2018 SAC Grant Report:

Recidivism with Extended Follow-Up Periods and Hazard Analysis

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Siobhan McAlister, Senior Research Analyst

Kelly Officer, Senior Research Analyst

Ken Sanchagrin, Research Director

Michael Weinerman, Senior Research Analyst

Katherine Tallan, Research Analyst

As the Oregon SAC, the CJC is responsible for collecting, analyzing, and reporting public safety and criminal justice related statistics to Federal, State, and local levels of government, as well as facilitating the sharing of state-level information nationally.

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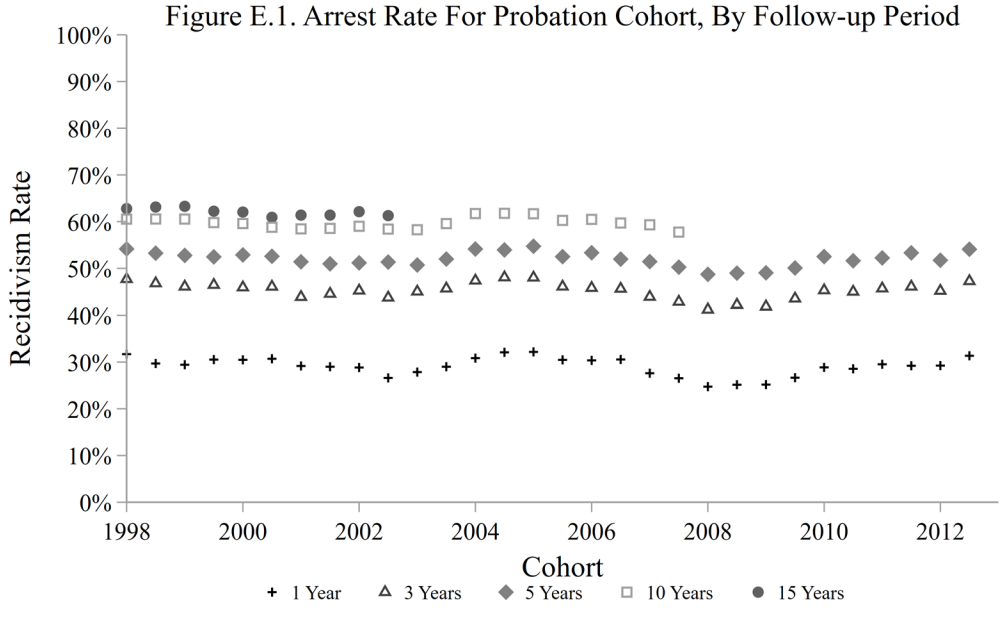
Executive Summary

Thanks to generous assistance from the Bureau of Justice Statistics, this report details a deeper dive into recidivism in Oregon. The definition of recidivism in Oregon requires three years of monitoring for arrests, convictions, and incarcerations for a new crime (ORS 423.557). We at the CJC, publish recidivism reports semiannually which update the public on recidivism in Oregon using the most recent data. These reports, however, include neither information on recidivism beyond three years nor the specific characteristics that are associated with recidivating events.

Research indicates that Oregon's three-year follow-up period after the imposition of probation or release from incarceration may provide an incomplete measure of recidivism and conceal differences between offenders. Prentky et al. (1997) find that while recidivating events for non-sexual, non-violent offenses occur, on average, within 2.75 years of the imposition of probation or release from incarceration, the average time interval to the first recidivating event for non-sexual, violent offenders is 5.58 years and for some sexual offenders is 4.55 years. Harris and Hanson (2004) report for sex offenders in Canada the chances of recidivism increase with time for the entire sample, but there are significant differences in patterns among subgroups.

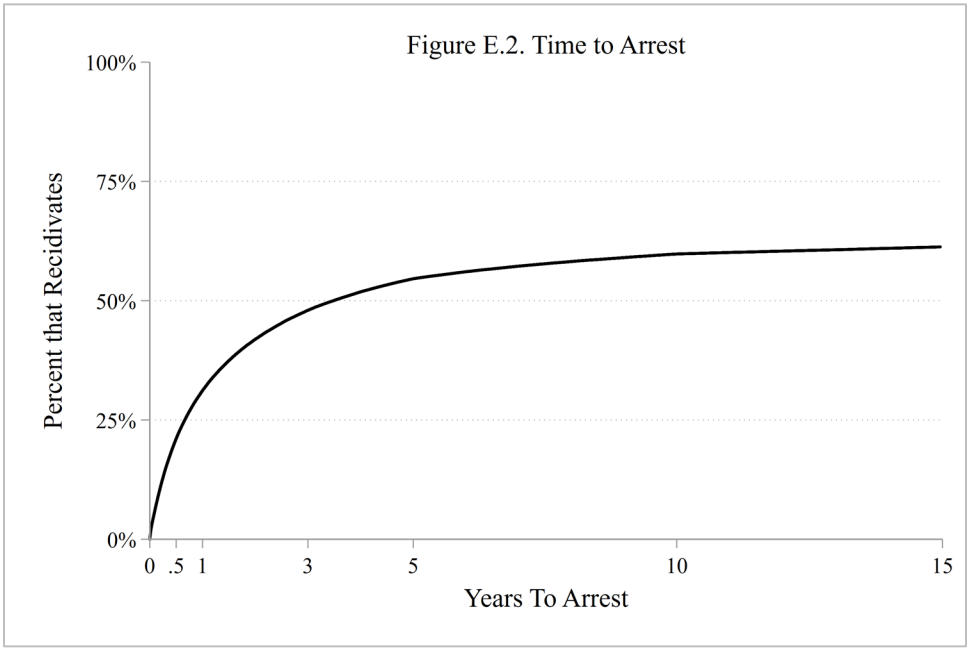
In this report we analyze individuals who were released from incarceration or sentenced to probation from 1998 through 2012 in the State of Oregon. Due to inconsistent findings across subgroups over extended periods in prior research, this report examines recidivism patterns for a wide variety of crimes using the existing 3-year interval, as well as 5-, 10-, and 15-year intervals. This report also expands on previous CJC recidivism reports' methodologies by incorporating hazard analysis which provides measures of how many and what type of ex-offenders recidivate within a specified follow-up period.

