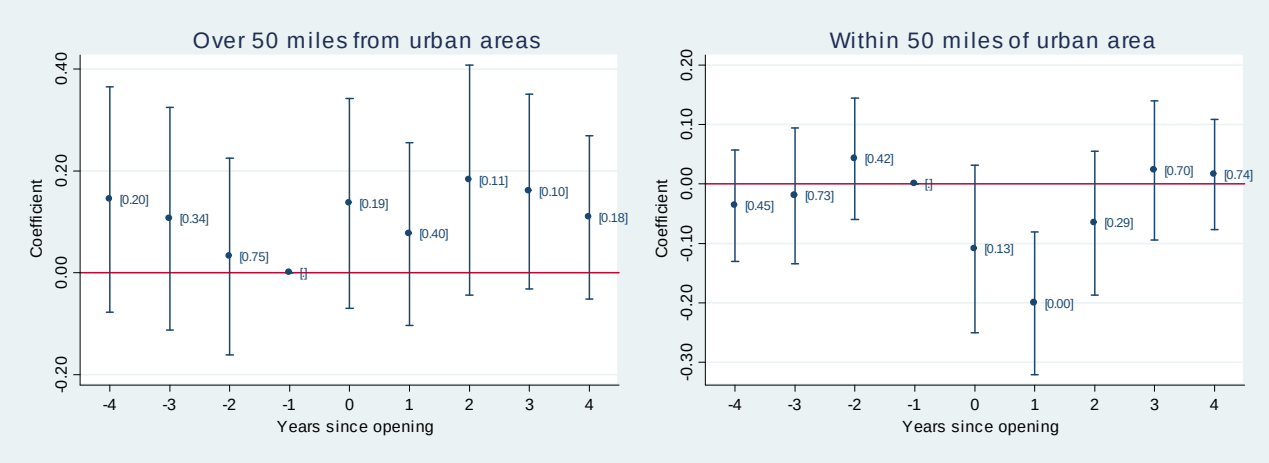

Figure A.16: The impact of park opening on traffic fatalities by closeness to urban areas

Event study estimates of park opening on log number of fatal accidents, separately for areas over/within 50 miles of large metropolitan areas (population over 1 million). Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years 1975-2017. N = 116,229.

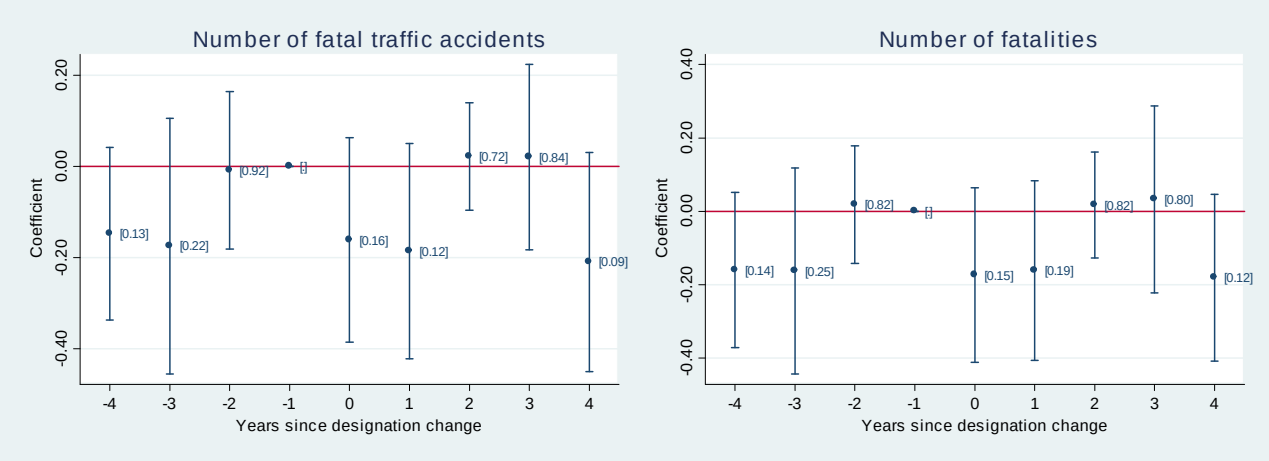

Figure A.17: The impact of NP designation on traffic fatalities

Event study coefficient estimates of NP designation on log number of fatal accidents and log number of traffic fatalities. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years: 1975-2017. N = 8084.

