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Inmate Recidivism as a Measure of Private Prison Performance

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The growth of the private corrections industry has elicited interest in the comparative performance of state and private prisons. One way to measure the service quality of private prisons is to examine inmates' postrelease performance. Current empirical evidence is limited to four studies, all conducted in Florida. This analysis replicates and adds to the Florida measures in a different state and enhances previous methods. It uses data for a large cohort of Oklahoma state prison inmates released between 1997 and 2001. Controlling for known covariates, multivariate survival analysis revealed comparative rates of reincarceration for inmates in multiple exposure and comparison groups. These results are unique among prior studies on this topic; private prison inmates had a greater hazard of recidivism in all eight models tested, six of which were statistically significant. Finding no empirical support for claims of superior service from private corrections, the authors discuss policy implications and prospects for future research.

Keywords: *corrections; inmate; private prison; recidivism*

The prison population in America had approximately a threefold (A. Beck, 2000) to fivefold (Irwin, 2005) increase during the 1980s and 1990s. By the end of the 20th century, almost 1.5 million persons were incarcerated in federal and state prisons throughout the United States, although the growth rate is slowing. Furthermore, many state prisons are operating at or

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above capacity (Harrison & Beck, 2005). With the growth of correctional populations, per capita state prison expenditures more than doubled between 1986 and 2001, while expenditures for building new prisons or renovating existing ones has been decreasing (Stephan, 2004). Over the past two decades, the country has increasingly turned to the private sector to deal with burgeoning prison populations.

Americans' affinity for market economy solutions and a concomitant distrust of government in general led to a belief that the private sector might outperform state governments in providing incarceration services (Shichor & Sechrest, 2002; Spitzer & Scull, 1977). Although the proportion of total state correctional operating costs allocated to the incarceration of prisoners in private facilities is relatively low at the national level (6%), some states spend a much higher portion of their corrections budgets on private prisons than the average. At 30%, Oklahoma ranked fourth among the states for the proportion of corrections operating budget spent on housing inmates in private facilities (Stephan, 2004). Furthermore, Oklahoma ranked sixth in the percentage of the total prison population housed in private prisons (Harrison & Beck, 2005). Oklahoma thus provides an excellent site to evaluate the efficacy of private prisons. In this study, we use recidivism as an evaluative measure of incarceration's effectiveness. We compare the recidivism rates of released prisoners based on the time spent in private institutions relative to public institutions and the type of facility from which prisoners are released (public vs. private). Bales, Bedard, Quinn, Ensley, and Holley (2005) note that all prior research studies (including their own) that examine recidivism as a measure of the relative efficacy of private versus public prisons have been in the state of Florida. Following their recommendation that "additional research is needed in other states to determine whether the findings are supported or contradicted" (p. 123), this study replicates but also expands on previous methods.

Issues in the Privatization of Prisons

With the growing use of private prisons to offset the pressures from prison overcrowding, two important topics can be assessed to evaluate the effectiveness of private prisons in meeting the needs of the state and the inmate: cost and postrelease performance. Privatization of corrections began to increase during the War on Drugs and the concurrently rapid expansion of prison populations around the country, leading to a search for more economical and effective ways to house inmates. This movement has brought with it

concerns about the quality of services provided by the private prison industry. The compatibility of incarceration's human service responsibility with the private prison industry's inherent profit-seeking goal has incited fears that private prisons' profit-conscious budgets will cut corners more than will allocated public budgets; such concerns have led to calls for judicial review and an ongoing ethical debate (Dunham, 1986; Wecht, 1987).

Private prison corporations purport several ways to reduce the costs of incarceration services. Blumstein and Cohen (2003), in a report funded by Corrections Corporation of America, proposed that private prison contracting leads to cost savings in the public sector due to increased accountability that is fostered by competition. In other words, private prisons save expenditure because "their existence helps control the cost of public prisons" (p. 1). In a study using 46 states as units of analysis, the authors found that private prison housing was significantly associated with reduced growth in per diem expenditures on publicly held prisoners between 1999 and 2001.

Also, private companies can allegedly build prisons more quickly and cheaply (Austin & Coventry, 2001). Austin and Coventry point out that the costs of constructing private prison facilities do not require voter approval for submission to state operating budgets, and although prisons built by the private sector reduce the initial capital outlay of the state, the long-term cost may meet or exceed the short-term savings. In addition, private prisons often reduce operating costs by offering lower pay rates and less training than their public sector counterparts (Irwin, 2005). Lappin, Kane, Saylor, and Camp (2005) compared the costs of a private federal prison and several Federal Bureau of Prison (BOP) comparison facilities of equivalent design and security level that were constructed at the same time, housing similar types of inmates. The study found that the cost of operating the prisons was essentially comparable whether the Wakenhut Corporation or the BOP administered the facilities.

Some public costs associated with private prison expenditures may go unnoticed. Although private corporations assume the costs of operating private prisons, state governments must still monitor and oversee the facility operations (Austin & Coventry, 2001; Shichor & Sechrest, 2002). In addition, costs may be incurred due to increased prisoner and staff lawsuits that result from reductions in services or from civil rights violations. Overall, the anticipated savings of private correctional services has been strongly challenged. Austin and Coventry (2001) estimate that rather than the expected 20% cost reduction, the average savings has been closer to only about 1%.

The other evaluative aspect of an emergent private prison industry is the degree to which the private industry's services have compared in quality to

those of the public sector. In a study of three women's prisons in New Mexico, Logan (1992) examined the quality of confinement, using an index with measures of security, safety, order, care, activity, justice, conditions, and management. The author concluded that, overall, the private prisons fared better on almost all dimensions than either the state or federal prisons. However, the finding of superior performance by private prisons held true only when examining staff opinions. From inmates' perspectives, state prisons were preferable to private prisons (Logan, 1992). Also noteworthy is that care was the one dimension in which Logan found that state prisons exceeded the performance of private prisons. This issue had also been noted in the mid-1980s, as privatization started increasing. Dunham (1986) argued that some private facilities, in their efforts to reduce costs, could be violating prisoner rights. Furthermore, in his review of a book by James et al., Debro (1998) reported that a British study did not suggest that private prisons were more efficient, although they tended to be newer.