Figure E.1. Arrest Rate For Probation Cohort, By Follow-up Period



We find that most Oregon offenders that will recidivate do so quickly. We see the largest increase in recidivism in the first year after release or sentencing, followed by another jump between one and three years (Figure E.1 shows only arrest rates. Conviction and Incarceration patterns are of the same shape as arrest). The increases in recidivism in each of the 5-, 10-, and 15-year follow-up periods are smaller. In the probation cohort, on average, 74 percent of individuals who are *arrested* and 75 percent of individuals who are *convicted* at some point within fifteen years of release recidivate in this way within three years. On average, 52 percent of those who are *incarcerated* within fifteen years are incarcerated within three years. A similar pattern holds for the 10-year to 3-year

comparison. Oregon's standard 3-year follow-up period does not appear to meaningfully underestimate recidivism, at least not in the context of Oregon's overall recidivism rates. In general, Oregon's 3-year recidivism metric provides a good approximation of longer-term recidivism rates, while also satisfying policy-makers' and analysts' need to understand changes in recidivism in the medium term.



We identify the proportion of offenders who recidivate within fifteen years. Figure E.2 displays all individuals released from incarceration or sentenced to probation from 1998 through 2012. About sixty percent of offenders are arrested within fifteen years. The curve has a steep positive slope between 0 and 1 years to arrest, and then gradually flattens. The change in slope indicates that the majority of rearrests occur within one year. The probability of not being rearrested by three years is very similar to the probability of not being rearrested by five years, as indicated by the near-zero slope of the curve spanning three to five years. This pattern holds for rearrest and reincarceration as well.

Recidivism patterns vary by original crime type. For example, for the second probation cohort of 2002, 58.5 percent of drug possession offenders are rearrested within five years. This makes up 90 percent of all drug possession offenders that are rearrested within ten years. Drug possession offenders are the fastest group to reoffend. For sex offenders, the slowest group to reoffend, 79.1 percent of arrests that occur within ten years have already occurred by five years in the example cohort. This has implications for expungement practices in Oregon. The process of expunging a criminal record typically follows a ten year timeline (ORS 137.225). In light of our analysis, ten years may be cautious. This analysis shows that any offender who does not recidivate within as few as five years is not likely to recidivate at all. Having a criminal record can harm a former offender's job and employment prospects, and these data show that lengthy expungement times may mostly affect individuals who are unlikely to reoffend. Policymakers with dual goals of maintaining public safety and fostering former offenders' opportunities may, thus, consider reducing expungement times to five years for all offenders or even three years for drug and property offenders.

The cox proportional hazard model more precisely estimates the patterns we observe when considering individual demographics and other characteristics. Taking the results of the model together, young, Black males with a longer criminal history who have committed a property or drug possession crime and have already recidivated have a greater risk of recidivating than others, controlling for many factors. This report details the most advanced examination of factors influencing recidivism risk that we have undertaken thus far.

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1. Background

In 2013, House Bill 3194, Section 45 created a new, standardized definition of recidivism in Oregon. This definition was then modified by Senate Bill 366 in 2015, which defined recidivism as an arrest, conviction, or incarceration for a new crime within three years of release from incarceration or imposition of felony probation. In response to HB 3194 and SB 366, we developed tracking and reporting methodologies to comply with the standardized definitions of recidivism. This system requires merging data across multiple criminal justice data systems and is used to create semi-annual recidivism reports available on our website.[1]

As of December 2019, we have written ten semiannual recidivism reports. Seven of these reports are long form reports that analyze recidivism differences among individuals. The three most recent reports provide an update on overall recidivism rates using the most recent data available, without examining offender characteristics. This simplified approach allows us to devote time to conduct more detailed analyses while fulfilling our legislative responsibilities.

Research indicates that Oregon's 3-year time interval following the imposition of probation or release from incarceration may provide an incomplete measure of recidivism. Prentky et al. (1997), for instance, find that while recidivating events for non-sexual, non-violent offenses occur, on average, within 2.75 years of the imposition of probation or release from incarceration, the average time interval to the first recidivating event for non-sexual, violent offenders is 5.58 years and for some sexual offenders is 4.55 years. This means that while the definition of recidivism in Oregon captures the average non-sexual, non-violent offender and thus could provide a relatively accurate picture of the recidivism rate in the state for this class of offenses, when it comes to other offenses, current rates may be underestimating recidivism.

