

Technical Appendix for *Trends and Issues Update:*
Measuring the likelihood of felons receiving a prison sentence in Illinois

This document is intended to explain in some detail the information sources, analytical methods, and results for the Trends and Issues Update publication titled *Measuring the Likelihood of Felons Receiving a Prison Sentence in Illinois*. Copies of this report can be obtained on the web at www.icjia.state.il.us or by contacting the Illinois Criminal Justice Information Authority's Research and Analysis Unit at 312-793-8550. Specific questions regarding the Trends and Issues Update report, or this technical appendix, can be directed to David Olson or Sharyn Adams, at (312) 793-8550 or dolson@icjia.state.il.us.

What were the sources of data used in the analyses and what are their limitations?

Data regarding felony sentences in Illinois are available from three general sources.

1) The Administrative Office of the Illinois Courts (AOIC) collects aggregate data annually from each of Illinois' 102 county Clerks of the Circuit Court regarding the number of convicted felons sentenced to prison and probation. The major limitations of these AOIC data are that they do not distinguish these felonies by offense type (e.g., drug versus violent versus property crimes), and prison and probation sentences by felony class have not been separated since 1992. Finally, AOIC data do not include information on sentence lengths or any conditions of the sentences (e.g., treatment, restitution, fines, etc).

2) More detailed, case-level data regarding *prison* sentences, including felony class, specific conviction offenses, and sentence lengths, are collected and maintained by the Illinois Department of Corrections (IDOC). These data are collected by IDOC for all convicted felons sentenced to prison and admitted to an IDOC institution.

Comparing the number of convicted felons sentenced to prison reported to the AOIC from county Clerks of the Circuit Court to the number of convicted felons received by IDOC revealed a very close correlation, with a few exceptions. On a year-to-year basis across the individual counties in Illinois there were some slight differences, which can be attributed to some felons being sentenced in abstencia (producing a prison sentence, but no admission to IDOC) or some minor differences in reporting periods. One rather dramatic difference, however, was noted between the number of felons sentenced to prison from Cook County reported to the AOIC and the number of felons admitted to IDOC from Cook County (IDOC admission data). Much of this difference appears to be the result of Cook County counting the number of sentences imposed, rather than the number of defendants sentenced. Thus, if one felon received three sentences to prison (e.g., for three separate offenses), this was counted as three prison sentences by Cook County in reports to AOIC, but only 1 felon admitted to IDOC. Due to this difference, the analyses for Cook County relied on the IDOC data to determine the number of felons sentenced to prison from Cook County.

3) Detailed, case-level data for samples of *probation* sentences in Illinois have only been collected at a few specific points in time (probation admissions during two months in 1990 and one month in 1995, and probation discharges during one month in 1997 and 2000). Using the case-level probation admission data collected during May 1995, in combination with IDOC data for prison sentences imposed that month, it was possible to produce a data file containing detailed, case-level information for a snapshot of all convicted felons sentenced during May 1995. Although these data have the limit of being only a sample of sentences imposed during a particular year, they do offer the possibility of examining the factors associated with which type of sentence (probation versus prison) were imposed on convicted felons in Illinois. The common data elements available through the two sources of information (probation sentences and prison sentences) include: age, race, gender, education level, conviction offense, sentence length, county where the sentence was imposed, and whether or not the felon had been previously sentenced to prison. A more detailed description of how these data were analyzed is presented below.

How were the county-level risks of incarceration for probationable offenses calculated?

In order to calculate the proportion of felons convicted of a probationable (i.e., excluding Class M and X felonies, which carry a mandatory prison sentence upon conviction) offense sentenced to prison it was first necessary to calculate the total number of felons sentenced to prison for a probationable offense. This was done by taking the IDOC data, and totaling the number of felons sentenced and admitted to IDOC for a Class 1, 2, 3, or 4 felony for each Illinois county and for each year from 1991 through 1999. The number of probationable felons sentenced to prison during 1990 was obtained from the AOIC data, which included sentences by offense class for that year. This produced the total number of felons sentenced to prison for a probationable offense across each county and year from 1990 through 1999 (Total Probationable to Prison). These figures (Total Probationable to Prison) were then combined with the number of felons sentenced to probation (Total Probationable to Probation) reported to AOIC across each county and year during the same time period, producing the total number of convicted felons sentenced for a probationable offense (Total Probationable Sentenced).

