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The Impact of Prison Closure on the Local Economy

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THE IMPACT OF PRISON CLOSURE ON THE LOCAL ECONOMY

by

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Abstract

This paper examines the impact of prison closures on economic indicators in rural and urban counties in the United States using panel data regression analysis. The dataset focuses on the years 2001 to 2020 and includes 81 counties across 19 states. The analysis uses two key predictors, a dummy variable indicating the presence of a prison in a county, and a continuous variable representing the number of prisons in a county each year. The results reveal no significant impact of the presence of prisons on real GDP, unemployment, per capita personal income, or employment. These results have important policy implications for the use of prison closures as a cost-cutting measure and suggest that the spillover effects of closing a prison on the economic well-being of the county are limited.

Introduction

America's total prison population peaked in 2009 with 1.6 million prisoners, and has been in steady decline since, decreasing 25% to a population of 1.2 million in 2021 (Figure 1). Coupled with this, the 2008 recession had a negative impact on state budgets, leading to a country-wide spate of prison closures concentrated throughout the early 2010s. While these closures were celebrated by activists and abolitionists, they did not necessarily lead to a decrease in the prison population or a change in punitive structures. On the other hand, closures do mean that prison employees will face layoffs, and the community will lose an industry. When governments chose to close prisons due to financial inefficiency or other bureaucratic processes, they often face backlash from the local communities, who cite loss of payroll and revenue for local business (Petrella and Friedmann, 2013). This study attempts to answer the question of whether the loss of a prison actually harms the local economy.

Background and Literature Review

Prisons in Rural Communities

Beginning in the 1980s, rural communities began to experience economic hardship due to a nationwide shift away from agriculture and an increase in farmers being unable to repay loans taken out in the 1970s (Davidson, 1990). This situation caused small communities to seek to entice manufacturing or industrial companies to move into their area to bring job opportunities, but since these companies were for-profit, they sought predominantly cheap labor sites (Drabenscott, 2003).

Concurrently in the '80s, incarceration rates increased across the country. States were incarcerating more individuals than they could house, and housing inmates over capacity was deemed cruel and unusual punishment (Hallinan, 2001). Since states needed new facilities, and

rural communities needed an economic boost, most of the prisons constructed in the 80s and 90s were built in rural counties. Locating prisons in a rural area was a novel phenomenon—because the majority of inmates hail from urban environments, most prisons were situated in more populous areas, making housing less costly (Beale, 1995). In addition, Eason (2010) finds that prisons are typically sited in more disadvantaged communities, which is due to the notion that a bringing a person to an area will boost that area's economy.

However, it is necessary to examine the legitimacy of the claim that prisons provide an economic boost to a community. The concept is based off the fact that prisons need guards and staff, thereby bringing jobs to the local community. However, there are requirements for correctional officers, especially higher paying and managerial positions, such as education and experience that rural residents likely will not have (Huling 2002). Therefore, these new prisons were more likely to be staffed with transfers from other prisons (Huling 2002). Gilmore (2007) finds that in California, only 20% of the jobs that a new prison staffs go to the locals in that community. Even in private prisons, where experience may not be as necessary, the turnover rate of prison employees is too high to make a long-lasting positive impact on employment. Additionally, prisons may be displacing low-wage workers by completing community jobs as a captive workforce that gets paid little to nothing (Huling 2002).

It is also argued that staff and visitors of the prison spend more at local businesses thereby boosting the economy; however, King et al. (2003) finds that when there is additional spending, it is not enough to boost the economy. The study also finds that the prison itself is unlikely to purchase necessary supplies from local businesses, especially in rural areas, where the local businesses are unlikely to either produce what the prison needs or be of the scale necessary to fully provide the prison. Additionally, public prisons do not pay taxes to the local

economy, and private prisons are also unlikely to contribute to local tax revenues, unlike a manufacturing or business addition to the town.

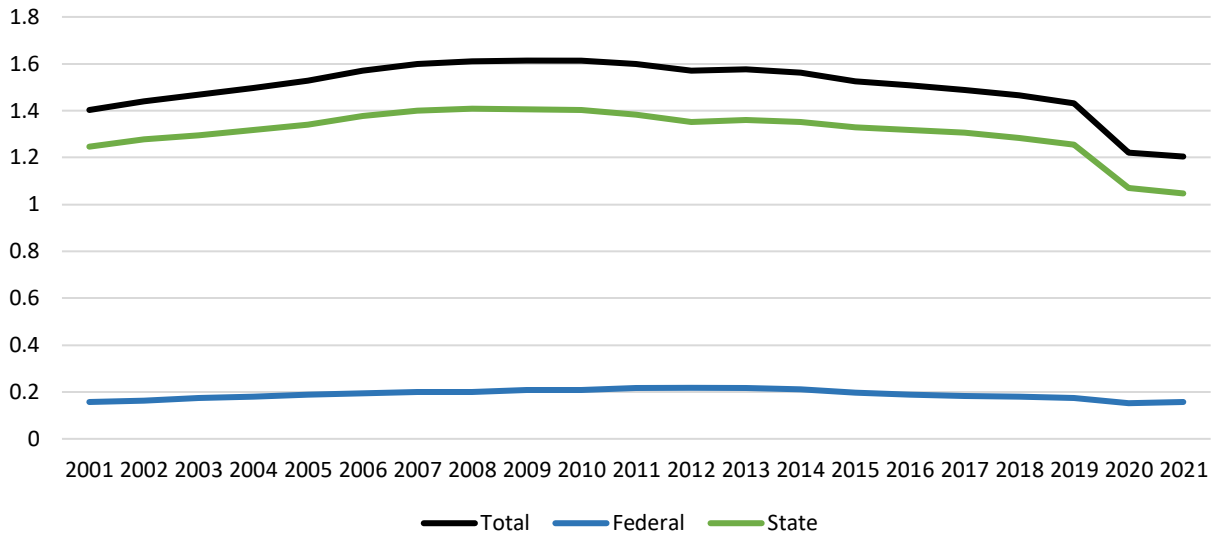
Prisons do not promote economic growth in rural areas, according to Hook et al. (2010), who used county-level economic indicators for all new and existing prisons from 1976 to 2004 and found that having or constructing a prison does not help rural areas' employment growth as predicted. Neither public nor private employment growth was aided by the addition of a prison. This impediment to growth is heightened for counties with worse education rates and is attributed by the authors to a lack of prison jobs going to the locals as well as the impact of prison labor on the local economy.