Research also indicates that recidivism patterns, particularly when analyzed over periods longer than three years, may not conform to commonly held beliefs about the relationship between time and recidivism risk. Harris and Hanson (2004), for example, report in a study of sex offenders in Canada that the chances of recidivism increase with time for the entire sample, but there are significant differences in patterns among subgroups. For instance, offenders who are offense free during earlier follow-up periods see a decrease in the chances of recidivism at the next five year check in. Thus, while the overall rate of re-offense rose from 14, to 20, to 24 percent at the 5-, 10-, and 15-year follow-ups, respectively, this pattern obscures the fact that certain subclasses of offenders display other, often opposing patterns. The authors also find differences in the risk of re-offense between first-time offenders and offenders with prior convictions. Longer follow-up windows offer opportunities to examine long-term trends while also providing a chance to examine subclasses of offenders as they recidivate over time.

Thanks to assistance from the Bureau of Justice Statistics, we are able to more thoroughly examine recidivism rates in Oregon. This report details the findings of our investigation into several alternative recidivism metrics, focusing particularly on the use of longer follow-up periods. Specifically, this project examines recidivism patterns for a wide variety of crimes, ranging from property and drug crimes to violent crime and sex offenses, using the existing 3-year follow-up period, as well as 5-, 10-, and 15-year observation periods.

This report also incorporates hazard analysis, also known as survival analysis, previously unused in analyzing recidivism in Oregon. Hazard analysis provides measures of how many ex-offenders reoffend along with precise measurements of the time between an individual's entry into the risk period and the re-offense event. An individual is said to "survive" if they do not recidivate within a specified follow-up

[1] https://www.oregon.gov/cjc/SAC/Pages/Publications.aspx

period. Hazard analysis allows us to include all subjects in the study and to include other time varying and time invariant characteristics in the model. This inclusion permits us to look at differences across offense types, offender characteristics, and the like. These analyses produce the cumulative proportion of ex-offenders who have had a recidivating event by the end of the specific interval.

2. Data

The data used in the CJC's previous recidivism reports are expanded into a form that allows measurement of long-term recidivism rates and implementation of hazard analysis. The data consist of 218,147 observations and include offender demographic data (gender, age, and race) along with criminal history. We include individuals who were released from incarceration or sentenced to probation from 1998 through 2012.

The expanded data set allows for 3-, 5-, 10-, and 15-year follow-up periods. This data set includes data from multiple criminal justice data systems to compile the rates of arrest, conviction, or incarceration for a new crime within each time interval following release from prison or imposition of probation. The cohort definition is the same as in previous reports, and includes Parole-PPS (Post-Prison Supervision) cohorts and Probation cohorts. Parole-PPS cohorts include individuals released from prison or a felony jail sentence. Probation cohorts include individuals starting felony probation who are supervised by a county community corrections department. New arrests are captured in the Law Enforcement Data System (LEDS), which is a record of all arrests for a new crime where the person was fingerprinted. New convictions are captured in the court case data system, which includes misdemeanor and felony convictions. New incarceration events are captured in the Department of Corrections (DOC) data system, which includes incarceration sentences (i.e. a prison or a felony jail sentence) for a new crime.

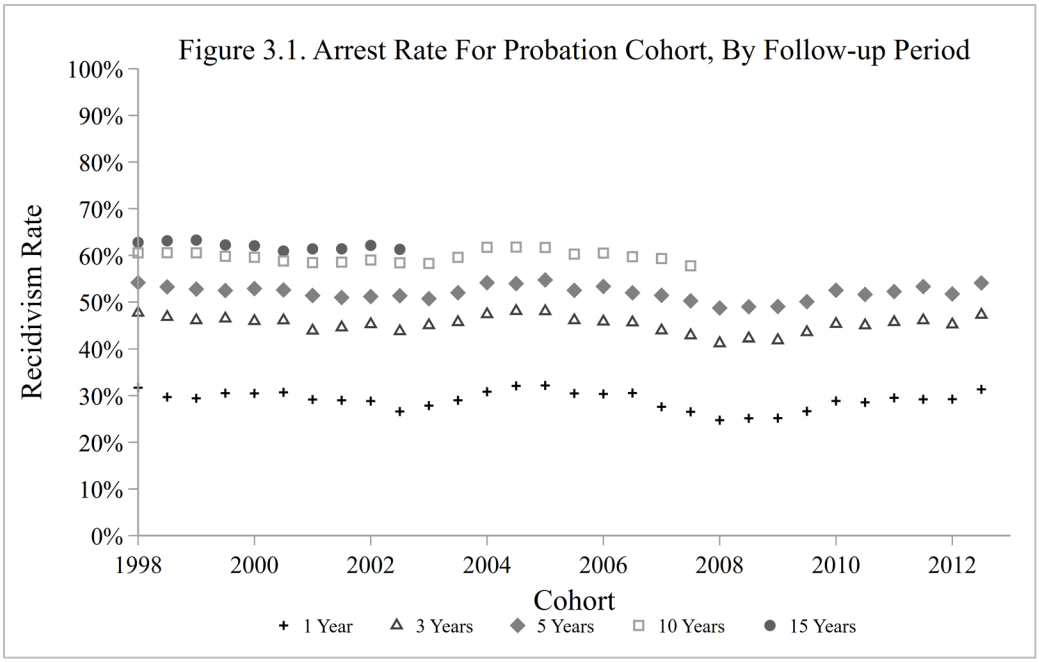
In some years and cohorts our inmate counts are relatively small. Table 5.1.1 in the Methodology section details the cohort sizes. For hazard analysis, we include all individuals released from incarceration or sentenced to probation from 1998 through 2012. This is different from our usual recidivism analysis, which examines Parole-PPS and Probation separately, and also reports recidivism individually for each six-month cohort. By including all eligible individuals in our sample, we have more statistical power to identify differences in time to re-offense across offense types and offender characteristics.