The formula (Equation 1) below summarizes the computation of the risk of incarceration for probationable offenses for each county (*c*) and year (*y*).

Equation 1

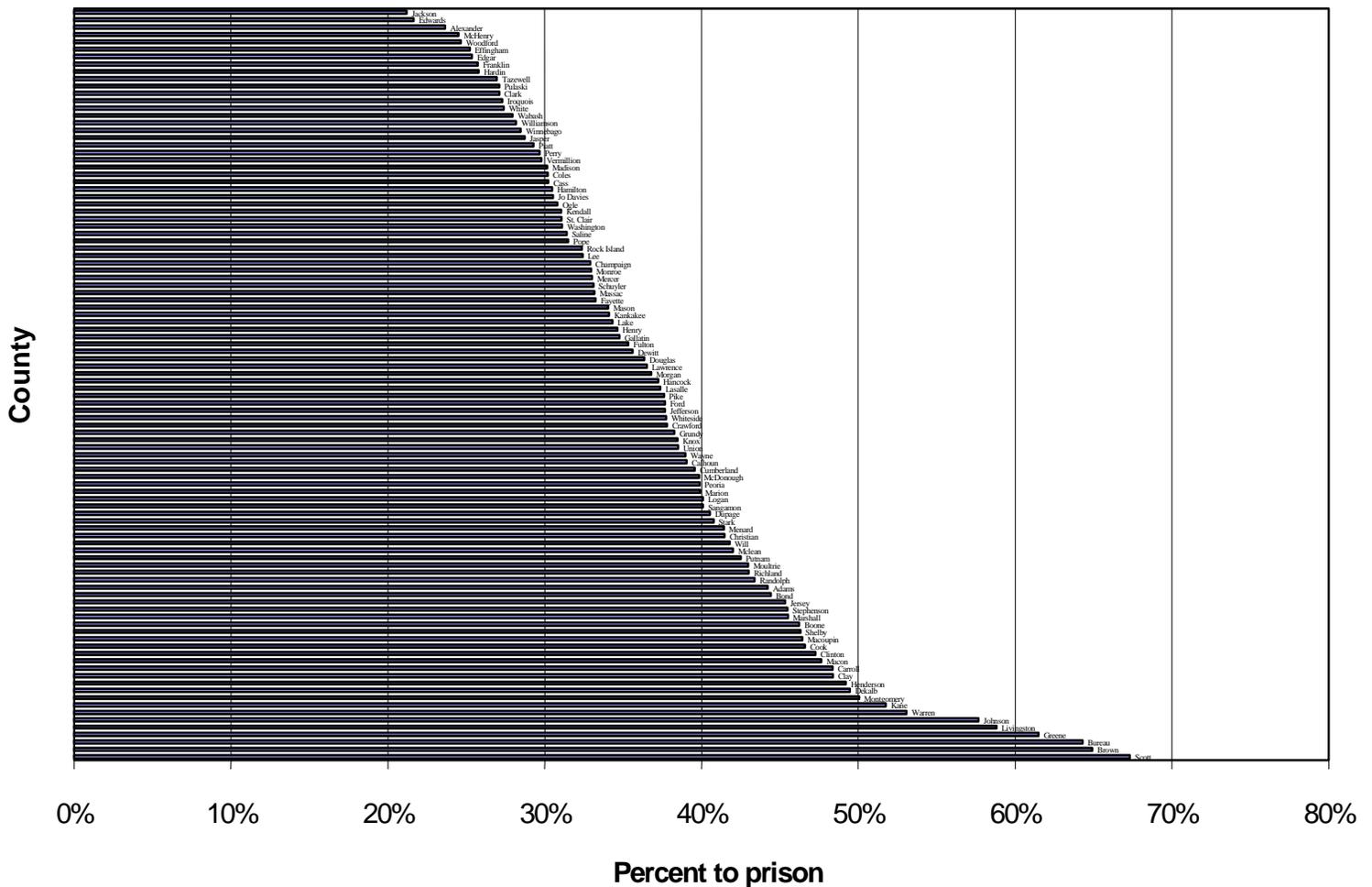
$$\text{Risk of Incarceration for Probationable Felonies} = \frac{\text{Total Probationable to Prison}_{c,y}}{\text{Total Probationable Sentence}_{c,y}}$$