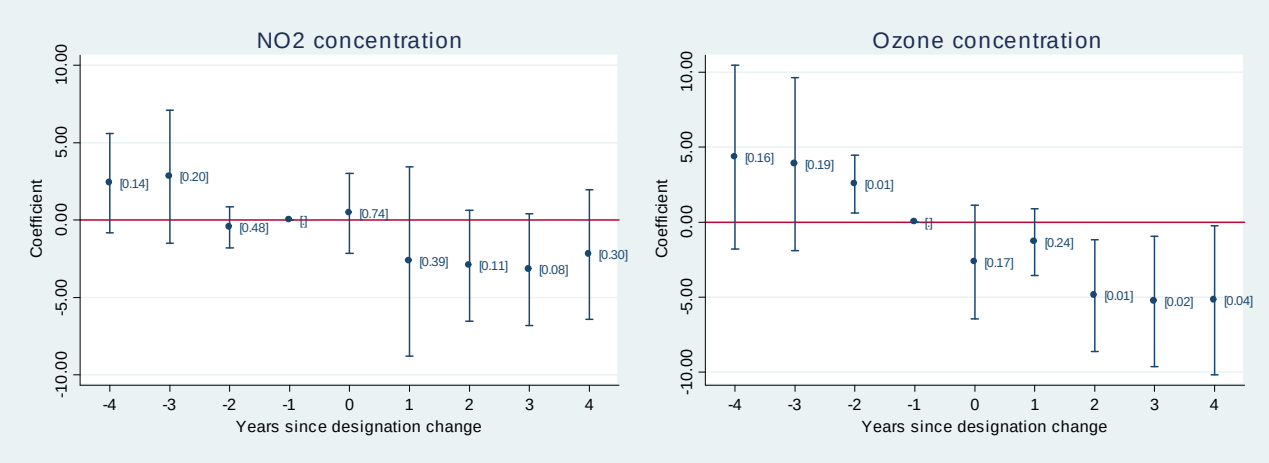

Figure A.18: The impact of NP designation on air pollution

Event study coefficient estimates on NO2 and O3 concentration. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years 1980-2017. N = 1928, 3801.

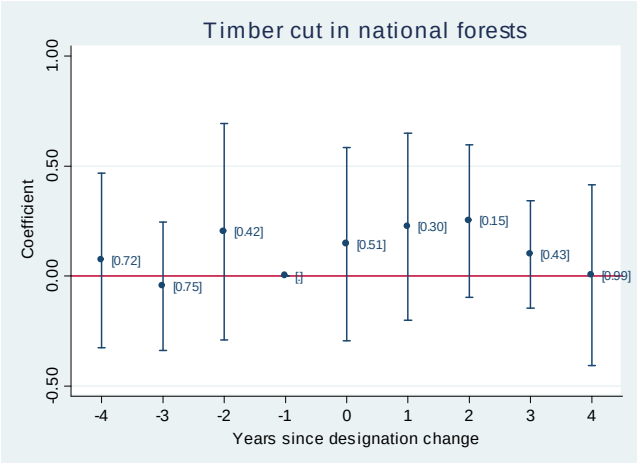

Figure A.19: The impact of NP designation on timber cut in adjacent national forests

Event study estimates of NP designation. Timber volume is measured in log(1000 board feet). Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. Years 1977-2017. N = 3608.

5 On the economic benefits of parks

The top panel of Figure A.20 looks at income in the hotel sector separately for the NP designation and park opening events. Though the estimates are noisy, neither graph shows a clear positive impact, especially in the first 3 years following the event. This lack of short-run effects could mean that the extra tourism initially comes from day visitors (e.g., from the local area or nearby cities) who do not use hotels. It could also reflect investment activities: for example, if proprietors undertake renovation projects or build extra capacity, these increased costs would reduce measured income. To check this, we looked at longer run estimates for hotels. These are consistently positive, though also imprecise (Figure A.21).

The next two panels show results for the retail and construction sectors. For park openings, we see a clear impact on retail income, which rises by 2-4% beginning one year after a park's opening. NP designation has a sizeable positive impact of construction income, showing a 15-20% increase following the designation change.[2] In both cases the increase is sustained for at least the next 4 years.

For construction, employment data is also available, and this yields similar results to construction income (Figure A.23). To check that construction primarily reflects commercial rather than residential buildings, we looked at the number of residential construction permits issued, and found no effect. We also did not find any effect on a house price index (Table A.24).

Park expansions appear to have temporary positive effect on retail income, with no effect on hotels or construction (Figure A.25).

[2] For construction, employment data is also available, and this yields similar results to construction income (Figure A.23).