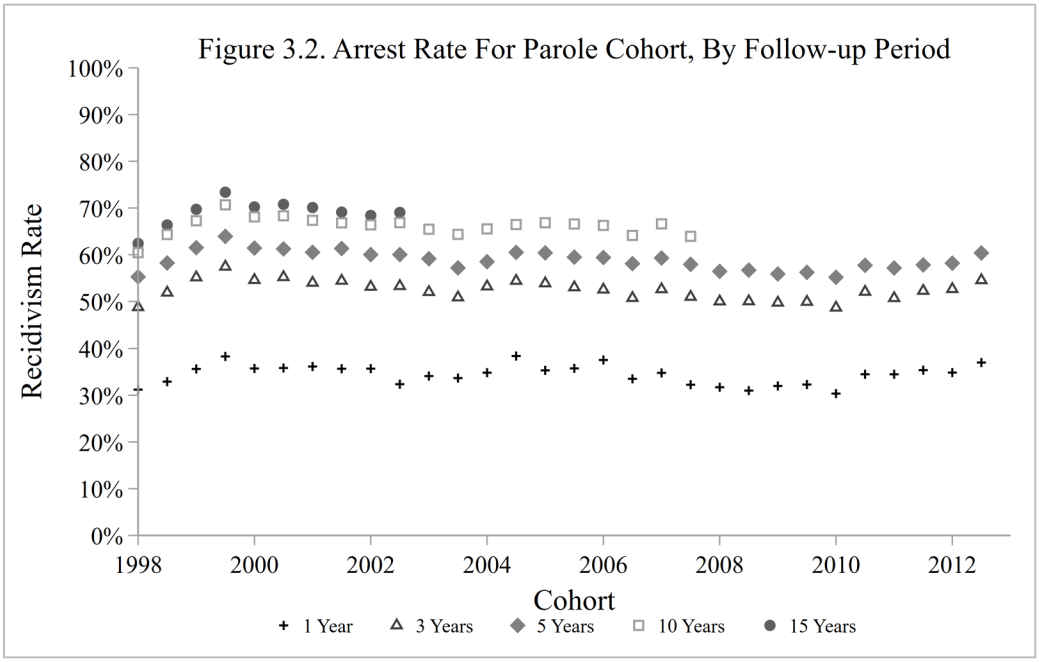
3. Extended Follow-Up Period

We calculate recidivism in the form of arrest, conviction, and incarceration rates for six-month cohorts spanning from 1998 through 2012. We calculate 1-, 3-, and 5-year rates for all cohorts. We have sufficient data to compute 10-year recidivism rates for cohorts from 1998 to 2007. For the 15-year follow-up period, we analyze Parole-PPS and Probation cohorts from 1998 to 2002.

The arrest rates by follow-up period are displayed in Figures 3.1 and 3.2. The conviction and incarceration rates follow a similar pattern, and can be found in the Appendix (Figures A.1, A.2, A.3, and A.4). We see the largest increase in recidivism in the first year, followed by another jump between one and three years. The increases in recidivism in each of the 5-, 10-, and 15-year follow-up periods are smaller, as shown by the negligible differences between the 10- and 15-year periods. Detailed tables of the recidivism rates are in the Appendix (Tables A.1 and A.2).

Most of the offenders that will recidivate do so quickly. In the probation cohort, on average, 74 percent of individuals who are *arrested* and 75 percent of individuals who are *convicted* at some point within fifteen years of release recidivate in this way within three years. On average 52 percent of those who are *incarcerated* within fifteen years are incarcerated within three years. This also approximately holds when we compare the percent of people who recidivate within ten years to those who recidivate within three.





Oregon's standard 3-year follow-up period does not appear to meaningfully underestimate recidivism, at least not in the context of Oregon's overall recidivism rates. In general, Oregon's 3-year recidivism metric provides a good approximation of longer-term recidivism rates, while also satisfying policy-makers' and analysts' need to understand changes in recidivism in the medium term.

We also examine recidivism patterns by the original type of crime the offender committed. Tables 3.1 and 3.2 display the recidivism rates for the second cohort of 2002, the most recent cohort that has completed the 15-year follow-up period. Drug possession offenders recidivate faster and more often than all other types of offenders. Drug possession is often tied to drug addiction, so we would expect that these

offenders would continue to recidivate while they are still addicted to drugs. Property offenders also recidivate quickly. We know that drug possession charges often coincide with property charges and may be similarly tied to drug addiction. Sex offenders recidivate the slowest and the least, across all measures. These recidivism patterns are consistent across cohorts. The recidivism rates varying by follow-up period for two other cohorts appear in the Appendix (Tables A.3, A.4, A.5, and A.6).