The results of these calculations were then analyzed to answer two questions. First, for each county, what proportion of felons convicted of a probationable offense during the 1990s were sentenced to prison? This was determined by calculating the total number of

felons sentenced for a probationable offense (Total Probationable Sentence) during the entire 10 year period and dividing it by the total number of felons sentenced to prison for a probationable offense (Total Probationable to Prison) during the 10 year period. Aggregating the sentencing data for the 10 year period is advantageous because it mitigates the problems associated with some counties having relatively large year-to-year fluctuations in the number of felons sentenced, and therefore, fluctuation in the proportion sentenced to prison. Presented in Figure 1, below, are the results of these calculations for each of Illinois' 102 counties, answering the first question "what proportion of felons convicted of a probation offense during the 1990s were sentenced to prison?"

Figure 1

**Percent of probationable felons
sentenced to prison, 1990 - 1999**



How were the county-level *trends* in the risk of incarceration for probationable offenses calculated?

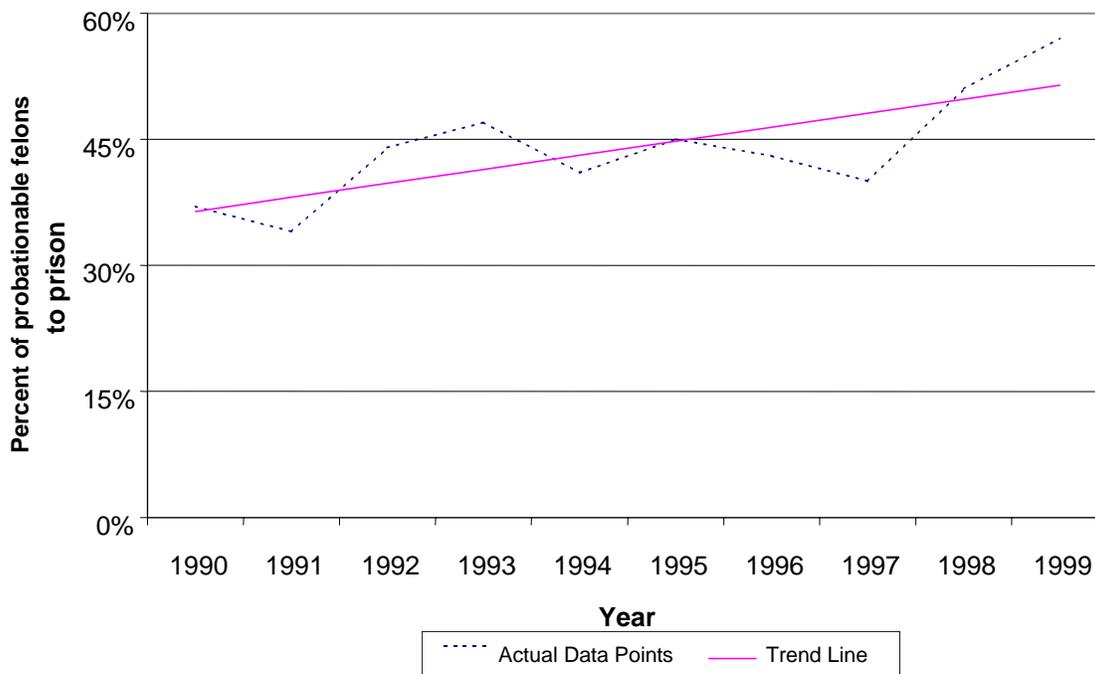
The second question that these data were used to answer was, “What is the *trend* in the proportion of probationable felons sentenced to prison across each of Illinois’ 102 counties during the 1990s?” In other words, which counties experienced an increase, decrease or no change in the likelihood of convicted felons being sentenced to prison? In order to determine the “trend” in the risk of incarceration for each county, the proportions produced for each county and year through Equation 1 were summarized using a simple regression analysis. Specifically, the risk of incarceration for probationable felonies for each individual county, for each year (1990 through 1999) was considered to be the dependent variable in a regression equation, while the year was considered the independent variable.