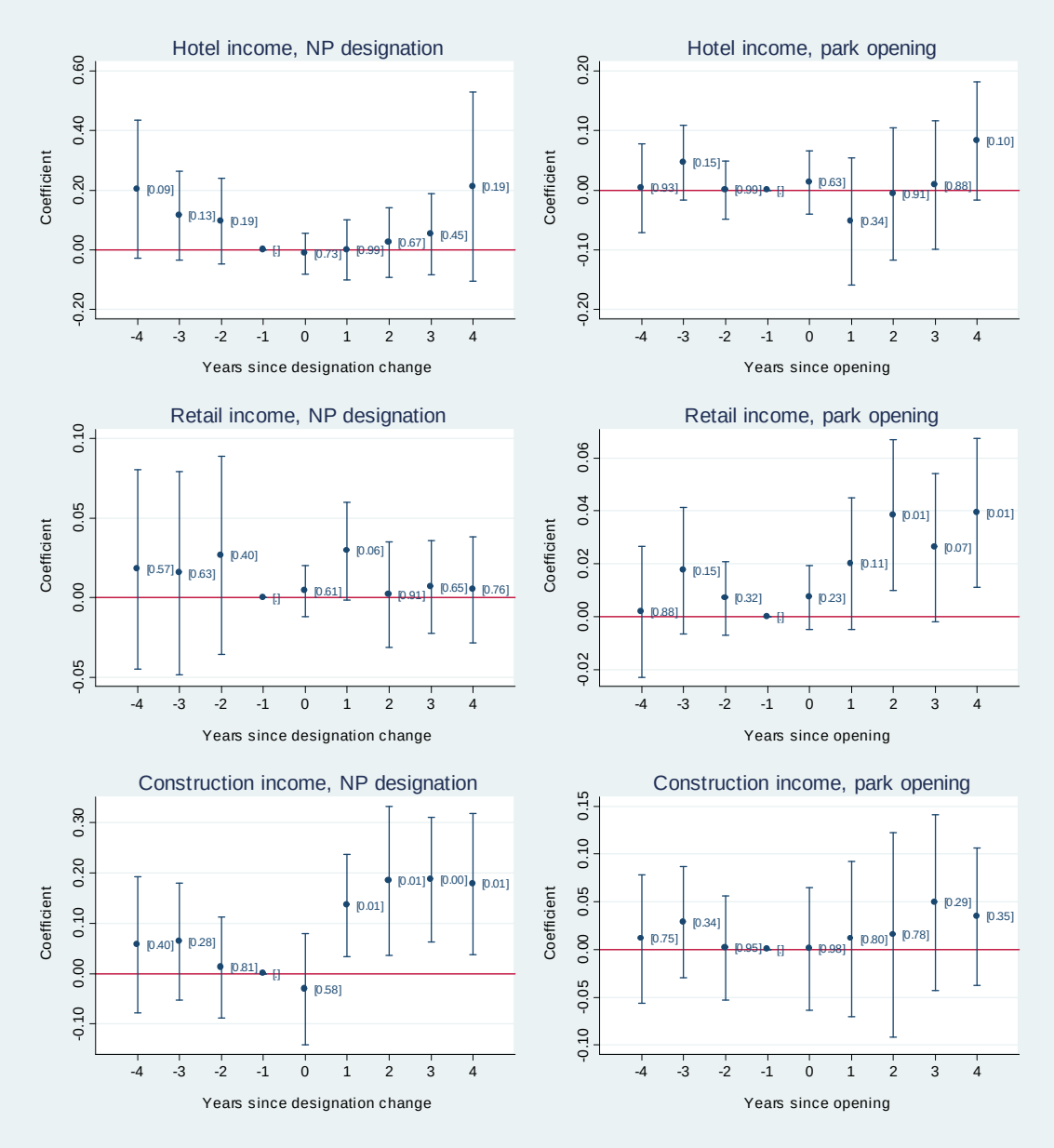

Figure A.20: The impact of parks on the hotel, retail, and construction sectors

Event study coefficient estimates for the impact of NP designation or park opening. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8287, 86465, 8846, 119843, 8812, 122816.