Lappin et al. (2005) evaluated the performance of private prisons between a federal facility maintained by Wackenhut and several BOP comparison facilities of equivalent design and security level that were constructed at the same time, housing similar types of inmates. The Wakenhut facility's service was compared to the BOP prisons via staff and inmate surveys and through inmate misconduct incidents. In comparison with the BOP prisons, staff surveys in the Wackenhut prison indicated lower-than-expected scores on institutional operations, organizational commitment, and perception of fire hazard but higher institutional commitment. Although the authors note that the Wakenhut prison was required by a BOP contract to pay employees more than was being paid at other Wackenhut facilities, the private facility still had higher turnover than the comparison BOP prisons. An inmate survey indicated that prisoners perceived worse sanitation and food services at the private facility but that security and gang-activity levels were about the same. In addition, the Wackenhut prison had higher rates of most kinds of inmate misconduct, including all types of misconduct considered together, than was statistically expected in comparison to the BOP facilities. Because misconduct data are influenced by policy decisions and the ability to detect misconduct when it occurs, the study also examined data from random drug tests (providing an indication of the actual rate of drug use in each facility), which indicated a higher-than-expected level of drug use at the private prison in comparison to the BOP facilities.

Another way in which the privatization of prisons could affect both the cost and the quality of services provided, and thus the ability to rehabilitate

prisoners, involves mobility. Because private prisons are profit maximizing by definition, keeping bed occupancy high (as close to capacity as possible) takes precedence over the quality or continuity of services. Inmates who are transferred to maximize occupancy may find themselves in different states with different policies. After such interstate transfers, court-mandate treatment may not be provided, visitation may become almost impossible, and nonviolent offenders may find themselves ill-classified into higher security levels with more violent offenders. Providing adequate monitoring from the jurisdiction of origination could become cost prohibitive, and even intrastate transfers could disrupt rehabilitative programming (Shichor & Sechrest, 2002).

Recidivism

Comparing recidivism rates is one way to assess the relative performance of private and public prisons and is the focus of the current study. Farabee and Knight (2002) point out that Florida's private prisons have higher rates of academic, vocational, and substance abuse program enrollment and completion, which could lead to better postrelease performance. However, there have been relatively few studies in the United States comparing recidivism rates between public and private prisons. In addition to the paucity of research on this topic, comparisons of past studies are methodologically challenged by the fact that multiple operational definitions exist for recidivism (Jancic, 1998).

Although the concept of recidivism can generally be defined as the reversion or relapse to criminal acts of an offender who has been subject to punitive sanctions or rehabilitative treatment for previous conduct, such reversions or relapses can be measured as rearrest, reconviction, reincarceration, or even absconding (Maltz, 1984). In addition, the use of different measures of time between release and the recidivistic event can confuse the interpretation of data. Some jurisdictions count the occurrence of rearrest or new offense as the date of recidivism, whereas others use the date of conviction (A. Beck, 2001).

A study of Maltese prisoners used both reconviction and reincarceration as measures of recidivism (Baumer, 1997), and a recent Department of Justice report used four different measures including new arrest, conviction for a new offense, resentencing to prison on the original charges, and resentencing to prison on a new sentence (Langan & Levin, 2002). The authors examined a sample of 33,796 (representative of 272,111 released prisoners

from 15 states in 1994), finding slightly more than half reincarcerated for a new conviction (25.4%) or a parole violation (26.4%) 3 years after release, although this overall rate dropped by about one fifth (from 51.8 to 40.1) when California, which has an unusually high return-to-prison rate, was excluded (Langan & Levin, 2002).[1]

In addition, other measures of offenders' postrelease performance, including personality change, attitude improvement, employment success, and family relations, can act as indicators of recidivism (Waldo & Griswold, 1979). Nonetheless, whether a former inmate reoffends or returns to prison is perhaps the most important measure of success or failure, and thus this study examines Oklahoma prison inmates using return to prison as the measure of recidivism. We believe that this measure is an especially revealing definition because reincarceration includes the first two measures, as well as technical violations of parole. Also, if there is any degree of generality in the phenomena related to a return to criminal behavior, factors predicting a greater likelihood of returning to prison should also tend to predict a greater likelihood of being rearrested, reconvicted, or absconding.

Predictors of Recidivism

A brief consideration of recidivism's known correlates may enhance our ability to interpret the effects of control variables when comparing private and public prison inmates, and past research has confirmed the usefulness of various statistical modeling techniques to identify and evaluate a number of consistent predictors. In one study, computerized models actually predicted recidivism better than parole boards making clinical decisions did (Hassin, 1986). From the perspective of rehabilitation goals, individual clinical assessments might be preferable, but from the perspective of crime prevention, statistical models may give the most pertinent information. It is noteworthy that much of the error in the statistical model resulted from false positives (i.e., predicting recidivism when it did not occur; Hassin, 1986).

The characteristics associated with recidivism tend to be very similar to the traits that predict offending in general: age, race, sex, and prior criminal behavior (J. Beck & Hoffman, 1976; Harer, 1994; Jones & Sims, 1997). One study of prison releases in North Carolina found that being younger, single, and African American was associated with a greater likelihood of recidivism (Jones & Sims, 1997), and a study of released federal inmates found an inverse association with age. In other words, even when controlling for prior criminal histories, the likelihood of returning to prison

decreased as age increased (Hoffman & Beck, 1984). The literature regarding race as a predictor of recidivism is mixed. Some studies indicate that Whites are less likely than non-Whites to return to prison (A. Beck & Shipley, 1989; Harer, 1994), whereas others do not find a race-recidivism association (Orsagh & Chen, 1988). The relationship between gender and recidivism is somewhat clearer. Virtually all studies comparing rearrest or reincarceration between men and women find substantially higher recidivism among the former (A. Beck & Shipley, 1989; Jones & Sims, 1997; Langan & Levin, 2002; Ulmer, 2001). Meanwhile, uncertainty exists about the relationship between education and recidivism. Some research indicates that high school completion and college are related to a reduced likelihood of recidivism (A. Beck & Shipley, 1989; Brewster & Sharp, 2002; Ulmer, 2001). However, research in Oklahoma has indicated that completion of a vocational-technical program may increase the likelihood of recidivism (Brewster & Sharp, 2002; see also Chown & Davis, 1986), whereas Maguire, Flanagan, and Thornberry (1988) reported that higher education also increased the risk of recidivism.