The formula used was $Y = M(X) + B$ (Equation 2), where Y was the risk of incarceration (Equation 1), X was the year (1990 through 1999), and the regression analyses produced M (the coefficient), which can be interpreted as the slope of the line which best summarizes the relationship (trend) between the risk of incarceration and time (years).

To illustrate, Figure 2 plots the actual proportion of convicted felons sentenced to prison (data produced with Equation 1) in Adams County for the years 1990 through 1999 (the dashed line). By “regressing” the risk of incarceration for each year (the dependent variable) against the individual years (the independent variable), the regression coefficient for the independent variable (M in Equation 2) produced through the analyses was .017. This value (.017) can be interpreted as the change in the proportion of convicted felons sentenced to prison for each increase in the independent variable (year), or the slope of the line which best summarizes the linear relationship between the risk of incarceration and time. Thus, on average, each year between 1990 and 1999, the proportion of convicted felons going to prison in Adams County increased 1.7 percentage points. Graphically, the coefficient can be used to superimpose the “trend” in the proportion of convicted felons sentenced to prison over the actual values (the solid line in Figure 2).

Figure 2

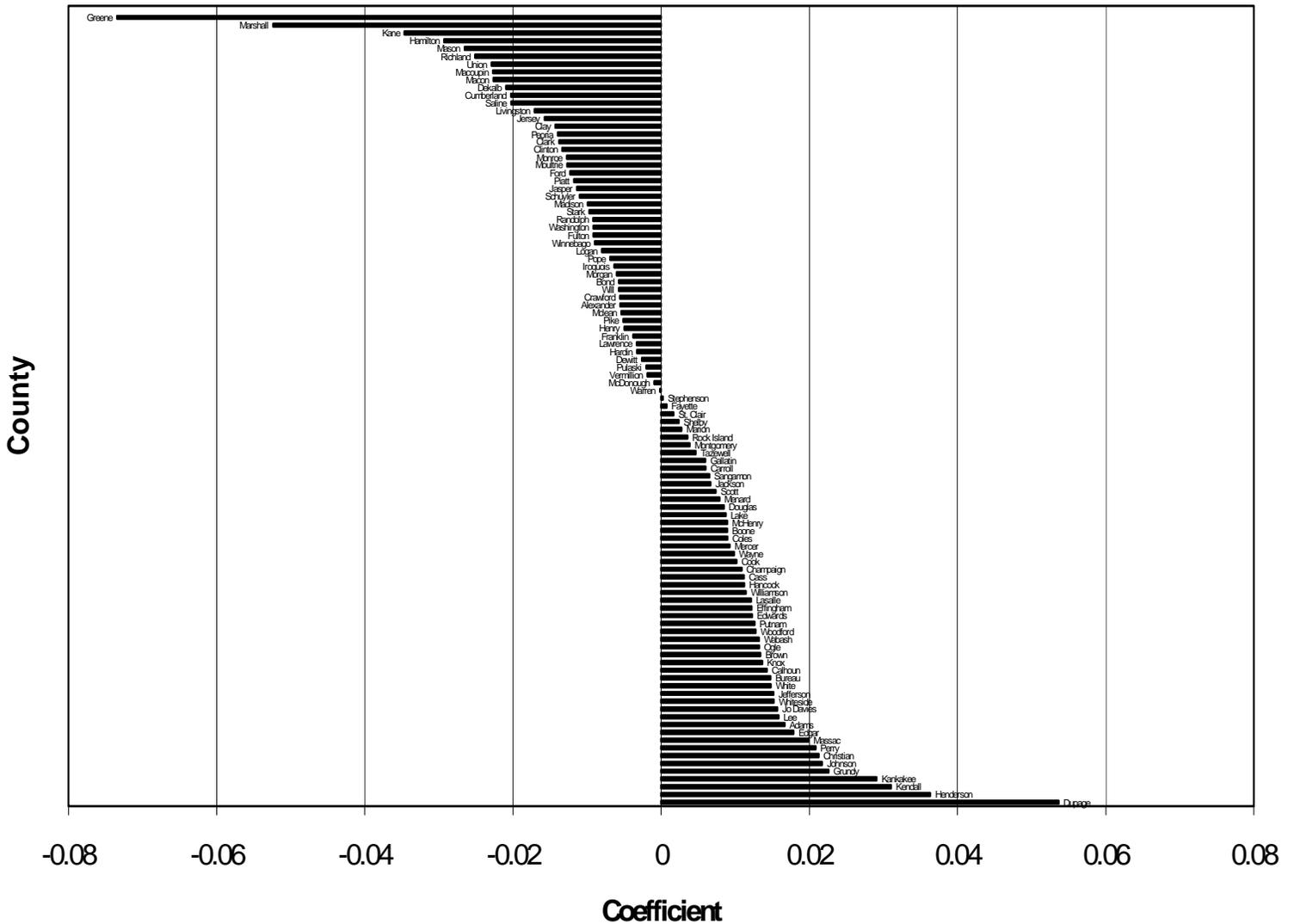
**Percent of convicted felons sentenced to prison
Adams County, 1990 to 1999**