Table 3.1. Recidivism Rate for Probation Cohort (2002, Second Six Months)

	Follow-up Period				
Crime Type	1 Year	3 Years	5 Years	10 Years	15 Years
			Arrest Rate		
Drug Possession	32.9%	51.0%	58.5%	65.0%	68.1%
Drug Sale/Transport	28.8%	45.7%	53.1%	60.1%	63.1%
Person	22.6%	40.3%	48.6%	58.1%	61.7%
Property	29.7%	47.8%	56.2%	61.5%	63.5%
Sex	16.1%	34.3%	41.6%	52.6%	59.1%
Other	25.7%	44.3%	51.9%	60.6%	63.8%
			Conviction Rate		
Drug Possession	32.3%	50.0%	58.1%	65.1%	67.5%
Drug Sale/Transport	28.6%	44.8%	52.3%	59.6%	62.0%
Person	22.8%	36.4%	44.2%	54.2%	58.8%
Property	29.8%	45.5%	52.6%	58.4%	61.0%
Sex	35.8%	46.7%	52.6%	59.1%	64.2%
Other	23.4%	37.8%	46.0%	53.7%	57.3%
			Incarceration Rate		
Drug Possession	4.7%	13.8%	18.3%	21.4%	23.6%
Drug Sale/Transport	4.2%	12.1%	16.3%	19.4%	21.4%
Person	4.6%	10.8%	13.6%	18.7%	21.2%
Property	5.4%	14.1%	18.3%	23.4%	25.5%
Sex	6.6%	13.1%	16.1%	19.7%	21.9%
Other	2.4%	8.2%	12.1%	17.1%	19.5%

Table 3.2. Recidivism Rate for Parole Cohort (2002, Second Six Months)

	Follow-up Period				
Crime Type	1 Year	3 Years	5 Years	10 Years	15 Years
			Arrest Rate		
Drug Possession	39.8%	62.2%	68.5%	75.3%	76.3%
Drug Sale/Transport	33.1%	54.7%	60.8%	67.3%	69.6%
Person	30.3%	51.1%	58.3%	66.4%	68.2%
Property	42.5%	63.3%	70.9%	77.5%	79.8%
Sex	19.4%	37.2%	45.9%	54.1%	56.6%
Other	31.2%	56.4%	62.9%	69.5%	71.9%
			Conviction Rate		
Drug Possession	24.9%	49.6%	61.0%	68.3%	70.7%
Drug Sale/Transport	20.0%	42.1%	53.0%	60.4%	63.7%
Person	12.2%	36.0%	47.0%	56.4%	60.9%
Property	22.7%	52.4%	63.5%	74.2%	76.4%
Sex	8.3%	21.1%	28.5%	43.0%	45.9%
Other	20.0%	43.1%	53.8%	63.3%	67.1%
			Incarceration Rate		
Drug Possession	7.9%	20.1%	28.6%	34.9%	37.6%
Drug Sale/Transport	5.7%	15.9%	23.0%	28.9%	32.3%
Person	2.6%	14.1%	20.6%	27.1%	30.5%
Property	9.6%	27.9%	35.6%	43.9%	47.4%
Sex	3.3%	8.7%	12.4%	19.8%	23.6%
Other	5.0%	17.4%	21.7%	30.0%	33.6%

Long-term recidivism patterns have implications for expungement practices in Oregon. The process of expunging a criminal record typically follows a ten year timeline (ORS 137.225). This means that an offender who is sentenced to probation and is revoked may not apply for expungement until ten years following the date of revocation. In light of our analysis, ten years may be overly cautious. This analysis shows that if any offender does not recidivate within as few as five years, that offender is not likely to recidivate at all. For example, for the second probation cohort of 2002[2], 58.5 percent of drug possession offenders are rearrested within five years. This accounts for 90 percent of all drug possession offenders that are rearrested within ten years (Table 3.3). Drug possession offenders are the fastest group to reoffend. For sex offenders, the slowest group to reoffend, for the second probation cohort of 2002, 79.1 percent of arrests that occur within ten years have already occurred within five years. For offenders that recidivate quickly—drug and property—over 76 percent of their ten-year rearrests occur within three years in the example cohort. Having a criminal record can harm a former offender's job and employment prospects, but these data show that lengthy expungement times may mostly affect individuals who are unlikely to reoffend. Policymakers with dual goals of maintaining public safety and fostering former offenders' opportunities may, thus, consider reducing expungement times to five years for all offenders or even three years for drug and property offenders.

[2] Other cohorts follow a similar pattern to the pattern presented for the second probation cohort of 2002.

Table 3.3: Probation Cohort Speed of Arrest (2002, Second Six Months)

	Arrest Rate by Follow-Up Period			*Percent of 10-Year Rearrestees that Recidivate by:*	
Crime Type	3-Year	5-Year	10-Year	3 Years†	5 Years††
Drug Possession	51.0%	58.5%	65.0%	78.5%	90.0%
Drug Sale/Transport	45.7%	53.1%	60.1%	76.0%	88.4%
Person	40.3%	48.6%	58.1%	69.4%	83.6%
Property	47.8%	56.2%	61.5%	77.7%	91.4%
Sex	34.3%	41.6%	52.6%	65.2%	79.1%
Other	44.3%	51.9%	60.6%	73.1%	85.6%

†This column is equal to the "3-Year" column percentages divided by the "10-Year" column percentages. Example: Drug possession 51.0/65.0=78.5%

††This column is equal to the "5-Year" column percentages divided by the "10-Year" column percentages. Example: Drug Possession 58.5/65=90%

4. Hazard Analysis

We utilize hazard analysis to quantify the correlation between offender characteristics and their hazard, or risk, to recidivate. As a first step, Kaplan-Meier curves identify the proportion of offenders of a certain type that have reoffended within a specific time period. The Kaplan-Meier approach, however, cannot control simultaneously for multiple offender characteristics that affect recidivism risk. The Cox Proportional hazard model allows us to identify which offender characteristics are associated with higher risk to recidivate by taking advantage of a fuller sample of both Parole-PPS and Probation offenders. Not all offenders appear in the sample for the complete 15-year follow-up period. As offenders recidivate they drop out of the sample. Also, we can only track the complete 15-year follow-up period for offenders released from prison or sentenced to probation from 1998 through 2002. All other offenders will drop out of the model at the end of the potential follow-up period. More details on the statistical explanation of why offenders drop out can be found in the Methodology section.