In addition to demographic variables, several legal and behavioral variables merit consideration. Prior offending strongly predicts the likelihood of reoffending, and some evidence exists for an association between length of incarceration and recidivism (Baumer, 1997; Orsagh & Chen, 1988), although J. Beck and Hoffman (1976) failed to observe any predictive strength in amount of time served. Offense types also appear to be related to the risk of returning to prison, with property offenders being more likely than violent and sex offenders to recidivate (Jones & Sims, 1997; Petersilia, 1985). Lastly, the type of release also appears to be associated with inmates' postrelease performance. Spivak and Damphousse (2006) recently found that being paroled or released to probation, as opposed to being discharged without postrelease supervision, increased the hazard of recidivism, and being released to probation (via a split sentence) led to an especially high hazard of reincarceration. However, none of these studies examined the relationship between recidivism and having served in private versus public prisons.

Recidivism and Private Prisons

All of the previous research comparing the recidivism of public and private prison inmates has been done in the state of Florida, and all four studies conducted there used data from the Florida Department of Corrections (FDOC). The first three analyses found some degree of support for a lower

rate of recidivism among private prison inmates (Farabee & Knight, 2002; Lanza-Kaduce & Maggard, 2001; Lanza-Kaduce, Parker, & Thomas, 1999), whereas the most recent found no relationship (Bales et al., 2005).

The first study compared 12-month recidivism rates for 396 male inmates (representing 198 matched pairs) released from public and private prisons. Inmate pairs were matched for age, race, and number of prior incarcerations and were tracked for 1 year after release. Although no differences were found for technical violations and time to rearrest, a greater overall proportion of public prison releases recidivated when all possible measures of recidivism were considered (Lanza-Kaduce et al., 1999). The FDOC expressed concern with the authors' methodology, however, citing the small sample size and limited criteria for matching inmates (Austin & Coventry, 2001).

Lanza-Kaduce and Maggard (2001) then performed further analyses on a subset (149 pairs, more closed matched for age than the original 198 pairs) of the same matched pairs. Over a longer follow-up period of 4 years, the authors confirmed the previous finding of a lower rate of reimprisonment among the private prison releases, this time for both technical violations and new offenses. Charles Thomas, director of Private Corrections Project, which undertook the study, was later penalized by the Florida Ethics Commission due to the large consulting fees he had received from the private corrections industry, prompting suspicion that the conclusions drawn by Lanza-Kaduce and colleagues (1999, 2001) may have reflected a potential conflict of interest (Greene, 2003).

Farabee and Knight (2002) improved on the previous studies' methods in several ways. The authors used a significantly larger sample size (8,848), matched the pairs across more criteria (adding offense type, custody level, education, and time served), and expanded the categorical definition of private and public inmate groups from release facility to facility in which the inmates spent the final 6 months of incarceration. Across a 3-year follow-up period, a proportional hazard regression model indicated no difference in recidivism among male inmates from private and public prison groups but did find a difference for female inmates. Women in the private prison group were 25% less likely to reoffend and 34% less likely to be reincarcerated than were those in the public prison group.

Most recently, a carefully designed study by Bales et al. (2005) compared recidivism of inmates released from public and private correctional facilities in Florida between 1995 and 2001. The authors substantially improved on the three prior methods by designing measures to capture the degree of inmates' exposure to private and public prisons. They noted that

the previous research had defined public and private prison inmate release groups according either to the release facility (Lanza-Kaduce & Maggard, 2001; Lanza-Kaduce et al., 1999) or by the facility where the inmate spent his or her last 6 months (Farabee & Knight, 2002). Both of these methods could misclassify an inmate who had spent the majority of his or her sentence in one type of facility but who was transferred and subsequently released from the other. When considering that such transfers may have occurred for disciplinary reasons or other treatment concerns, the extent to which unintentional bias may be introduced into data that used such limited categorical definitions becomes clear. Bales et al. (2005) provided a more representative measure of public versus private incarceration by including categories defined by the amount of time inmates spent in each type of facility. This quasi-experimental design included multiple treatment and control groups coded by type of release facility, whether the inmate had spent any time in public and/or private prisons, and the amount and proportion of time spent in each. In a follow-up period of up to 60 months, the authors found no significant difference between any of the treatment and control groups for adult male, adult female, or youthful male offenders (Bales et al., 2005).

Private Prisons and Recidivism in Oklahoma

In this article, we replicate and expand on the study by Bales et al. (2005) using Oklahoma data. Several studies have been conducted on recidivism in Oklahoma, but none have focused on comparisons of private and public facilities (cf. Brewster & Sharp, 2002; Chown & Davis, 1986; Spivak & Damphousse, 2006). As we noted earlier, Oklahoma is an excellent location for a comparative evaluation of recidivism rates for public versus private prison inmates. The state ranks fourth in incarceration rates (Harrison & Beck, 2005) and has an unusually high proportion of its inmates in private prisons (Harrison & Beck, 2005). This last fact is important because the impact of privatization on corrections should be greater in states that place a larger proportion of its inmates in private facilities.

Also particular to Oklahoma is the security-level structure of the private prison sector. The private prisons with which the Oklahoma Department of Corrections contracts for bed space are all medium-security facilities. Medium-security correctional institutions are defined in Oklahoma as having particular fencing and lockdown capability requirements, including individually locking cell doors and electronically monitored perimeters. The private prisons in Oklahoma have all of these features, which are also

present to the same standards in public facilities at the medium-security level. Thus, when this study compares inmates on the basis of their relative time spent in public versus private prisons, the comparison will be between very equivalent types of facilities (private medium-security-level facilities and public medium-security-level facilities).