This regression analysis was done for each Illinois county, and the values of the coefficients (the average change in the proportion of convicted felons sentenced to prison each year) are presented in Figure 3. In general, if the coefficient was positive, there was an increasing trend in the proportion of convicted felons going to prison in a particular county, whereas a negative value indicated a decreasing trend. For purposes of summarizing the trends in the Trends and Issues Update, we interpreted a coefficient of .01 or greater as indicating an increase, a value of -.01 or less as a decrease, and values between .01 and -.01 as “stable.”

Figure 3

County trend in proportion of probationable felons
Sentenced to Prison, 1990 - 1999



How were the county-level proportion of prison sentences accounted for by Class M and X (non-probationable offenses) calculated?

In addition to examining the proportion of probationable felonies resulting in a sentence to prison, we also determined the proportion of sentences to prison that were non-probationable (e.g., Class M and X felonies). As with the previous analyses, this was determined for each county during the period between 1990 and 1999, and relied on both AOIC and IDOC data. For each county and year, we calculated the total number of felons

sentenced to prison for a Class M or X felony, relying on AOIC data for 1990 and IDOC data for the period between 1991 and 1999. This figure was then divided by the total number of sentences to prison for each county and year. As with the previous analysis, we aggregated these data for the entire 1990 to 1999 period to mitigate the problems associated with some counties having relatively large year-to-year fluctuations in the number of felons, particularly for Class M and X felonies, sentenced to prison. Presented in Figure 4, below, are the results of these calculations for each Illinois county.

The dependent variable was the percent of prison sentences accounted for by Class M and X offenses, while the independent variable was the year. The coefficient resulting from the regression equation using these data is interpreted as the average annual change in the proportion of prison sentences accounted for by non-probationable offenses.