Comparing economic indicators for small towns that brought in a new prison in the 1990s with small towns that did not, while controlling for a number of factors including population, Besser and Hanson (2004) find that small towns with new prisons experience higher public sector employment growth, but fare worse on all other indicators, including total employment, poverty, average income and housing values. This finding contradicts the notion that building a prison in an economically disadvantaged area will bring jobs and boost the economy.

Prison closure

Beginning in the late 2000s, there were two major occurrences which contrasted with the conditions in the 1980s. First, there was a recession that impacted state budgets. Second, after its peak in 2009 at 1.6 million prisoners, the prison population began a steady decline which continues to this day (Figure 1). These two factors began a trend of closing prisons across America – by 2013, 15 states had closed 35 prisons (Petrella and Friedmann, 2013).

Figure 1. Prisoner Population in America



Source: Bureau of Justice Statistics

Prison closure can be a result of many factors—a decrease in crime rates that leads to fewer prisoners to be housed, a change in the state budget or local budget, or the age of prisons making them too old to be maintained (Petrella and Friedmann 2013). In all of these situations, the crucial factor becomes efficiency, or the lack thereof. Prisoners are expensive to house and feed, the infrastructure is expensive to maintain, and employing guards and administration requires a high payroll. Due to the fixed costs of operating a prison, when incarceration rates decrease, the cost per prisoner increases. Additionally, for prisons in rural areas, there may be higher costs for transporting prisoners to the area – that is, rural prisons will account for prisoners in a larger (but less dense) area of land than an urban prison, and if a prisoner needs to be transported from the south of a state to the north, the cost of their transportation is higher than that of someone within the immediate vicinity. So, if prisons are expensive and inefficient, the

question becomes whether another reason exists to keep the prison open—for example, a significant impact on the local communities' job market or revenue.

One commonly held notion is that losing a prison will greatly the local economy– however, the existing research has failed to support the idea that adding a prison would help an economy, so a qualitative analysis is necessary to understand how closing prisons impacts the local economy. Chirakijja (2022) examines the impact of prison closure on the county level economy using a difference in difference model. The study finds that while prison closures lead to a 10% decrease in government jobs, with prisons accounting for an average of 235 government jobs, this impact does not have a significant effect on overall employment, and there are no spillover effects of prison closure to the private sector. Furthermore, the effects on government employment can be mitigated by the repurposing of prison infrastructure for other services that may benefit the community (Porter, 2016).

Research has yet to be conducted examining the direct impacts of prison closures on factors outside of employment, such as gross domestic product (GDP) and personal income. Moreover, while most of the research on prison opening focuses on the impact on rural counties, there is a lack of research on the difference between impacts on rural versus urban counties. This thesis will fill in these gaps in the literature by examining the effect of prison closure on different economic indicators in both rural and urban counties.

This paper focuses on the relationship between prison presence and economic outcomes in 19 states and 81 counties across the United States, using panel data from the years 2001-2020, controlling for population and educational attainment. The economic indicators of interest are total employment, unemployment rate, real GDP, and per capita personal income. This paper includes both urban and rural counties, because there is a vast difference in how they operate and

the scale of their economies. Because research indicates that rural counties are slower to grow and have fewer employment opportunities than urban areas, the effect of prison closure on rural areas should be greater than on urban areas.

Based on previous literature, there is no expected effect of prison closure on employment indicators, for either rural or urban counties. A lack of statistical impact would mean that prison operations are not a monopsony, or the only source of employment for the laid off. That is, if a prison is the only industry in an area willing to purchase the labor of the employees working for it, this creates ultimate market power for the prison, and means that prison employees do not have another option for work if they were to be laid off. On the other hand, a lack of change in employment indicators would be evidence that prison employees, once laid off, were able to find employment at their second-best option, which would provide evidence that prisons are not monopsonies, and there is demand for the prison employees' skills elsewhere in the market. If employees were not able to find work or if they work, they could find was at a significantly lower wage than the rate paid by the prison, per capita personal income would also be impacted.

There is also no expected effect of prison closure on real GDP but given the backlash from the local community of a prison closure about the impact of losing a prison on revenue and employment, it is important to examine the data. Additionally, if there are spillover effects of prison closure, they should be captured in one of the economic indicators. While the results are expected to be non-significant, the magnitude for rural counties is expected to be greater than for urban counties because having fewer people, fewer businesses and lower GDPs lends itself to being more impacted by changes in any local industry such as the prison industrial complex.

Data

This study investigates how the loss of a prison in a county impacts economic indicators of that county. To answer this question, a data set of relevant information needed to be constructed.

Because this analysis focuses on the county, and county-level data is harder to source than state or national level data, and there was no pre-existing dataset with all the indicators necessary to answer the question, a new data set needed to be compiled. The economic indicators of interest were real GDP, per capita personal income, total employment and the unemployment rate. Real GDP is included as a measure of the economy as a whole, and to see whether prison closure has an effect on the productivity or output of the county. Per capita personal income is included as a measure of how a prison closure impacts the individual. This study differentiates total employment and unemployment rate because workers who leave a county immediately after a prison shuts down would not be captured in the unemployment rate, as it measures the number without a job but in the labor force, and once people leave, they are no longer counted in the labor force. However, this effect may be captured by the total employment statistic, which as an aggregate number, will capture if there is a significant decrease in the number of people working in a county. If there are other spillover effects of the closure on employment, such as impacts on the local businesses that lead to layoffs, these would be captured by the unemployment rate of the county.

For this analysis, a "prison" is defined loosely and includes any correctional or detention facility without "jail" in its title, as jails serve a different purpose to the community, namely the cost to run a jail and the amount of time inmates spend at the different institutions (Barger, 2020). These titles include but are not limited to titles such as "correctional facility," "youth

detention center," and "work camp." To compile the data set for this study, a list of closed prisons published by a non-profit entitled The Sentencing Project was employed and then cross referenced with state and county websites to validate the prisons' locations and the year closed. This process revealed 70 counties with prison closures. Within their respective states, a random county generator was used to produce 11 more counties, which were checked using state and county websites to see whether they had experienced a closure – 5 had never had a prison, 5 had prison(s) but did not experience a closure, and one experienced a prison opening in the relevant time frame.