Part of this study replicates that of Bales et al. (2005), using treatment and control group categories (which in this study are called exposure and comparison groups) in a quasi-experimental design that allows for the evaluation of inmates' private prison experiences with their postrelease performances. We control for age; education; race; prior incarceration; offense type; probation, parole, or discharge release; sentence length; time served; number of days in a private medium-security prison; number of days in a public medium-security prison; and proportion of sentence served. In addition, we expand on Bales et al.'s study by using measures of the proportion of time served in private facilities and proportion of time served in pubic facilities as continuous independent variables to predict recidivism.

Data

The data for this study were originally derived by the Oklahoma Department of Corrections and were made available to us by the Oklahoma Criminal Justice Resource Center. The Oklahoma Department of Corrections compiled 27,094 release records between June 1, 1997, and May 31, 2001. Releases from the Regimented Inmate Discipline (RID) program were then deleted (3,686). RID is a special boot-camp unit in which young offenders serve a sentence of only 3 to 6 months in the intensive program and are then reevaluated for special release. All regular receptions to the Department of Corrections have felony sentences of at least one year, as required by state statute. After eliminating an additional 294 cases for missing values on one or more of the variables, 23,114 release records were left for analysis. These records comprise 22,359 actual inmates who left prison during the period. More release records than inmates exist because some of the inmates who left prison recidivated, served another term of incarceration, and left prison again during the 4-year period. Each of the releases is considered a separate case, or observation, and each release observation represents the movement of an inmate from the legal status of incarceration either to being completely discharged with a closed record or to probation or parole supervision. For each of these releases, reception was matched by inmate identification number to determine if the offender returned to prison at any time between that record's release date and May 31, 2004.

For all release observations, Table 1 shows the descriptive breakdown of categorical variables in number of cases and percentages of the total. Oklahoma incarcerates a greater proportion of women than do most states, reflected in the table's sex ratio, with about 15% of releases being female inmates. Note that slightly more than half the releases were of nonminority offenders, and slightly less than half of the releases were of offenders with less than a high school equivalency diploma. Of all releases, about three fifths include inmates being released from prison in Oklahoma for the first time, whereas almost one quarter are being released for the second time, and only about one in seven releases during the period are for the offender's third or subsequent release. The largest single offense category is for drug offenses, followed by property, violent, and sex offenses. These are the offense categories recorded at the most recent reception to prison prior to the release date of that case (reception dates are tracked as early as the 1950s, and although some inmates were being released after two decades or more, most served an average of about 2.5 years). Although only 5.6% of releases were offenders who had been most recently received for a sex offense, a total of 7.4% had ever been convicted of a sex offense in the past (including the most recent), even if they only received probation for the prior sentence. In addition, whereas 18.8% of releases consisted of inmates who had been most recently received on a sex or violent offense, 34.2% of releases consisted of inmates who had at least one sex or violent felony conviction in the past (including the most recent), even if they were not incarcerated for prior convictions. Slightly more than half of releases were to "the street," or discharges without supervision (due to completion of sentence), whereas 29.4% and 11.8% were released to probation and parole supervision, respectively.

Ninety-one offenders serving life sentences were paroled during the 4-year observation period of prison releases, and this variable is included to determine whether these inmates have worse postrelease performance than other paroled inmates, controlling for offense type, length of stay, and other possible intervening variables. About one third of all releases during the period resulted in a return to prison before May 31, 2004.

Table 2 shows descriptive statistics for the continuous variables.[2] Age in years was calculated for each inmate at the time of release, with a mean age of about 34 years. *Sentence length* refers to the length of the sentence (in years) for the offense at reception, the same offense indicated in the categories in Table 1. *Time served* refers to the actual time spent in prison, from the most recent reception to the release date of that case. Time to recidivism or censor is a measure of the delay from release date to either the date the

Table 1
Univariate Descriptive Statistics of Categorical Variables

	Cases	Percentage
Sex		
Male	19,661	85.1
Female	3,453	14.9
Ethnicity		
Caucasian	13,024	56.3
African American	7,158	31.0
Native American	1,838	7.9
Hispanic	1,006	4.4
Other	88	0.4
Education		
High school dropout	11,127	48.1
High school equivalency	3,194	13.8
High school diploma	5,361	23.2
Vocational-technical	1,001	4.3
Some college, associate's	1,888	8.2
College graduate, 4-year	543	2.4
Previous incarcerations		
None	14,235	61.6
1	5,513	23.9
2	2,171	9.4
3 or more	1,195	5.1
Offense category		
Drug	9,812	42.5
Property	8,946	38.7
Violent (excluding sex)	3,043	13.2
Sex	1,313	5.6
Cumulative sex and violence		
Ever had sex offense in Oklahoma	1,698	7.4
Ever had violent or sex offense in Oklahoma	7,915	34.2
Release type		
Discharge (no supervision)	9,532	58.8
Probation (from split sentence)	6,785	29.4
Parole	2,747	11.8
Lifer		
Yes	91	0.4
No	23,023	99.6
Recidivated		
Yes	7,270	31.5
No	15,844	68.5
Spent any time in private prison		
Yes	3,802	16.4
No	19,312	83.6

offender returned to prison (for the 31.5% who recidivated) or to the end of the tracking period (May 31, 2004) for those who did not recidivate by that time. The proportion served is simply the total time served divided by the sentence length, giving the proportion of the original sentence length spent in prison; this method is repeated for proportion served in private medium-security prisons and proportion served in public medium-security prisons. Released inmates tended to have served a bit less than half their sentences. Median scores for these variables tend to be smaller than their respective means due to outliers, especially in the case of days and proportions of time spent in public and private medium-security facilities. Median values of zero here indicate that more than half the inmates did not serve time in private medium-security facilities or public medium-security facilities.