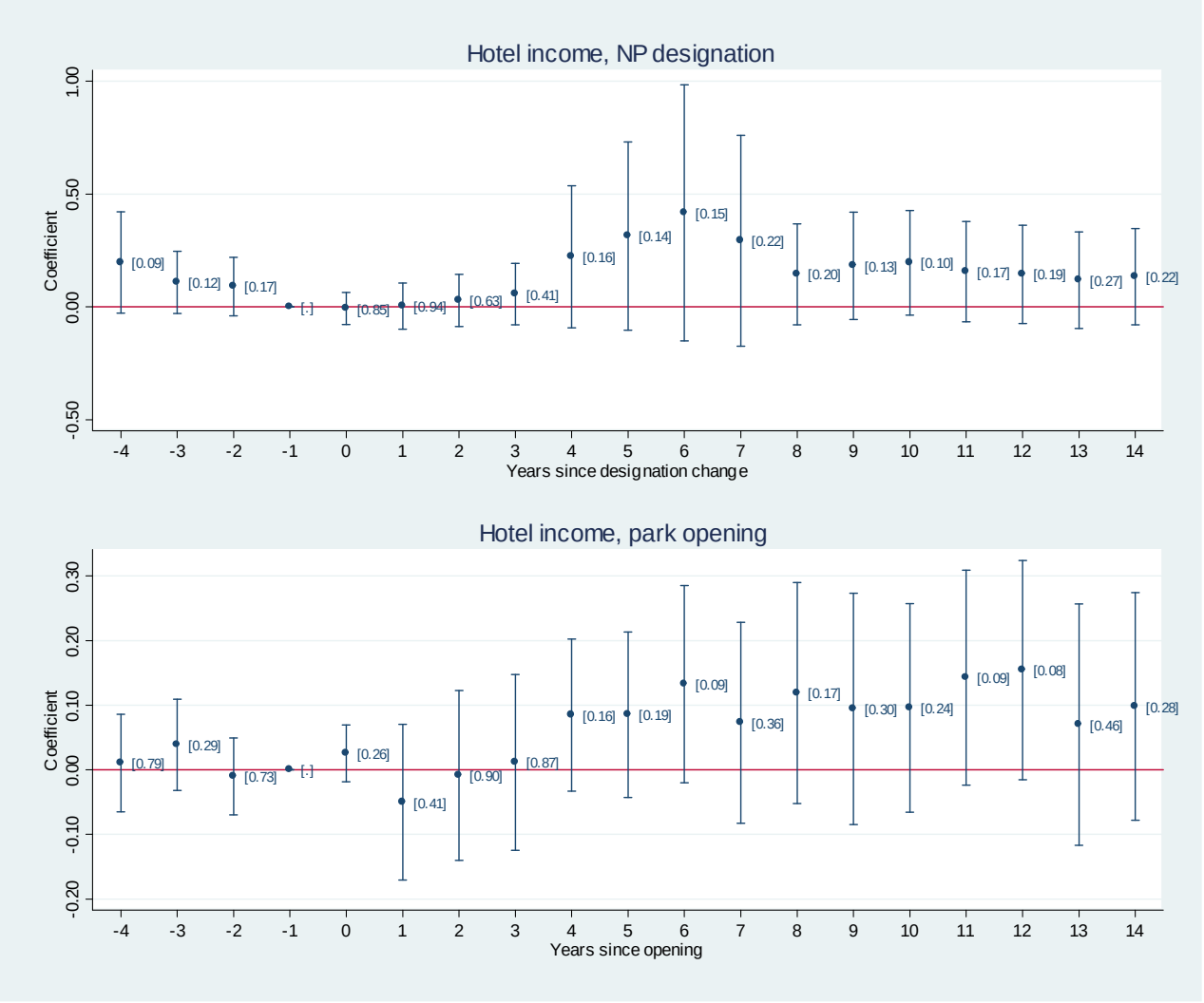

Figure A.21: Parks and hotel income in the long run

Event study coefficient estimates for the impact of NP designation and park opening on log hotel income. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8287, 84725.

Table A.22: Multiple inference adjusted p-values for industry outcomes

Years since	Hotel income		Retail income		Construction employment		Construction income	
NP designation	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval
0	0.73	0.73	0.61	0.73	0.47	0.73	0.58	0.73
1	0.99	0.99	0.06	0.08	0.06	0.08	0.01	0.04
2	0.67	0.89	0.91	0.91	0.07	0.14	0.01	0.04
3	0.45	0.6	0.65	0.65	0.06	0.12	0.003	0.01
4	0.19	0.25	0.76	0.76	0.09	0.18	0.01	0.04

Years since	Mining employment		Mining income		Forestry income		Farm employment		Farm income	
NP designation	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval
0	0.59	0.59	0.03	0.15	0.09	0.23	0.53	0.59	0.37	0.59
1	0.12	0.3	0.02	0.1	0.95	0.95	0.43	0.72	0.59	0.74
2	0.03	0.08	0.05	0.08	0.63	0.63	0.52	0.63	0.002	0.01
3	0.04	0.2	0.17	0.21	0.82	0.82	0.09	0.21	0.15	0.21
4	0.07	0.33	0.18	0.33	0.38	0.46	0.46	0.46	0.2	0.33

Years since	Hotel income		Retail income		Construction employment		Construction income	
park opening	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval
0	0.63	0.84	0.23	0.84	0.45	0.84	0.98	0.98
1	0.34	0.68	0.11	0.44	0.78	0.8	0.8	0.8
2	0.91	0.94	0.01	0.04	0.94	0.94	0.78	0.94
3	0.88	0.88	0.07	0.28	0.63	0.84	0.29	0.58
4	0.1	0.2	0.01	0.04	0.83	0.83	0.35	0.47

Years since	Mining employment		Mining income		Forestry income		Farm employment		Farm income	
park opening	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval	pval	adjusted pval
0	0.05	0.25	0.48	0.61	0.62	0.62	0.49	0.61	0.35	0.61
1	0.71	0.71	0.28	0.28	0.44	0.44	0.79	0.79	0.4	0.4
2	0.68	0.68	0.28	0.28	0.83	0.83	0.79	0.79	0.84	0.84
3	0.65	0.65	0.3	0.3	0.96	0.96	0.61	0.61	0.49	0.49
4	0.6	0.6	0.89	0.89	0.61	0.61	0.66	0.66	0.32	0.32

Notes: The table shows p-values for the industry employment and income regressions adjusted for multiple inference, along with the original unadjusted p-values. Adjusted p-values control for the false discovery rate (Benjamini and Hochberg, 1995; Anderson, 2008) in a group of hypotheses defined by event, industry group, and year relative to the event (for example, testing whether $\beta_0 = 0$ for the NP designation event for all "winner" outcomes).