Yearly panel data was constructed for 81 counties from the years 2001-2020. The data used in this study come from several different sources. The data cover economic indicators including GDP, per capita personal income, employment, and educational attainment. Real GDP (based on 2012 dollars), population, per capita personal income and employment were all obtained from the Bureau of Economic Analysis. Unemployment rates utilized were sourced from the Bureau of Labor Statistics.

Data for educational attainment for counties was the most difficult indicator to complete, but its inclusion was necessary due to the impact that education can have on economic growth (Mankiw et al., 1992). Because of the lack of data availability, this study uses high school level attainment statistics as the measure. St. Louis FRED provided county-level high school educational attainment percentages from 2010-2020, sourced from the U.S. Census Bureau. The rest of the educational attainment information was found using Bode 2010, which estimated county level 2001-2005 numbers based on the 2000 census. The missing years, 2006-2009, were filled in with educational attainment or high school graduation rates coming from individual state and county websites. However, these numbers were not always available for every county or for

every year, and as such, 34 counties have at least one missing value in educational attainment. Population was also included in the analysis to account for the differences in county indicators that have to do with the size of the county; that is, a county with more people will likely have a larger GDP, and the other indicators may also be impacted by population.

Additionally, to test differences between rural and urban areas, a dummy variable was created to indicate whether a county was considered rural by the definition given by the Census (1=*yes* and 0=*no*). Non-rural areas are considered urban. There were 5 counties which had area that is considered to be rural, but those counties also contained a metropolitan area, and were therefore counted as urban because they experience increases GDP and population in a way that fully rural counties do not experience.

The dataset is panel data, with 81 counties observed for 20 years. The dataset contains 1,620 observations, with no missing values for any of the indicators except for educational attainment, which has 33 missing values from the years 2006-2009 in 34 counties. Without those values, the regressions are left with 1,587 observations. There were 36 counties considered to be rural and 45 counties considered to be urban, resulting in 720 and 900 total observations, respectively. However, the missing values of education impacted both rural and urban counties, such that rural counties lost 19 observations, leaving 701 observations; urban counties lost 14 observations, with a remaining 886 observations.

First, the largest variables, including GDP, population, per capita personal income and total employment were log-transformed. Unemployment rates and educational attainment were not changed.

Table 1 shows the means and standard deviations for the primary variables overall and when split into rural and urban counties (by the census definition), as well as the mean differences across urban and rural counties for each indicator.

Table 1. Means of Economic Indicators by County Type

	Rural	Urban	Total	Mean Diff. [Urban-Rural]
Number of Observations	720	900	1,620	
Percent	44.44%	55.56%	100.00%	
Number of Prisons	2.44	5.26	4.01	2.81***
	(1.98)	(4.27)	(3.72)	
Real GDP (in thousands)	5,399.82	38,748.44	23,926.83	33,348***
	(8,344.65)	(82,949.67)	(64,236.96)	
Per capita personal income	34,572.52	43,688.02	39,636.69	9,115.5***
	(9,941.66)	(21,172.74)	(17,701.60)	
Population	128,945.79	487,626.89	328,213.07	358,681***
	(168,491.94)	(552,313.56)	(462,365.70)	
Total Employment	68,991.65	346,676.65	22,3261.10	277,685***
	(98,671.77)	(528,544.23)	(422,489.75)	
Unemployment Rate	6.69	6.16	6.40	-.53***
	(2.64)	(2.14)	(2.39)	
% with High School degree	82.10	84.31	83.33	2.21***
	(9.16)	(7.22)	(8.20)	

Note: Statistics are based on county-level data from years 2001-2020. Rural counties are defined by the Census.
*p<.05, **p<.01, ***p<.001

The Census defines rural as an area that is not urban, and urban areas are defined by their population. Given this definition, the difference in average rural population being less than a third of the average urban population is unsurprising. However, there are some other key

differences between urban and rural counties that establish an expectation for rural counties to be more impacted by prison loss than urban counties. First, the average GDP of a rural county is approximately 13% of an urban county's, despite the difference in average per capita personal income being less than $10,000. Part of this can be attributed to the difference in population, but it also indicates a higher level of business output in urban counties. The average unemployment rate for rural counties is also statistically significantly higher than for urban counties, indicating that rural counties may have a harder time during economic hardship, which also favors a greater impact of prison closure on rural counties than urban counties. Lastly, the number of prisons in urban counties is significantly higher than the average number of prisons in rural counties, which may not be a big difference when taking into account the number of prisons per capita, but it also indicates that an urban county would absorb a prison closure better than a rural one, as it may have the cushioning of the other prisons to soften the loss of an industry.

The standard deviations for population and employment are higher than the average, which indicates a wide range of populations across both urban and rural counties. While these counties are grouped by urban/rural status, it is important to note that the definitions of "urban" and "rural" are loose enough that counties that look very different (both in terms of total population as well as economic output) are categorized together. Nonetheless, rural counties should be impacted more than urban counties on all the outcome variables due to the significant mean differences seen in Table 1.

Figures 2-6 show the averages of the four outcome predictors and population over the 20 years by urban counties, rural counties, and all counties. Based on the trends with the most prisons (25) closing in 2011, and 38 more closing between 2012 and 2014, prison closure's impact on these economic indicators, if significant, should be indicated by a dip (or an increase

in unemployment) in the early 2010s. That is, if there is a significant effect of prison closure on GDP immediately following the closure, given the concentration of closures in this data set centering around 2011-2015, the trends should reveal a change in those years. The same logic follows for per capita personal income, unemployment and employment. Population is not expected to change due to prison closure, however the graph is included for comparison of the trend to GDP and total employment.