Method

We use a Cox proportional hazards survival regression analysis to evaluate the relationships between a number of independent measures and the dependent criterion of recidivism. There are several types of survival analyses, all of which are ideally suited to longitudinal data in which the occurrence of events can be measured both by whether the event occurred and how long it took for the event to occur. In biostatistics, survival analysis is frequently used to evaluate biological events, such as death, as a function of whether the event occurred before the end of the study and, if so, how long after some initial treatment point the event occurred. In the study of postrelease offender performance, we frequently know whether someone has recidivated before the end of an observation period and how long after release this happened. If we were to use logistic regression to predict the yes-no occurrence of the event, we would not capture the impact of long versus short delays. Presumably, returning to prison after 2 years suggests a greater inclination to good release performance than does returning after only 2 months. We could conduct a standard regression with time from release to return as a continuous dependent variable, but this method would necessitate either deleting the censored cases (those that did not recidivate before the end of the study) or treating their time scores as if they had recidivated. Either strategy would provide less adequate information than a survival technique (Allison, 1995).

Survival analysis takes into account the two dependent variables, delay until the event, and whether the event occurred; adjusts for censored cases;

Table 2
Univariate Descriptive Statistics of Continuous Variables

Variable	Mean	Standard Deviation	Median
Age (years)	34.8	9.9	34.0
Sentence length (years)	6.6	7.1	5.0
Time served (years)	2.6	2.7	1.71
Time to recidivism or censor (years)	4.05	1.71	4.07
Days in private medium-security prison	72.9	210	0
Days in public medium-security prison	201	502	0
Proportion served in private medium-security prison	.083	.228	0
Proportion served in public medium-security prison	.145	.273	0
Proportion of sentence served	.48	.74	.38

Note: Please see Note 2 for a detailed explanation of the data.

and generates a hazard function. The hazard is "a dimensional quality that has the form *number of events per interval of time*, which is why the hazard is sometimes called a rate" (Allison, 1995, p. 17).

The Cox proportional hazards model is a form of survival analysis that has become popular among researchers who used to use parametric regression models that required choosing a specific distribution. One of the advantages of the Cox method is that is it semiparametric and thus more robust than other methods (Allison, 1995). The procedure, conducted via the SAS system, produces coefficients and odds ratios that will allow interpretations of the differences in recidivism hazard for different sets of predictor variables.

To evaluate the relative differences in postrelease performance between inmates who served to varying degrees in private prisons, the analysis in this study uses a quasi-experimental design following the approach of Bales et al. (2005). Separate regression models for each exposure and comparison group are defined in Table 3. These groups compare inmates with private versus public prison experiences, which are as inverted as the data allow, and attempt to capture as much variation of experience in group levels A1 through C1. Groups D1 and D2 then revert to a traditional secondary analysis approach, simply using proportion of time spent in public versus private facilities as continuous variables to predict hazard of recidivism.

The regression models take into account 8 exposure and comparison and 16 control variables in the prediction of two dependent variables. Table 4 defines the coding of these measures as used in the analyses. Offense types

Table 3
Models for Analysis

Model	Exposure Group Definition	Comparison Group Definition	Excluded Cases
A1	Released from private medium	Released from public medium	Inmates released from maximum, minimum, and community facilities
A2	Released from private medium and served at least 6 months in private medium and served less than 6 months in public medium	Released from public medium and served at least 6 months in public medium and served less than 6 months in private medium	Inmates released from maximum, minimum, and community facilities; inmates who did not serve at least 6 months in private medium or public medium; and inmates who served 6 months or more in both
B1	Served at least 25% of time in private medium or at least 6 months in private medium and served no time in public medium	Served at least 25% of time in public medium or at least 6 months in public medium and served no time in private medium	Inmates who served in both public and private medium and inmates who did not serve at least 25%, or more than 6 months, at either
B2	Served at least 50% of time in private medium and less than 25% of time in public medium, or at least 12 months in private medium and less than 6 months in public medium	Served at least 50% of time in public medium and less than 25% of time in private medium or at least 12 months in public medium and less than 6 months in private medium	Inmate that spent 50% in either public or private medium and more than 25% at the other, inmates who spent at least 12 months in one but more than 6 months at the other, and inmates who did not serve either 50% or 12 months in either
B3	Served at least 75% of time in private medium or at least 12 months in private medium and less than 3 months in public medium	Served at least 75% of time in public medium or at least 12 months in private medium and less than 3 months in private medium	Inmates that served less than 75% in either public or private medium and who served less than 12 months at either, and inmates who served 12 months or more in either but more than 3 months in the other
C1	Served any time in private medium	Served no time private medium	No inmates excluded
D1	All releases, with proportion of time served in private medium-security prison (proportion private) and proportion of time served in public medium-security prison (proportion public) as independent treatment variables		
D2	Only releases who spent any time in either private or public medium-security prison, with proportion of time served in private (proportion private) and proportion of time served in public (proportion public) as independent exposure variables		

were coded as dichotomous dummy variables for property, drug, sex, and violent (other than sex) offenses. The variable for property offense is left out of the model so that the variables drug offense, sex offense, and violent (not sex) yield coefficients and odds ratios that indicate the hazard of recidivism for having been sentenced to a drug offense at reception (as opposed to a property offense), a sex offense (as opposed to a property offense), and a violent (other than sex) offense (again, as opposed to a property offense), respectively. The type of release is coded with two dummy variables, release to parole and release to probation, which test the hazard of recidivism for being released to parole (as opposed to discharge, the omitted dummy variable) and released to probation (again, as opposed to discharge).

Because no variable is available for institutional misconduct or other direct measures of institutional performance, a proxy is coded for the survival analysis. The variable proportion served indicates the proportion of the inmate sentence that he or she actually served in prison. Inmates with better institutional performance (who get fewer misconduct citations) earn more good-time credits in the Oklahoma Department of Corrections' earned credit system; thus, a greater proportion of sentence served indicates better behavior. A recent truth-in-sentencing statute that went into effect for violent offenses (requiring that good-time credits not reduce the time served to less than 85% of the original) was enacted after the most recent release considered in the analysis and so should not affect this variable in our study.