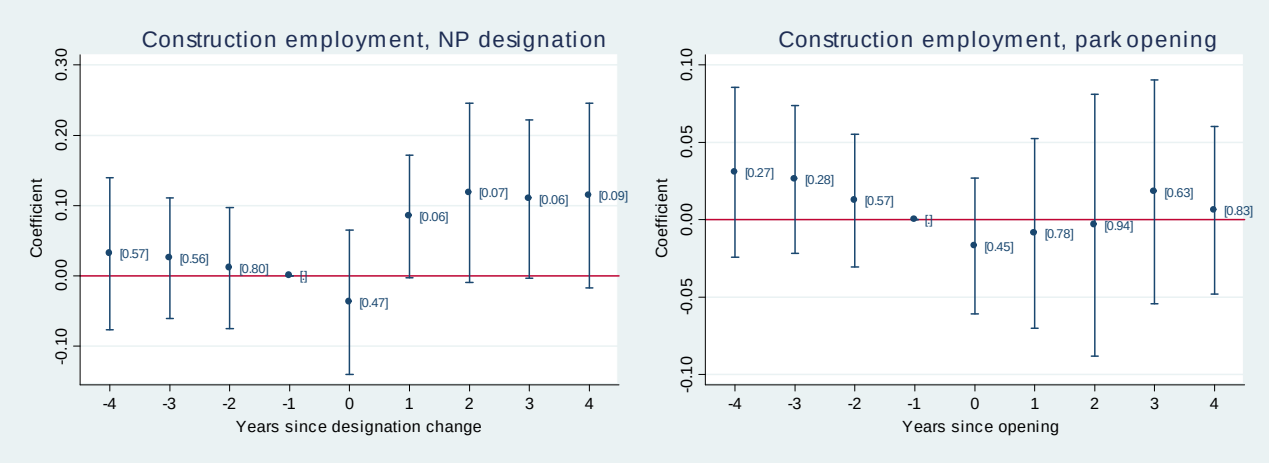

Figure A.23: The impact of parks on construction employment

Event study coefficient estimates for the impact of NP designation or park opening on construction employment. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8812, 122816.