Figure 2. Average real GDP (thousands) by county type

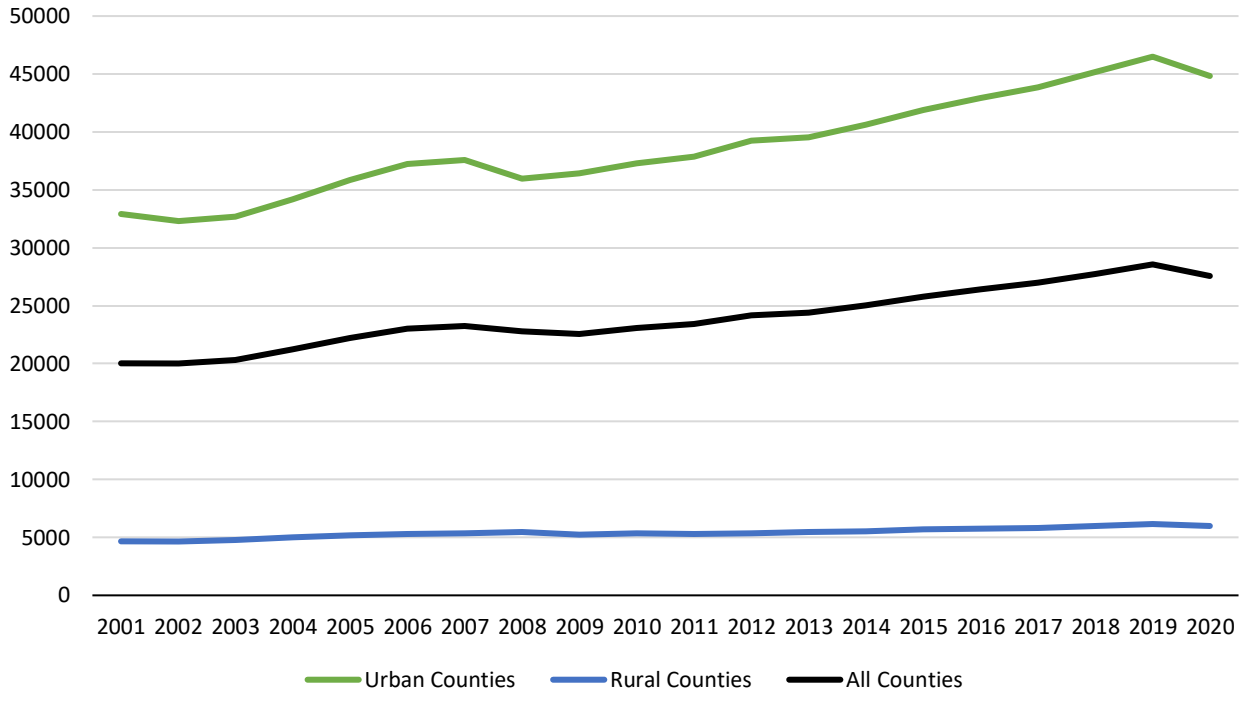


Figure 3. Average per capita personal income by county type

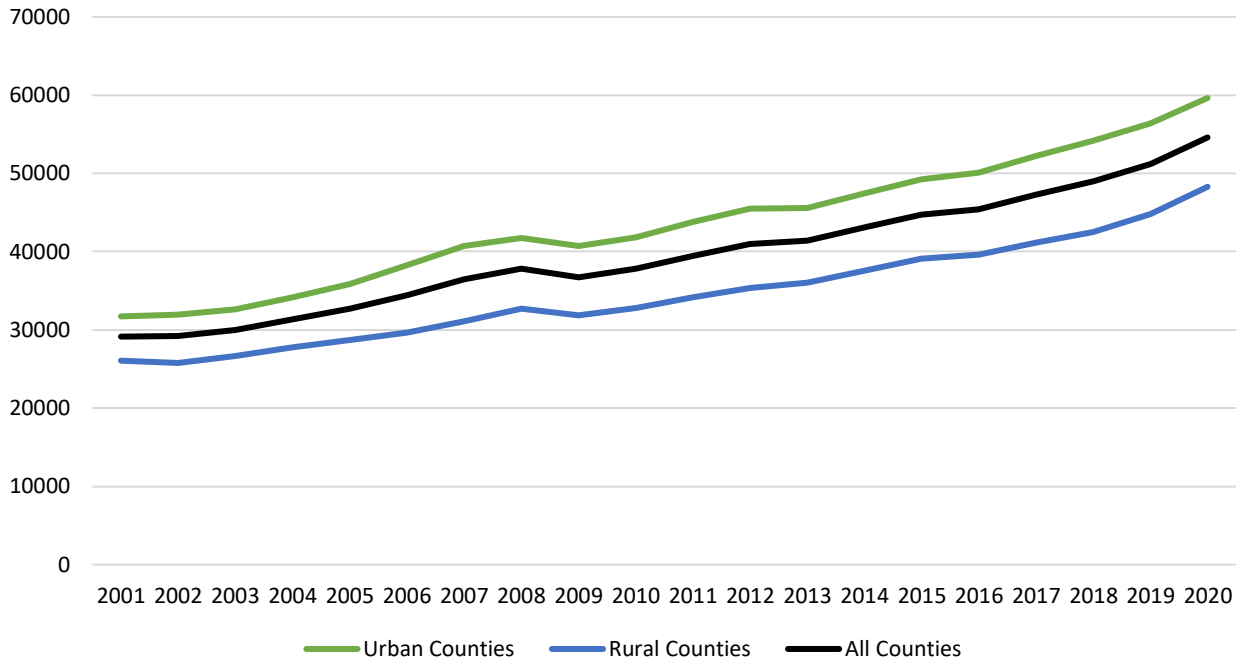