The variable times incarcerated indicates the number of times the inmate has been incarcerated in Oklahoma (including the current) and serves as a measure of past offense history, whereas *sent*, as the original sentence length at reception, may reflect judges' perceptions of offense severity and prior record at the time of sentencing. The variable months incarcerated measures length of stay in months; this measure helps to evaluate how time in prison relates to postrelease performance when controlling for the other correlates that could confound any effects, such as age and sentence length. The variables gender and minority are demographic control variables coded as simple dichotomies.

One of the two dependent variables in the hazard function is days out, which measures the days from release to either recidivism or, if the offender did not recidivate between the release date and May 31, 2004 (the censor date), the number of days between release and censor. The other dependent variable is event, coded as 1 if the release resulted in a return or zero if censored. As described above, the Cox regression method combines the prediction of both dependent phenomena into an overall recidivism hazard risk.

Table 4
Variables in the Regression Models

Independent treatment variables	
Group A1	Exposure group = 1, comparison group = 0
Group A2	Exposure group = 1, comparison group = 0
Group B1	Exposure group = 1, comparison group = 0
Group B2	Exposure group = 1, comparison group = 0
Group B3	Exposure group = 1, comparison group = 0
Group C1	Exposure group = 1, comparison group = 0
Proportion private	Proportion of time served in private medium-security facility
Proportion public	Proportion of time served in public medium-security facility
Independent control variables	
Age	Age in years
Gender	Male = 1, female = 0
Times incarcerated	Number of times incarcerated, including current
Education	High school dropout = 1, GED = 2, high school graduate = 3, vocational-technical = 4, some college or associate's = 5, 4-year degree = 6
Minority	Caucasian = 0, else = 1
Drug offense	Drug offense at reception = 1, else = 0
Sex offense	Sex offense at reception = 1, else = 0
Violent (not sex)	Violent offense at reception = 1, else = 0
Sex ever	Ever convicted of a sex offense = 1, else = 0
Violent ever	Ever convicted of a violent or sex offense = 1, else = 0
Release to parole	Released to parole supervision = 1, else = 0
Release to probation	Released to probation supervision = 1, else = 0
Lifer	Life sentence at reception = 1, else = 0
Sentence length	Sentence length in years
Months incarcerated	Months from reception to release
Proportion served	Proportion of sentence served
Dependent variables	
Days out	Days from release to (recidivism or censor)
Event	Recidivated = 1, censored = 0

Prior to analysis, a few considerations should be noted about the inmate data and the control variables. First, this study involves only adults; there are no juveniles. Furthermore, recidivating would be restricted to an operational definition of returning to prison and would not consider rearrest. Also, selection effects may well influence group differences and similarities. Persons released to parole supervision have been approved by the Oklahoma Pardon and Parole Board, whereas persons who are discharged to the street on completion of their sentences do so regardless of evaluation

by correctional authorities. Inmates discharged to probation supervision are released to the suspended portion of a split sentence, which may reflect judges' perceptions of the extent to which offenders require additional supervision after prison. Finally, inmates released to probation and parole supervision have more opportunities to return to prison than do inmates released to nonsupervised discharge. While on probation or parole, offenders can be returned to prison for a technical violation of their supervision, whereas discharged offenders can only be returned by being convicted of a new offense. In 2002, for example, of all probationers and parolees returned to prison in Oklahoma, 63% of the returning probationers and 83% of the returning parolees were technical violators. This higher opportunity for failure may have influenced past comparisons between probation-parole performance and postdischarge performance.

Results

To appraise the general extent of variation in the control variables between inmates serving in private and public prisons and to obtain a preliminary perspective of how these populations may differ, Table 5 presents bivariate descriptive measures for each of the variables in the private and public prison categories of Model B3. This model represents a relatively pure measure of exposure and comparison between private and public prison exposure and contains the most salient category criteria. Inmates included in this model spent a substantial proportion of their time in one type of facility and a minimal amount of time at the other: at least 75%, or at least 12 months, in one of either private or public medium-security facilities, with less than 25%, or fewer than 3 months, in the other.

Inmates who spent more time in private prisons tended to be younger and were slightly more likely to be racial minorities and drug offenders; this population consisted of a slightly smaller proportion of men than was the case for public prisons. Although they appear to be less likely to be sex offenders, the proportion who have ever had a violent offense is not significantly different. Those with more time in private prisons were also more likely to be serving split sentences (release to probation), had substantially shorter average sentences and time served, and served a smaller proportion of their sentences than did their public prison counterparts. They were more likely to recidivate, and although this difference appears with only modest significance ($p = .04$), an additional analysis of men and women separately (not presented) indicated that both the strength of relationship and the

Table 5
Descriptive Statistics of Public and Private Inmates: Exposure and Comparison Groups for Model B3, Means and Proportions With *t* Tests and Chi-Square as Indicated

		Significance	Public	Private
Age	*t* test	***	35.48	31.75
Gender (male)	χ^2	***	92.0%	83.6%
Times incarcerated	*t* test		1.64	1.60
Education	*t* test	***	4.96	4.51
Minority	χ^2	**	47.6%	52.2%
Drug offense	χ^2	**	25.7%	30.6%
Sex offense	χ^2	***	11.7%	7.2%
Violent (not sex)	χ^2		23.5%	25.0%
Sex ever	χ^2	***	15.3%	10.6%
Violent ever	χ^2	**	57.8%	59.4%
Release to parole	χ^2		11.5%	8.9%
Release to probation	χ^2	***	23.1%	28.3%
Lifer	χ^2	**	0.95%	0.25%
Sentence length (years)	*t* test	***	10.2	5.5
Months incarcerated	*t* test	***	57.0	25.7
Proportion served	*t* test	***	0.65	0.45
Days out	*t* test	***	1,468	1,286
Event (recidivated)	χ^2	*	29.8%	32.8%

*$p < .05$. **$p < .01$. ***$p < .001$.

directionality were affected by gender. Men who spent more time in private prison were more likely to recidivate (35.1% to 30.1%, $p = .0010$), whereas women who spent more time in private prison were less likely to recidivate, although the small number of women in the sample rendered this last difference insignificant (21.2% to 26.8%, $p = .1237$).