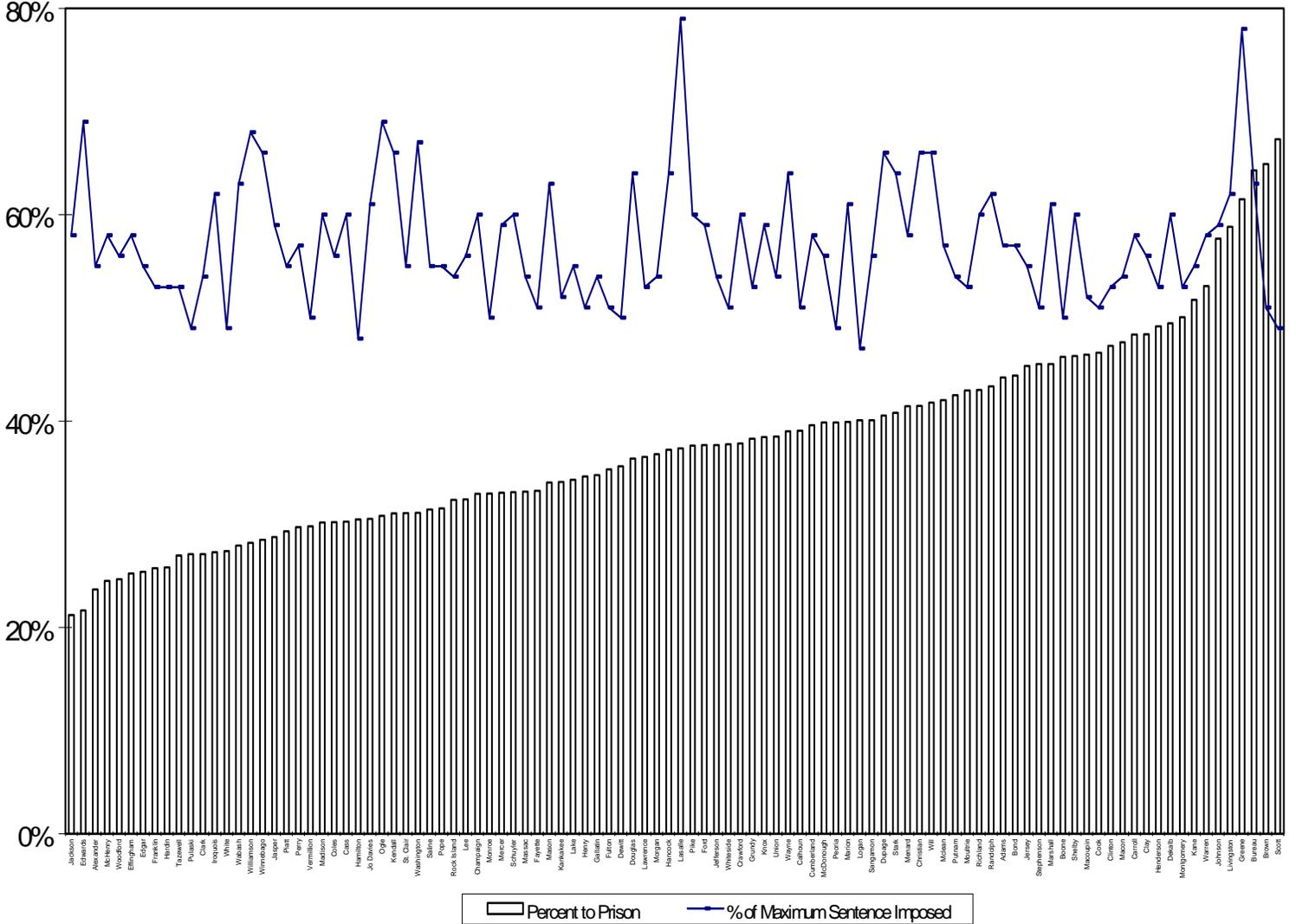
How was the “severity” of prison sentences calculated?

IDOC data were used to calculate the proportion of the maximum allowable prison sentences imposed for each county during the period between 1991 and 1999. To produce this measure of the severity of the prison sentences across Illinois’ 102 counties, we only examined the sentence lengths imposed on Class 1 through 4 felonies, since many Class X felonies are subject to aggravating circumstances, which influence what the legal maximum sentence length can be, and Class M offenses can result in sentences of life or death, which make it impossible to calculate percentages of maximum sentences. The major limitation of this measure is the potential that some of these Class 1 through 4 offenses were subject to longer possible sentence lengths due to the presence of aggravating circumstances. State law allows higher than normal maximum sentence lengths in situations where the judge finds there to be aggravating circumstances, such as great bodily harm. However, it is not possible to identify these circumstances when the sentencing involved aggravating circumstances, except when the actual sentence length exceeded the legally allowable maximum sentences without aggravating circumstances. As a result, the specific measures calculated may be an over-estimation of the severity of the sentence length.

From the IDOC data, we totaled the sentences imposed on all Class 1 through 4 felonies for each county during the period between 1991 and 1999. We then calculated the total maximum sentence that could have been imposed on each of these sentences (see Table 1 in the *T&I Update* for maximum sentence lengths by felony class). These two figures were then divided to produce the proportion of the maximum sentence imposed for each county during the period examined. To illustrate, consider the following hypothetical example: In a particular county, two felons were sentenced to prison, both for a Class 2 felony, with one receiving a three year sentence and the other a four year sentence. In this hypothetical county, the total sentence lengths imposed was seven years (3+4), whereas state law allows for Class 2 felons to be sentenced to a maximum of seven years in prison. Thus, the maximum allowable sentence length in this county was 14 years (two Class 2 sentences for a maximum of 7 years), and in practice the sentence lengths imposed totaled seven years. Dividing the sentences imposed (7 years) by the allowable maximum (14) results in a measure of severity of 50 percent, or 50 percent of the legal maximum sentence allowed was actually imposed. The results of the actual calculations across each of the 102 counties, along with the likelihood of incarceration (Same as Figure 1) for each of the counties are summarized in Figure 5 below.