Figure 4. Average unemployment rate by county type

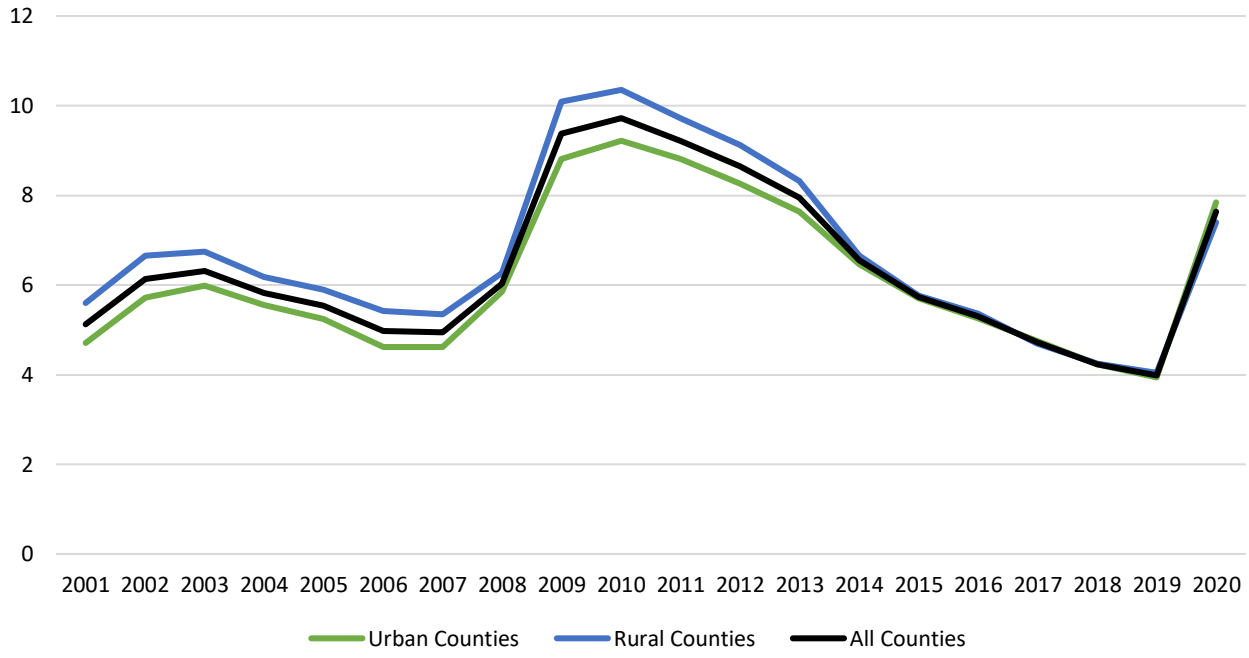


Figure 5. Average total employment by county type

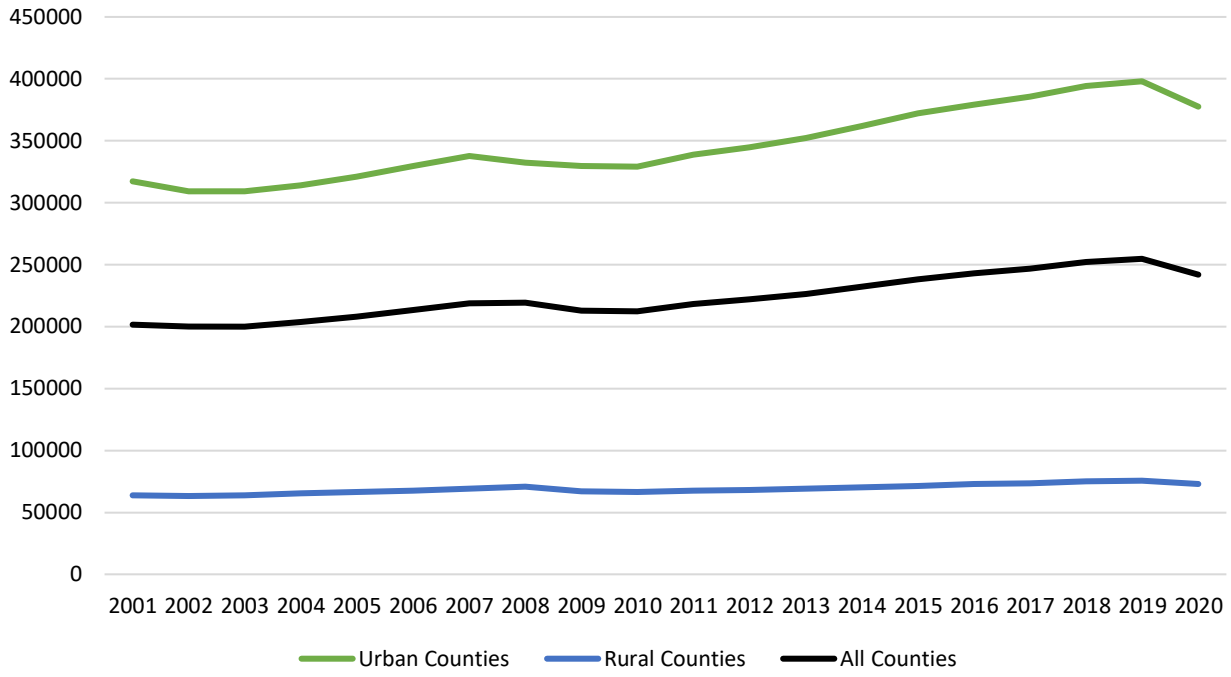
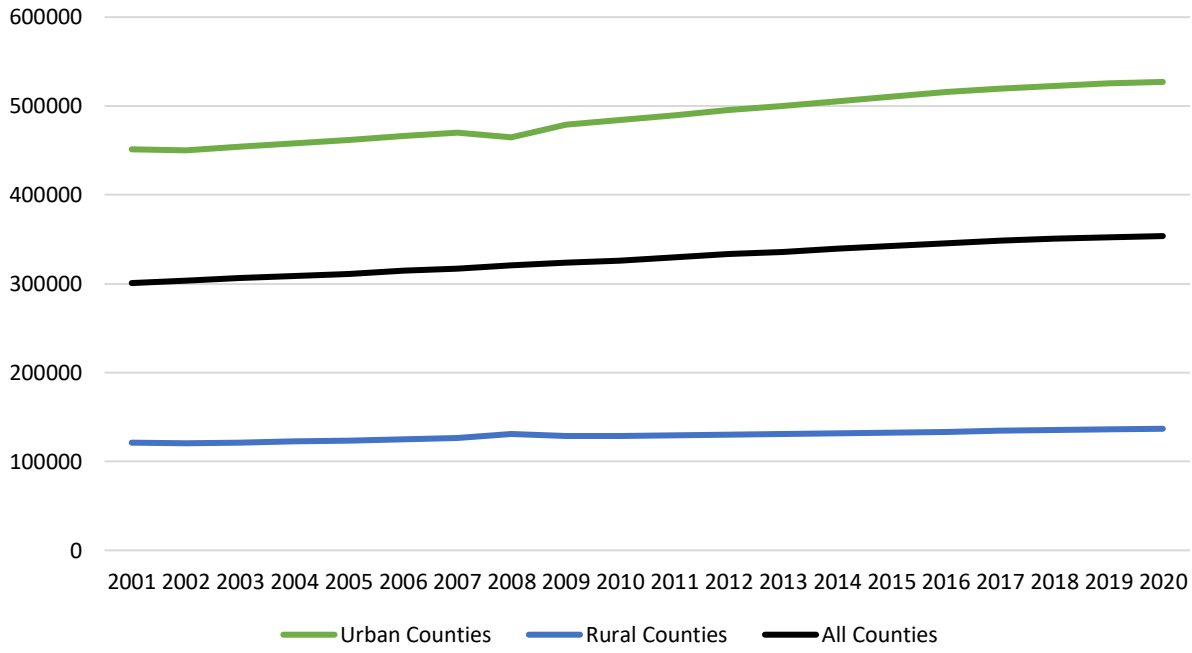