4.1. Kaplan-Meier Curves

We begin our hazard analysis by considering Kaplan-Meier curves stratified across several offender characteristics. Kaplan-Meier modeling allows us to determine the proportion of offenders in our sample who recidivate. We process the data so that any rearrested offender, regardless of follow-up period, is counted as recidivating in the form of an arrest. We do the same for conviction and incarceration.

In this report we do not present the Kaplan-Meier curves for conviction and incarceration. These curves are available upon request. The shape of the conviction and incarceration Kaplan-Meier curves are the same as the comparable curves for arrest. However, since convictions and incarceration take longer to process than arrests, a lower proportion of offenders are convicted or incarcerated.

Figure 4.1.1[3] displays the time to arrest of all individuals released from incarceration or sentenced to a probation sentence from 1998 through 2012. We can observe that about 60 percent of offenders are arrested within a 15-year follow-up period. The curve has a steep positive slope between 0 and 1 years to arrest, and then gradually flattens. The change in slope indicates that the majority of rearrests occur within 1 year.

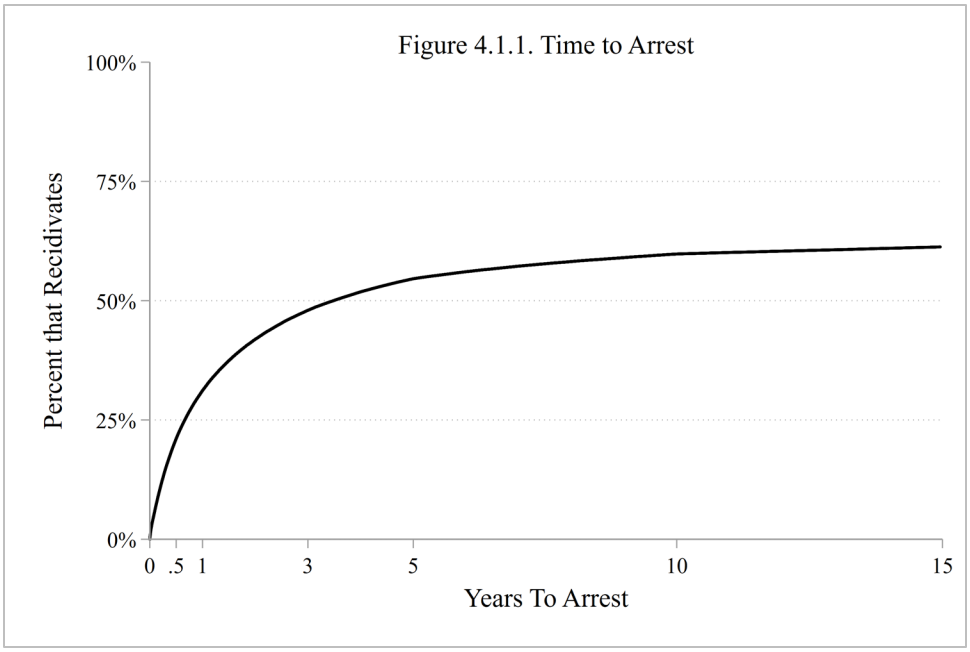
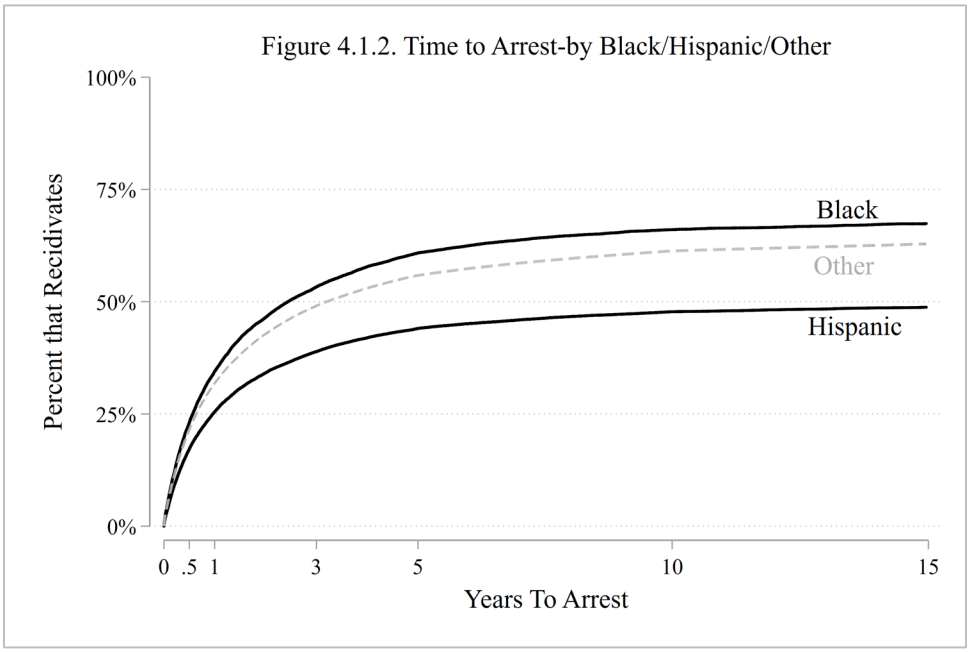