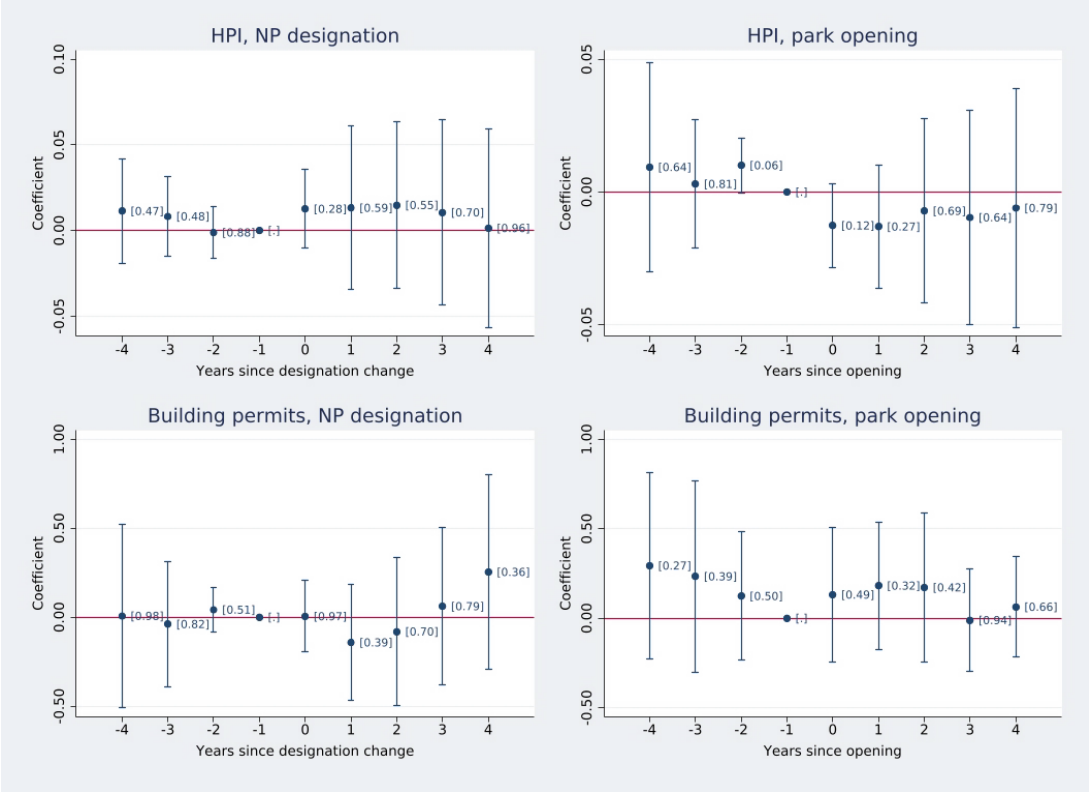

Figure A.24: House prices and building permits

Event study coefficient estimates for the impact of NP designation on house prices (1975-2017) and building permits (1990-2017). HPI is the FHFA house price index, number of building permits is from the US Census Bureau. See the Data Appendix for detailed sources and definitions. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 5054, 64983, 6563, 72157.

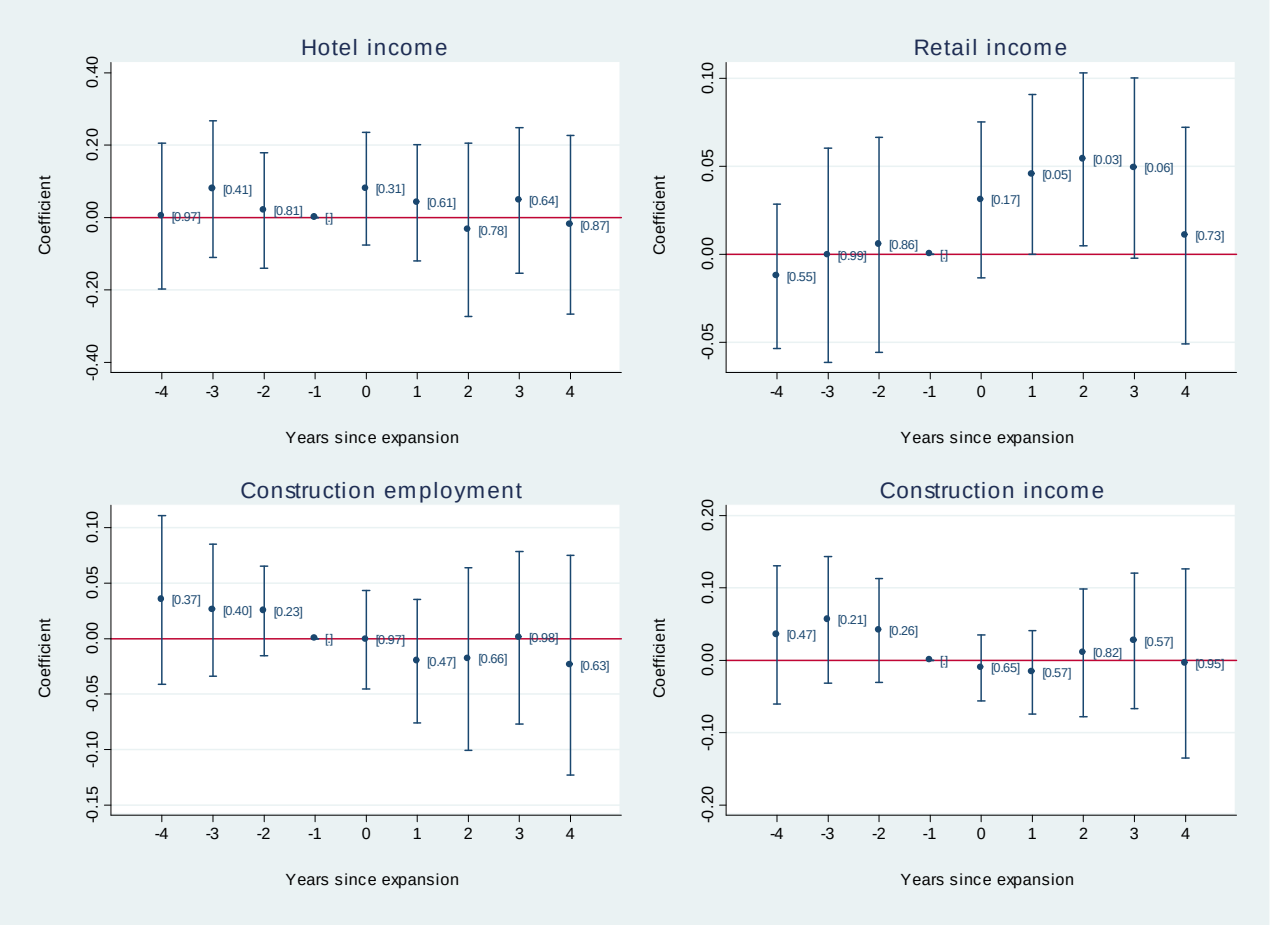

Figure A.25: The impact of park expansions on the hotel, retail, and construction sectors

Event study coefficient estimates for the impact of park expansions. Estimates are relative to the year before the designation change. Standard errors are clustered at the park level. Bars indicate 95 percent confidence intervals, p-values are in brackets. N = 8273, 8847, 8788, 8788.