Figure 6. Average population by county type



Although rural counties experience less GDP growth than urban counties, there is not an appearance of an impact in the years where prison closures are concentrated (Figure 2). Furthermore, although unemployment fluctuates greatly for all counties, it follows the expected trend of the impact of the recession in 2008 and the pandemic in 2020, and appears to be falling during the key years of prison closure (Figure 4). Population, per capita personal income and employment all trend similarly across rural and urban counties, without an apparent impact of the recession nor an impact of prison closure concentrated around the early 2010s (Figure 3, 5, 6). This is the first bit of evidence that there is not a large impact of prison closure on these economic indicators, as the average trends do not display a change in the years of prison closure or the years immediately following.

The analysis focuses on the relationship between a change in the number of prisons in a county and economic performance, including changes in GDP, employment and per capita personal income. Dependent variables are unemployment rates, GDP, employment, and per capita personal income. There are two main predictor variables, one called “prison presence”, which is a dummy variable that indicated whether there was a prison in the county that switched to 0 when the prison closed. However, this did not fully capture the nuance of having multiple prisons and prison closures in one county, so a second independent variable was included, called “number of prisons,” which was a continuous variable that measured the number of prisons in a county in a given year. To find this number, the County Office database was used, and any facility that fit the previous criteria of a prison in this analysis and was not described as a jail was counted. Counties with no prisons and only jails were counted as 0 in the analysis, due to the difference in the goals and maintenance of jails as opposed to prisons, especially the average amount of time a person would spend in both institutions.

Methods

Panel regressions were run for every outcome variable of interest (GDP, per capita personal income, total employment, and unemployment rate). The main predictors, prison presence as a dummy variable and number of prisons as a continuous variable, were used individually for each outcome. The controls, including year, population and educational attainment, stayed the same across all regressions. Additionally, in order to determine if rural or urban counties experienced a different effect, each regression with each outcome variable and each main predictor was run for just urban counties and just rural counties, in addition to the regression with all observations.

For each regression, a fixed and random effects model was estimated, and then the Hausman test was used to determine whether a fixed or random effects analysis was more appropriate. The results of the Hausman test can be found in Table 2. Using a fixed effects model accounts for additional variation that is not due to time effects, while a random effects model assumes that the variation in the model is random and not related to the predictor or other variables. Therefore, if the Hausman test reveals a significant difference between the fixed and random effects models, the assumption is that the fixed effects model is picking up on and accounting for an omitted variable bias that the random effects model is not, and therefore, when the *p*-value of the Hausman test is less than .05, the fixed effects model is preferred. However, if the *p*-value of the Hausman test is greater than .05, the random effects model is preferred.

Table 2. Results of Hausman tests

Outcome Variable		Rural		Urban		Total	
		Chi-Sq	*p*-Values	Chi-Sq	*p*-Values	Chi-Sq	*p*-Values
Log Real GDP	Model 1	30.16	.115	3.99	1.00	98.87	.000
	Model 2	148.85	.000	12.95	.934	30.02	.118
Log Per capita personal Income	Model 3	1.00	1.00	29.61	.128	42.00	.006
	Model 4	213.5	.000	37.65	.020	50.92	.000
Log total employment	Model 5	28.52	.159	1.06	1.00	.58	1.00
	Model 6	29.01	.145	7.17	.998	6.25	.999
Unemployment rate	Model 7	22.88	.409	33.09	.061	45.30	.002
	Model 8	21.95	.462	28.16	.170	48.38	.001

Using the results of the Hausman test (Table 2), tests with a *p*-value less than .05 used a fixed effects model, and the rest used a random effects model. Once the appropriate regression was determined by the Hausman test, the regression was run using robust standard errors to correct for any issues of heteroskedasticity, and the results from the corrected models are reported in the results section.

The regression models follow this equation:

$$Outcome_{it} = \beta_0 + X_{it} * \beta_1 + \alpha_i + \mu_t + \varepsilon_{it}$$

where *i* indexes the counties, *t* indexes the time periods (years), *X* is a vector of predictor variables, including population and educational attainment, and alternative main predictors of prison presence and number of prisons, α_i represents county-specific fixed effects, μ_t represents time-specific fixed effects, and ε_{it} represents the error term. The same model is used on four outcome variables, which are logged real GDP, logged per capita personal income, logged total employment and unemployment rate.

Results

Neither of the main predictors, prison presence or number of prisons, predicted a statistically significant change in any of the outcome variables for any grouping of counties.

The first variable of interest was real GDP, which was measured as a log. Neither prison presence nor number of prisons predicted a change in logged real GDP, and this effect did not change when looking at rural and urban counties separately (Table 3). However, the coefficients of the main predictors indicate a change in prison presence or the number of prisons for rural counties would lead to over a 12% change in GDP, where the change in urban counties is only around 1%. This is consistent with the hypothesis that rural counties would be impacted more by prison closure due to the already lower GDP, and the relative size of prison impact on these economies. Despite the difference in coefficient size from urban counties, rural counties are not statistically significantly impacted by either predictor, so while the magnitude is greater, it is not enough to warrant concern for the county.

Interestingly, prior to correcting for heteroskedasticity, both the main predictors for rural counties and for all counties were all significant predictors of GDP, but the presence of prisons for urban counties was never significant. However, after correction, the results were no longer significant, indicating the model is sensitive.