Each of the eight models corresponds to a proportional hazards regression presented in Table 6. With each exposure and comparison group and control variable is a hazard ratio for predicting the combination of days out and event**.** Hazard ratios are included in the table instead of regression coefficients because the hazard ratio has a directly meaningful interpretation and because the coefficients can be easily calculated from the hazard ratio. The formula for converting between the regression coefficient and the hazard ratio is

$$[e^{\text{regression coefficient}(\beta)} = \text{hazard ratio}], \text{ or } [\log_e \text{hazard ratio} = \text{regression coefficient } (\beta)].$$

The hazard ratios can be interpreted for 0 to 1 dummy variables as "the estimated hazard for those with a value of 1 to the estimated hazard for those with a value of 0 (controlling for the other covariates)" (Allison, 1995, p. 117). For example, in Model C1 the estimated ratio for gender is 1.362, which means that (because 1 = male and 0 = female) the hazard of recidivism for men is about 36.2% higher than the hazard for women. In the same model, the estimated hazard of recidivism for those who have ever been convicted of a sex offense in Oklahoma is only 72.2% as high as the hazard for those who have never been convicted of a sex offense.

For continuous independent variables, the results can be interpreted "by subtracting 1.0 from the risk ratio and multiplying by 100. This gives the estimated percent change in the hazard for each one-unit increase in the covariate" (Allison, 1995, p. 117). For example, the estimated ratio in Model A1 for age is 0.953, which means that given $0.953 - 1 = -0.047$ and $-0.047 \times 100 = -4.7\%$, for each 1-year increase in age at release, the hazard of recidivism goes down by an estimated 4.7%. Also in Model A1, the hazard ratio for times incarcerated is 1.316, so that given $1.316 - 1 = 0.316$ and $0.316 \times 100 = 31.6\%$, for each additional past incarceration, the hazard of recidivism increases by 31.6%.

Of the six exposure and comparison models (A1 through C1), four indicated a significantly greater hazard of recidivism, between 12.7% and 16.7%, for those in the exposure groups. The nonsignificant models A1 and A2 indicate that defining private and public prison experiences in terms of having been released directly from these facilities does not capture the same differences as do definitions that take into account the relative amounts of time served at each type of facility. Inmates who served more time, and a greater proportion of their time, in private prisons tended to recidivate more than those who spent an inversely greater amount of time in public prisons (and by the operational definitions of the comparison groups, correspondingly less time in private prisons).

The models using continuous exposure variables support the general tendency of the models that use exposure and comparison groups. Model D1 indicates that among all releases, having spent a greater proportion of time served in private medium-security facilities was associated with a modestly (but significantly, $p < .05$) greater hazard of recidivism. Model D2 indicates that among all inmates who served any time in either a public medium- or private medium-security facility, those who spent an overall greater proportion of their time in public prisons had a significantly (again, a modest $p < .05$) lower hazard of recidivism.

Table 6
Cox Proportional Hazard Regression Models ($N = 23,114$)

	Hazard Ratios for Predicting Days Out and Event							
Model	A1	A2	B1	B2	B3	C1	D1	D2
Group A1	1.071							
Group A2		1.057						
Group B1			1.127*					
Group B2				1.134*				
Group B3					1.167**			
Group C1						1.129***		
Proportion private							1.118*	1.007
Proportion public							0.952	0.863*
Age	0.953***	0.953***	0.963***	0.962**	0.964***	0.968***	0.967***	0.962***
Gender	1.162	1.226	1.209*	1.219*	1.236*	1.362***	1.358***	1.228***
Times incarcerated	1.316***	1.300***	1.305***	1.312**	1.320***	1.247***	1.248***	1.269***
Education	1.026**	1.040**	1.017	1.021*	1.022*	1.011*	1.010*	1.016*
Minority	1.016	1.085	1.006	0.977	1.008	1.061*	1.064**	1.050
Drug offense	0.929	0.929	0.931	0.924	0.917	0.954	0.952	0.892**
Sex offense	0.735	0.647	0.702*	0.735	0.751	0.722**	0.717**	0.753*
Violent (not sex)	0.846*	0.801*	0.823*	0.809**	0.829*	0.772***	.0772***	0.770***
Sex ever	0.841	0.884	0.876	0.822	0.789	0.806*	0.812*	0.823
Violent ever	1.095	1.159	1.077	1.079	1.069	1.054	1.062	1.074
Release to parole	0.995	0.755	1.008	1.045	1.017	1.073	1.071	1.088
Release to probation	1.233***	1.056	1.205***	1.228***	1.216***	1.281***	1.277***	1.232***
Lifer	1.983*	1.059	1.494	1.694	1.668	1.481	1.464	1.680
Sentence length	.995	1.013	0.989*	0.991*	0.989*	0.998	0.998	0.990**
Months incarcerated	1.001	1.000	1.003**	1.003***	1.004***	1.001	1.001	1.002**
Proportion served	1.080*	1.012	1.012	1.016	0.997	1.032	1.029	1.008
n_{exposure}	2,390	1,384	1,803	2,049	1,610	3,802	NA	NA
$n_{\text{comparison}}$	3,374	921	4,636	4,151	3,579	19,312	NA	NA
$N = (n_e + n_c)$	5,764	2,305	6,439	6,200	5,189	23,114	23,114	10,411

*$p < .05$. **$p < .01$. ***$p < .001$.

Conclusion

This study offers several enhancements to the current body of literature on private versus public prison recidivism. The method improves on those in Lanza-Kaduce et al. (1999), Lanza-Kaduce and Maggard (2001), and Farabee and Knight (2002) by adopting Bales et al.'s (2005) quasi-experimental method of multiple private and public inmate group categories that take into account the amount and proportion of time spent in each type of facility. In addition to providing a replication in a state other than Florida, our study then expands on the study by Bales and colleagues by adding the proportionate amounts of time spent in each type of facility as continuous variables, allowing for a confirmation of the exposure and comparison method using all available release records without the limitation of categorically restrictive conditions. Also, we use a continuous follow-up period that tracks reincarceration for between 36 and 84 months after release, longer than in any previous study.