6 Data sources

6.1 Employment and income

Source: Bureau of Economic Analysis: Regional Economic Accounts, https://apps.bea.gov

For documentation and definitions, see

https://www.bea.gov/resources/methodologies/local-area-personal-income-employment

We use the files CAINC5N, CAINC5S, CAEMP25N, CAEMP25S. The variables and industries we use are listed in Table A.26. Retail contains Eating places before 2000. After 2001, we add line codes 700 and 1802 to make the series consistent over time. Because employment for Eating places is not available separately, this adjustment can only be done for income.

Before 2000, logging is not included in the forestry sector, but is included in manufacturing under a category called "Lumber and Wood Products" which also includes sawmills, and the manufacturing of construction lumber, wood containers, and wood buildings. After 2000, logging was moved under forestry. To make this series consistent, we add Wood Products manufacturing to the forestry category both before and after 2000. Specifically, we add line codes 100 and 413 before 2000, and line codes 100 and 511 after 2001. As above, we can only make this adjustment for income because wood products manufacturing employment is not available as a separate category.

Table A.26: BEA variables and industries

	1969-2000			2001-2017		
	BEA income line code	BEA employment line code	Industry code (SIC)	BEA income line code	BEA employment line code	Industry code (NAICS)
Construction	300	300	C (15-17)	400	400	23
Mining, quarrying, and oil and gas extraction	200	200	B (10-14)	200	200	21
Forestry, fishing, and agricultural services	100	100	7, 8, 9	100	100	113,114,115
Logging, timber tracts and gathering of forest products	-	-	-	101	n/a	113
Logging	n/a	n/a	2411	n/a	n/a	1133
Lumber and wood products manufacturing	413	n/a	24	511	n/a	321
Farm	81	70	1,2	81	70	111,112
Retail	620	620	G (52-59)	700	700	44,45
Accomodation	805	n/a	70	1801	n/a	721
Eating and drinking places	627	n/a	58	1802	n/a	722

n/a: Not available in the dataset.

6.2 County level census data

6.2.1 GIS

Mapping of the counties used GIS boundary files from the United States Census Bureau, available at:
https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html

6.2.2 Age groups

Total population and the age distribution of the population is taken from the *Intercensal State and County Characteristics Population Estimates* of the US Census Bureau. The data is available at the county level for all years from 1970 at https://www.census.gov.

6.2.3 Employment 1940-1960

For guidance on the appropriate county level employment variables for historical census years, see Lebergott, S. (1966): "Labor Force and Employment, 1800–1960" *in*: *Output, Employment, and Productivity in the United States after 1800*, Dorothy S. Brady (ed.), National Bureau of Economic Research, 117-204. http://www.nber.org/chapters/c1567
Data source: Michael R. Haines: Historical, Demographic, Economic, and Social Data: The United States, 1790-2002, Inter-university Consortium for Political and Social Research ICPSR 2896. https://www.icpsr.umich.edu/web/ICPSR/studies/2896/datadocumentation
Variables used are shown in Table A.27.

Table A.27: Variable sources for employment data before 1970

Year	Data Source	Variable name
1940	Part 32: 1940 Census (County and State)	Sum of [126 M14EMP] and [127 F14EMP] Males 14+ employed and Females 14+ employed
1950	Part 35: 1950 Census (County and State)	Sum of [117 MEMP] and [118 FEMP] Males employed and Females employed
1960	Part 74: 1962 County Data Book (County and State)	47 VAR37 Total civilian labor force employed

6.3 Weather

We use the Precipitation Index (PCP) and Palmer Drought Severity Index (PDSI) data from the National Climatic Data Center. Data is available for all years at the county level at https://www7.ncdc.noaa.gov/CDO/CDODivisionalSelect.jsp#

6.4 Mines

We use data on mining employment and the number of mines collected by the Mine Safety and Health Administration (MSHA) and published by the Centers for Disease Control and Prevention. The data is available from 1983 at https://www.cdc.gov/niosh/mining/data/default.html. We use two annual mine level variables from the Address/Employment files (ae): (i) *avenemp*, the average number of employees, rounded at the subunit level, and (ii) *status,* status of the mine. For each year, we count the number of mines with "Full-time permanent," "Intermittent" and "Active" status in the county to measure the number of mines, and use average employment in these mines to measure average employment per mine.