Table 3. Prison presence and number of prisons on logged Real GDP

	Rural Counties		Urban Counties		All Counties	
Independent Variables	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Model 1						
Prison Presence	.127	.097	.013	.023	.086	.066
Log Population	1.037***	.058	1.142***	.0673	.928***	.131
Educational Attainment	-.002	.004	.000	.001	-.002	.002
Constant	3.153***	.739	1.933*	.799	4.532**	1.555
R^2	.9132***		.9497***		.945***	
Model 2						
Number Prisons	.129	.099	.0152	.0156	.046	.037
Log Population	.681*	.300	1.131***	.0679	1.068***	.069
Educational Attainment	-.003	.003	.000	.001	-.002	.002
Constant	6.919*	3.304	2.006**	.778	2.745***	.793
R^2	.8443***		.9463***		.937***	

*p<.05, **p<.01, ***p<.001

Note: Model 1 for Rural Counties and Model 2 for All Counties use fixed-effects estimation according to the Hausman test (Table 2); all other models use random-effects estimation.

Table 4 displays the results for the models with an outcome variable of logged per capita personal income. Once again, there is no significant impact of either primary predictor on income. These results also display a lack of impact of population or educational attainment, which indicates that there is another factor which impacts income that is not captured in this model.

Table 4. Prison presence and number of prisons on logged per capita personal income

	Rural Counties		Urban Counties		All Counties	
Independent Variables	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Model 3						
Prison Presence	.011	.014	-.011	.013	.002	.010
Log Population	.057*	.027	.074	.043	-.026	.057
Educational Attainment	-.001	.001	-.002	.001	-.001*	.000
Constant	9.559***	.311	9.529***	.504	10.644***	.667
R^2	.5307***		.5224***		.1284***	
Model 4						
Number prisons	.006	.016	-.003	.013	.001	.010
Log Population	-.039	.072	-.0198	.079	-.025	.0571
Educational Attainment	-.001	.001	-.002*	.001	-.001*	.000
Constant	10.643***	.779	10.711***	.972	10.641***	.668
R^2	.2882***		.1018***		.1331***	

*p<.05, **p<.01, ***p<.001

Note: Model 3 for urban counties and Model 3 for rural counties use random-effects estimation according to the Hausman test (Table 2), other models use fixed-effects estimation.

The most significant predictor of total employment is population (Table 5). The coefficients for all counties are close to 1, indicating a 1% increase in population will lead to about a 1% increase in employment overall. However, the coefficients for rural counties are slightly below 1, and the coefficients for urban counties are slightly above 1, indicating a better chance of employment in urban counties than in rural ones.

Table 5. Prison presence and number of prisons on logged total employment

	Rural Counties		Urban Counties		All Counties	
Independent Variables	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Model 5						
Prison Presence	.012	.015	-.004	.008	.005	.010
Log Population	.979***	.051	1.147***	.041	1.083***	.036
Educational Attainment	.000	.001	.000	.001	-.000	.000
Constant	-.526	.559	-2.436***	.507	-1.658***	.427
R^2	.9742***		.9747***		.9770***	
Model 6						
Number prisons	.006	.016	.003	.010	.005	.010
Log Population	.979***	.055	1.145***	.042	1.080***	.039
Educational Attainment	.000	.001	.000	.001	-.000	.000
Constant	-.519	.585	-2.434***	.505	-1.635***	.447
R^2	.9739***		.9743***		.9766***	

*p<.05, **p<.01, ***p<.001

Note: All models shown use random-effects estimation, according to the Hausman test (Table 2).

Table 6 reports the results of the models on unemployment rates. Once again, neither prison indicator significantly predicts unemployment. However, the coefficients indicate a much larger would-be impact of prison presence and number of prisons for rural counties than for rural counties.

Interestingly, educational attainment predicts unemployment in rural counties (Table 6), with a 1% increase in the high school degree-bearing population predicting a .04-point decrease in the unemployment rate for rural counties only. Because it was already established in Table 1 that urban counties have a significantly higher average educational attainment than rural counties, this may be a factor of that phenomenon, but it also indicates the type of employment available in both county types, and that education may make a bigger difference in employment opportunities for rural counties than urban ones.

Table 6. Prison presence and number of prisons on unemployment rates

	Rural Counties		Urban Counties		All Counties	
Independent Variables	*B*	*SE B*	*B*	*SE B*	*B*	*SE B*
Model 7						
Prison Presence	.245	.221	.004	.183	.027	.158
Log Population	.213	.186	-.243	1.46	.228	.735
Educational Attainment	-.040***	.007	.001	.011	-.014	.011
Constant	6.279**	.007	7.525***	1.896	3.595	8.717
R^2	.5807***		.5953***		.4968***	
Model 8						
Number prisons	.124	.161	.108	.060	.016	.149
Log Population	.134	.229	-.434*	.175	.229	.737
Educational Attainment	-.041***	.007	.005	.011	-.014	.011
Constant	7.067**	2.493	8.945***	1.883	3.547	8.912
R^2	.5830***		.6127***		.4910***	

*p<.05, **p<.01, ***p<.001

Note: Model 7 for all counties and Model 8 for all counties use fixed-effects estimation according to the Hausman test (Table 2), other models use random-effects estimation.

In all the models, there was no difference in significance between the two primary predictors, indicating that the results are robust. An additional robustness check was separating the counties into subgroups of urban and rural, and again a lack of change in significance of the main predictors indicates robust models.

Endogeneity concerns

There are a few endogeneity concerns with this analysis. First, states are more hesitant to close a prison in a county that isn't doing well (Chirakijja, 2022). This could bias the results upwards, as the analysis might not be showing the full picture of what a prison closure *could* do to a county. There is also an imbalance between the number of counties with a prison that closed (70), the number with a prison that opened (1), the number that never had a prison in the time period (5), and the number that had prisons open and operating throughout the entire time period and did not experience a closure (5). To avoid introducing more bias, the 10 untreated counties

all came from the states that had treated counties. However, this imbalance could still bias the results since the 10 counties may not be an accurate representation of other counties in America during the time period. Due to data availability and time constraints, this study is not able to fully account for this bias.