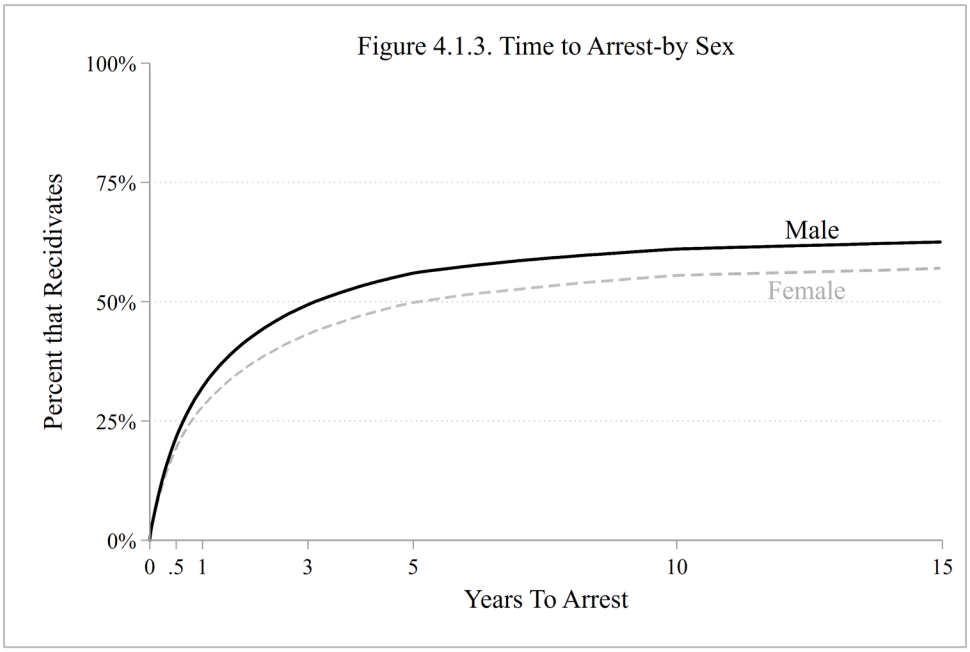
Figure 4.1.2 shows the difference in time to arrest between Black, Hispanic, and offenders of other races. We stratify race/ethnicity into only three categories due to several methodological challenges with the detailed race/ethnicity variable, described in depth in the Methodology section under Challenges with Race/Ethnicity Variables. A higher proportion of Black offenders recidivate compared with all other offenders. This could be due to the way we are aggregating up the race/ethnicity variable. According to Figure 5.2.1 in the Methodology section,



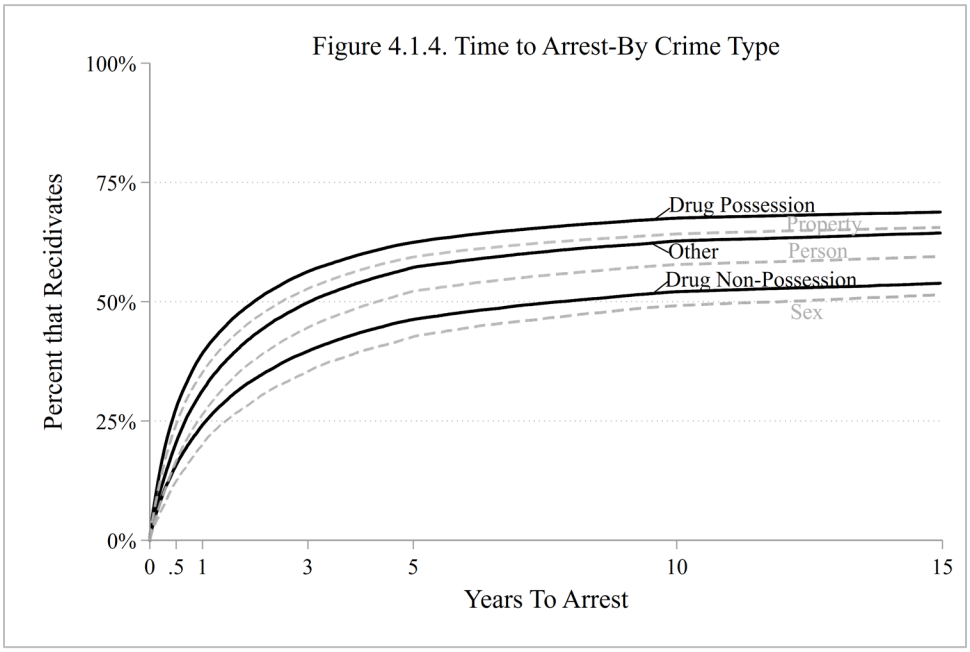
[3] Please note that Figures 4.1.1-4.1.6 do not include confidence bands. We decided to be consistent across all the Kaplan-Meier curves and not include 95% confidence bands because they complicate the graph, especially in Figure 4.1.4. An important assumption of the survival model requires that Kaplan-Meier curves do not cross for Figures 4.1.2-4.1.6. The confidence bands around the survival curve also must not overlap. When we include confidence bands in Figures 4.1.2-4.1.6, none of the confidence bands around the curves overlap. All the included Kaplan-Meier curves with confidence intervals are available upon request.

the Kaplan-Meier curve for Black offenders has one of the highest proportion of offenders who recidivate[4].

We also look at Kaplan Meier curves by sex (Figure 4.1.3). A similar proportion of men and women recidivate within our sample period, however a slightly higher percentage of men recidivate.