6.5 Number of forestry and logging establishments

Data on the number of establishments in the logging and the broader forestry sector comes from the County Business Patterns database of the Census Bureau, https://www.census.gov/programs-surveys/cbp.html. We use years 1974-2016. Over this period, the number of establishments is always available, whereas before 1974 and after 2016 it is suppressed for counties with few establishments in a given sector. For logging establishments, we use sectors 2411 before 2000, and 1133 after 2001 (see Table A.26). For the broader forestry sector, we use sectors 7, 8, 9 and 24 before 2000, and 113, 114, 115, and 321 after 2001 (this corresponds to the categories used in the BEA data).

6.6 Farms

County level data on farms comes from the USDA Census of Agriculture, https://www.nass.usda.gov/AgCensus. During our period of study, this data is available in 1974, 1978, 1982, and every 5 years after that.
Until 2012, the data is compiled in Haines, Michael, Fishback, Price, and Rhode, Paul: United States Agriculture Data, 1840 - 2012. Inter-university Consortium for Political and Social Research. https://doi.org/10.3886/ICPSR35206.v4.
For 1974, several missing observations can be filled in from the census report posted on the USDA website. Data for 2017 can also be obtained from that website.

We use the variables *Number of farms, Market value of agricultural products sold*, *Cattle & calves inventory*, and *Cattle & calves inventory (number of farms with inventory)*,

6.7 Traffic accidents

Source: Fatality Analysis Reporting System (FARS), 1975-2018, published by National Highway Traffic Safety Administration at
https://www.nhtsa.gov/research-data/fatality-analysis-reporting-system-fars.
We use the original variable *fatal*, the total number of fatalities per accident. Based on this we create two variables at the county-year level: (i) number of fatal accidents, and (ii) total number of fatalities.

6.8 Pollution

Data on the concentration of NO_2 and ozone is published by the EPA and is available at https://aqs.epa.gov/aqsweb/airdata/download_files.html. The data contains average annual readings at the monitor level starting in 1980. We aggregate this data to the county level, weighting each monitor by the number of readings for the year. For each pollutant, we use readings for sample durations of 1 hour (for ozone, 8-hour durations are also available and produce almost identical results in our regressions).

6.9 Timber cut in national forests

Information on timber cut in national forests comes from the US Forest Service's "Forest Products Cut and Sold" reports, available at
https://www.fs.fed.us/forestmanagement/products/cut-sold/index.shtml.
We use the annual reports for all regions, published since 1977, to extract the annual volume of convertible forest products cut in each forest. In these reports, timber volumes are given by forest/state, so that a national forest with parts in multiple states has separate volumes listed for each part. We clean the reports to fix obvious errors (such as spelling inconsistencies in forest names). There are some instances of a forest showing up under a different state in some years - in these cases we took the conservative approach and deleted that observation.

We use forest names to match the reports to GIS boundaries of the units managed by the Forest Service.[3] We then use the boundaries to match each forest to a county in our dataset, and identify which forests are adjacent to which park. The Forest Service manages some forests as a combined unit: throughout we use the units given in the Cut and Sold

[3]Boundaries are available at https://data.fs.usda.gov/geodata/edw/datasets.php?dsetCategory=boundaries

reports as our base. When forests appear both as combined units and as individual units over time, we combine the individual units to make the series consistent.

Overall, there are 123 forests with timber data. 96 of these are adjacent to a park in our dataset, while 23 are not adjacent to any park. Of these 23, 2 are located in counties that are not included in our dataset and are therefore dropped from the analysis.

6.10 House price index

Source: HPI for Counties (All-Transactions Index), 1975-2018, published by Federal Housing Finance Agency at
https://www.fhfa.gov/DataTools/Downloads/Pages/House-Price-Index-Datasets.aspx#mpo.
We use the original variable *HPI with 2000 base*, at the county level. See more details in A. N. Bogin, W. M. Doerner and W. D. Larson (2019): "Local House Price Dynamics: New Indices and Stylized Facts," *Real Estate Economics*, 47(2), 365-398.

6.11 Building permits

Source: Residential Building Permits Survey (FARS), County Level Residential Building Permit Statistics, 1990-2018, published by US Census Bureau at
https://www2.census.gov/econ/bps/County/
We create three variables at the county-year level: (i) number of permits for buildings, (ii) number of permits for units, and (iii) value of projects covered by the permits.

References

[1] Anderson, M.L. (2008): "Multiple Inference and Gender Differences in the Effects of Early Intervention: A Reevaluation of the Abecedarian, Perry Preschool, and Early Training Projects," *Journal of the American Statistical Association* 103(484), 1481-1495.

[2] Benjamini, Y., and Y. Hochberg (1995), "Controlling the False Discovery Rate," *Journal of the Royal Statistical Society*, Ser. B, 57, 289–300.

[3] Schmidheiny, K., and S. Siegloch (2019): "On Event Study Designs and Distributed-Lag Models: Equivalence, Generalization and Practical Implications," IZA Discussion Paper N. 12079.

[4] Szabó, A., and G. Ujhelyi (2023): "National Parks and Economic Development," working paper.