Additionally, prison closures aren't random events – while this study is a natural experiment, it is important to note that prisons could be closed for reasons that do or do not impact the economy that are unaccounted for in this analysis, such as policy changes or movement of prisoners from prisons to jails (Petrella and Friedmann, 2013).

Another concern is the way the main predictors are measured. Because so many different prisons are represented in this sample, and some include consolidations or partial closures (i.e., a wing of the prison is closed but not the full prison), it would be more accurate to have a measure of funding that the prison receives, its payroll, or the number of beds the prison fills as a main predictor. Due to lack of data availability, this was not an option. However, it is important to note that the main predictors, prison presence and number of prisons, do not fully account for the differences in prisons. That is, a small prison and a large prison are treated as equals in this analysis, even though they may not have the same size effect on their county economy.

Discussion

The results indicate no impact of prison presence nor number of prisons on any of the key outcomes, including real GDP, per capita personal income, total employment or unemployment. As predicted, for every outcome except income, the beta coefficients for rural counties were higher than the beta coefficients for urban counties, which shows that rural counties, with lower GDPs and population are more sensitive to change than urban counties. However, this was not a significant impact.

Population was a significant positive predictor of both GDP and total employment. Population's impact on GDP can be easily explained by previous research and the concept that more people working in an economy will lead to more output. Education was not a strong predictor of any of the outcomes, only having a significant impact on unemployment in rural counties. This could be because education is not as important to economic indicators, but it could also speak to the strength of the predictor in this analysis. The data in this study used high school attainment, which might not be a high enough level of educational attainment to make a difference – that is, attainment of a bachelor's degree might be a stronger predictor of economic outcomes. Additionally, the missing observations may have reduced the power, since they were concentrated between 2006 and 2009, which are the years leading up to the majority of the closures of the early 2010s, and dropping these observations limits the observable trend from before and consequently the understanding of how the trend changed after.

When discussing prison closure, many news articles cite the number of jobs that would be lost in the economy if the prison were to close. Although the prison may be employing local people, the impact of prison closure is not seen either on unemployment rate nor on the total employment in a county. This bolsters the previously mentioned theory which states that because guarding a prison is a job that requires training, especially for public-operated prisons, it is easier to transfer guards into a county or city where a prison has opened and give those jobs to them rather than hire and train local residents. A further consequence of this dynamic is that when the prison is shut down, those guards are less likely to stay in the county than people who were already living there, and therefore the loss of those jobs will not impact county employment indicators. Furthermore, the lower-paid administrative positions (which require much less

training) that the prisons may have provided existing residents, may also be easier jobs to replace for those individuals, meaning lower unemployment effect when the prison closes.

Overall, the results provide important insight into the relationship between the presence of prisons and economic outcomes in both rural and urban counties, namely that the concerns presented by locals in a community facing a prison shut down do not have an empirical basis. This is important to understand, especially as movements such as prison abolitionism, Black Lives Matter, and drug decriminalization prompt less punitive policies and governments across America, and prison closures continue to be scheduled, especially in California. As the prison population falls, and incarceration rates decrease, prison closures may become more common, and although governments may still face backlash from their community, this paper provides support that the economy should not be impacted on the measures of employment, GDP or personal income due to the closure.

Limitations

The first limitation that this study faced is that only 81 counties and 19 states are represented by the data, which excludes many states and counties with high crime rates and multiple prisons. Most of the data, 71 of the 81 counties, were from places where a prison had closed or opened in the 20 years of interest, which not every state or county experienced, but also may have created a selection bias since the analyzed states were predetermined by events that have already occurred. Prison closures are also not isolated events, and there may be other things impacting that state or county's employment or income trends that are not captured by the regressions, such as natural disasters or changes in policy.

This study was limited by the lack of consistent access to county-level information. This was especially true with regard to educational attainment data, which required the use of

estimates provided by Bode (2010), as well as searches of individual county and state websites for educational attainment numbers. Due to this lack of availability, high school graduation rates for the missing years were used where found. However, educational attainment and high school graduation rates are not measuring the same thing, with educational attainment measuring the number of people in an area who have reached a certain level of education, and graduation rates indicating the number of students in a certain class who managed to complete their high school degree. Despite what they are measuring, the indicator might not have been strong enough to predict economic indicators, since the directionality in the regressions seemed counterintuitive and very statistically insignificant. Using educational attainment for higher degrees than high school may have helped this issue, however the lack of consistency in data availability stunted the usefulness of adding an education measure as a control.

Future Directions

Future research can address some of the issues pointed out with this research. First, using a more consistent and higher-level educational attainment indicator or another way to measure education help to strengthen that control. It would also be useful to see how different types of prison closure, such as when a prison closes a wing or an annex and not the whole prison, or when two prisons consolidate into one, affect the economy without coding those closures the same as true closures. Being able to capture different aspects of GDP or a measure of private versus public prisons would also help narrow down where prisons are affecting GDP.

One area not measured is whether opening or closing a prison in an area impedes or promotes economic growth. This type of analysis would be helpful to understand the impact of a prison's presence beyond the immediate impact on economic indicators and would speak to the long-term effects of prisons.

The possibility for future research concerns the size of the impacted area. This study examines the impact on the county because of the availability of the data, but the impacts on the city the prison resides in could be much greater than the county predictors indicate if the city is too small for the results to be apparent. Although city-level data may be more difficult to find and measure properly, it may also show the impacts on the people living in direct proximity to the prison itself and who have the potential to be affected the most.

Conclusion

This study provides important insight into how the presence of prisons impacts local economies, specifically comparing outcomes in urban and rural counties. Regressions examining the effect of prisons in two ways reveal that closing a prison has no significant impact on a local economy through GDP, employment or personal income, in rural and urban counties alike. Therefore, this study provides valuable information and insight for policymakers and researchers interested in how a prison impacts economic indicators. These results may be especially relevant as prisons built during a crime boom continue to be less and less useful and cost effective as crime falls in the United States. As prisons lose their efficiency, the question of closing the prison arises, it is important for policymakers to understand the economic ramifications of keeping or closing these institutions. Further studies with wider scope and more time and resources for data gathering may further enlighten this issue by examining impacts on a city level and refining some of the key indicators.

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