The results from Oklahoma are unique among all of the prior studies on this topic; curiously, the analyses indicate a significantly greater hazard of recidivism among private prison inmates in six of the eight models tested (four of the six exposure and comparison group models and both of the continuous models). In every categorical model (including the two that were nonsignificant), private prison inmate groups had a greater hazard of recidivism than did public inmate groups. In the continuous models, a greater proportion of time spent in private facilities predicted a modestly ($p < .05$) greater hazard of recidivism, whereas a greater proportion of time spent in public facilities predicted a modestly ($p < .05$) lower hazard of recidivism.

Although we find no indication that private prison incarceration improves postrelease performance, we would recommend caution before interpreting these results to necessarily imply the reverse. Consider that the largest difference observed (Group B3) indicated a 16.7% greater hazard of recidivism for the 1,610 exposure group inmates compared to the 3,579 comparison group inmates. Inmates in the exposure group were significantly younger, were more likely to be drug offenders, had shorter sentences and far less time served, and were more likely to be released to probation (see Table 5). Although these variables were controlled in the proportional hazard regression, the description recalls a qualitative caveat in the anecdotal experience of one of the authors (Spivak). While a case manager at a medium-security public prison in Oklahoma in 1998, he noted an inclination for case management staff (himself included) to use transfer

requests to private prisons as a method for removing more troublesome inmates from case loads. With state correctional budgets constrained to the point of mandatory furloughs, case loads were often prohibitively large (this author had a protracted double roster of 180 inmates for several months), and private prisons provided an outlet for staff members to avoid the time-consuming burden of inmates with greater disciplinary problems, excessive complaints and grievances, and other issues. These inmates tended to be younger, had fewer years in prison, were often minority and drug offenders who were reputed to be associated with gangs, and often appeared to be seeking social status through violent confrontations with other inmates and by adverse interactions with security and management staff. They were usually cooperative and often favored such transfers because the private prison facilities were typically newer and featured air-conditioned housing units (absent in most public facilities' housing units). These offenders may have differed qualitatively from inmates less troublesome to staff (and thus less likely to be transferred) in ways that would enhance their hazard of recidivism but not be adequately captured by the control variables.

Therefore, even the most conservative interpretation of these results indicates that serving more and/or a greater proportion of time in private prisons does not appear to improve inmates' postrelease performance. As private prisons have been alleged to achieve higher rates of program participation and completion, future research studies (especially outside of Florida) that are able to obtain data on inmate programs between private and public facility inmates may not only confirm or disconfirm the claim but may also reveal the role (if any) that programming has on inmates' postrelease performance (Farabee & Knight, 2002). In addition, control variables for marital and parental status are badly needed in research on private and public prison inmate recidivism and on recidivism in general. This study, like that of Bales et al. (2002), was unable to obtain such data measures, an important limitation of the current research. The importance of family status variables becomes especially relevant when considering the role of visitation needs in inmates' requests for and cooperation with facility transfers, including those to private prisons.

In considering the costs and benefits of using private corrections, policy makers may consider both the relative monetary expense and the quality of services provided. Ideally, the extent to which public policy favored the private sector would be commensurate to whether the state obtained (relative to public operations) a cost savings, an improvement in services, or both.

Private-sector claims of greater efficiency may be tempered by concerns that for-profit budgets result in service quality allocations that are inadequately geared toward corrections' overall human service goal. Meanwhile, private prison advocates might respond that politically strained state budgets are no less inclined to cut corners. This debate has by no means been solved, and the extent to which private and public prisons are comparatively fulfilling their performance expectations and potential should be continually and rigorously evaluated. Unless future studies find contradictory results, this study supports that of Bales et al. (2002) in the conclusion that future policy decisions should focus on relative expense issues, as the most complete analyses thus far find no indication that private prison services are superior to those of public prisons, as measured by inmate recidivism.

Notes

1. Oklahoma's 3-year return-to-prison rate of about 30% is somewhat lower than the Bureau of Justice Statistics (BJS) report's average of 51.8 for the 15 states in the sample or 40.1 after removing California. Part of this difference is due to the fact that the BJS report included interstate data; 7.6% of released inmates were rearrested in states other than the release state, whereas 67.5% of the sample were rearrested either in the same state or in a new state. Although interstate reincarceration is not cited as a proportion, it is certainly not more than the rearrest rate, the low proportion of which helps maintain the validity of studies using single-state data. The BJS report double sampled California releases "to improve the precision of estimates" (Langan & Levin, 2002, p. 12); fully enumerated Delaware and Minnesota's releases, and noted that one of the largest contributing states, New York, mistakenly classified an unknown proportion of jail returns as prison returns. This last fact may have inflated the overall recidivism rate as well.

2. In Table 2, the length of stay for private and public prisons refers to the average amount of time spent in each. The overall average length of stay is from the time of reception to release, which includes time spent in facilities that are not included in either category. The exposure and comparison groups are defined in Table 3 to contrast between relative time spent in private facilities (which in Oklahoma are all medium security) and their equivalent public counterparts (medium-security public facilities). Some of the time that inmates are incarcerated is spent in either maximum security (the reception and assessment center and the Oklahoma State Penitentiary) or minimum/community security, which are not part of either the exposure or comparison group definitions. Thus, total time spent in private facilities (days in private medium-security prison) and time spent in public facilities (days in public medium-security prison) do not add up to the 2.6 years of total average length of stay in prison. The same dynamic applies to the proportion of sentence served. An average of 22.8% of total sentence length was served in either a medium-security public facility or a medium-security private facility (14.5 in public plus 8.3 in private). Overall, inmates served 48% of their sentences, meaning that an average of 25.2% (48.0 – 22.8) of sentence lengths were served in either maximum or minimum/community security levels.

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