Figure 5

Percent of probationable felons to prison and sentence severity 1991-1999



How were the case-level data examined to isolate the effects of offender characteristics on whether or not a prison sentence was imposed?

In an attempt to examine the individual factors that explain which probationable felonies result in a sentence to prison or probation, data for all prison and all probation sentences imposed in Illinois during a one-month period in 1995 were examined. During May 1995, 1,653 adults were sentenced to prison in Illinois for a probationable offense, while 1,754 were sentenced to probation. We then examined the differences across age, race, gender, offense, jurisdiction type (urban versus rural) and the seriousness of the felons' criminal history in the proportion sentenced to prison

The dependent variable was the sentence imposed on the convicted felon (coded as 1= a prison sentence and 0= a sentence to probation). The independent variables were categorized as demographic, conviction offense, criminal history, and sentencing environment. The demographic variables included age, race, and gender. The coding scheme for these variables were: age (in years), race (minority=1, white=0), and gender (1=male, 0=female). The offense type was coded as a violent, property, drug possession, drug-sale, or "other" offense. The way in which the seriousness of the convicted felons' criminal history was operationalized relied on whether or not they had previously been sentenced to prison. Although more detailed information about the convicted felons' criminal history (e.g., number of prior arrests or convictions, or the types of offenses which the individual was previously convicted) would have been better, we were limited to only knowing if they had been previously sentenced to prison. Thus, the coding for criminal history was 1=one or more prior IDOC commitments and 0=no prior IDOC commitments. Finally, the county population where the individual was convicted was also included to account for sentencing differences across different jurisdiction types/sizes.

Using logistic regression analyses to identify the independent role that these factors have over who is sentenced to prison. As a result of the analyses (presented in Table 1 below), all variables included in the model were statistically significant (at the accepted level of $p < .05$) predictors of convicted felons being sentenced to prison. Included in Table 1 are the specific results produced from the logistic regression analyses, including the Beta Coefficient (B), the standard error (SE), the Wald statistic, the degrees of freedom (df), the level of statistical significance for each variable (Sig), and the odds ratio for each variable (Exp(B)). The odds ratio indicates the change in the odds of a prison sentence for each unit change in that specific variable. So, for example, for each unit change in gender (e.g., from female to male), the odds of being sentenced to prison is 2.04, or a doubling in the odds. Also, the overall efficiency of the model was quite high, with a hit ratio of more than 71 percent and a pseudo R² of .32. Among those adults convicted of a felony, the following characteristics had an independent influence, or increased the likelihood of being sentenced to prison, after when all of the other factors were statistically controlled: being male, being non-white, having a prior sentence to prison, being sentenced in Cook County (relative to being sentenced in a rural county), and being sentenced of a drug-sale offense (relative to a drug possession offense).

Table 1: Logistic regression results for model predicting prison sentence

	B	S.E.	Wald	df	Sig.	Exp(B)
Age (in years)	.012	.005	6.558	1	.010	1.012
Gender (Male=1, Female=0)	.713	.116	37.911	1	.000	2.041
Race (Non-white=1, White=0)	.426	.101	17.718	1	.000	1.532
Prior prison sentence (Yes=1, No=0)	1.758	.098	322.690	1	.000	5.801
Rural counties (Comparison Base)			44.597	2	.000	
Other urban counties	-.135	.138	.950	1	.330	.874
Cook County	.505	.145	12.107	1	.001	1.657
Drug possession (Comparison Base)			229.963	4	.000	
Violent	.948	.134	49.746	1	.000	2.581
Property	1.199	.113	113.303	1	.000	3.317
Drug sale	1.816	.132	190.413	1	.000	6.145
Other	.417	.142	8.650	1	.003	1.517
Constant	-1.836	.188	94.903	1	.000	.160