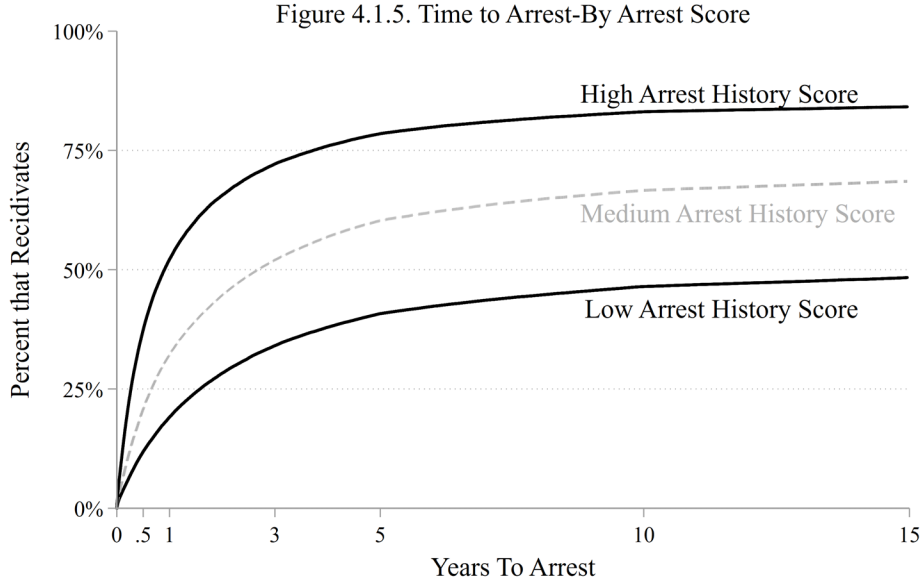
Tables 3.1 and 3.2 imply that the original crime the offender commits may be an important indicator of whether or not they recidivate. Figure 4.1.4 displays the proportion of offenders who recidivate within fifteen years, by crime type. The steepness of the curves indicates how quickly each type of offender is rearrested. The Kaplan-Meier curves echo the findings of Tables 3.1 and 3.2. About 70 percent of drug possession offenders are rearrested. This is a relatively high percentage when compared to the less than 50 percent of sex crime offenders who are rearrested.



[4] The only race category with a higher proportion of offenders who recidivate is Native American. Less than 2 percent of our sample is Native American. By pooling together White, Asian, Native American, and Unknown races we are losing the influence of the Native American population that pulls the proportion of offenders that recidivate up above the proportion of Black offenders. However, losing this variation may not be statistically important because there are so few Native American offenders in our sample.

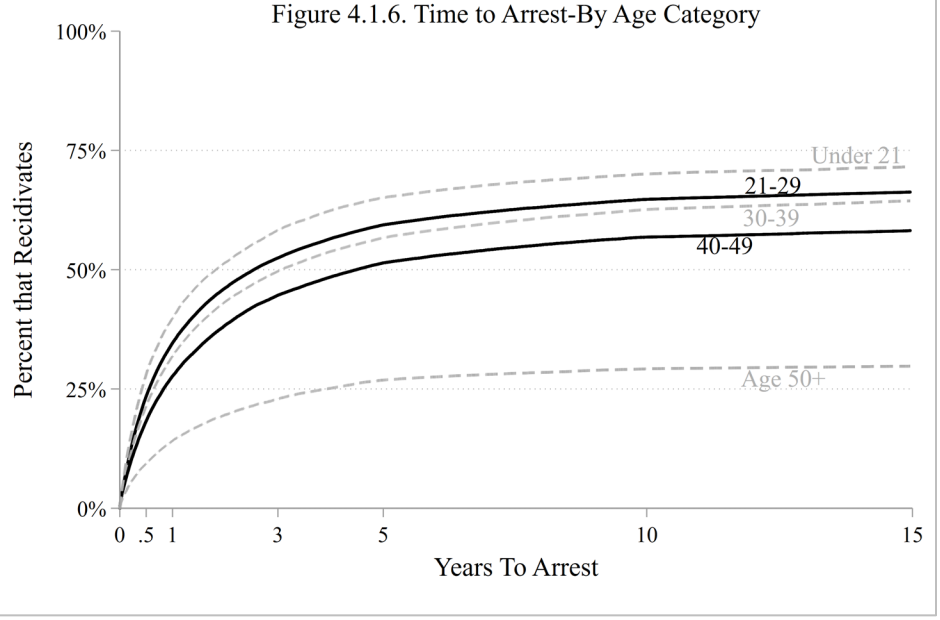
We also calculate Kaplan-Meier curves by criminal history. We use arrest history score, a new measure of criminal history. Arrest history score is a weighted sum of the number of times the offender was arrested within five years before they exit incarceration or are sentenced to probation. Arrests one year before an offender enters our sample are weighted four times more than arrests five years before the offender enters our sample. A more detailed description of arrest history score is in the Methodology section. To draw the Kaplan-Meier curves, we stratify arrest history scores into three categories: low, medium, and high. We split the offenders into three quantiles of equal probability. Many—more than 75 percent of—individuals who have high arrest history scores recidivate (Figure 4.1.5). This implies that recent criminal history is correlated with future criminal activity.

Figure 4.1.5. Time to Arrest-By Arrest Score



We also consider Kaplan-Meier curves contingent on age. As shown in Figure 4.1.6 younger offenders recidivate at a higher rate than older offenders. Offenders also tend to "age-out" of criminal activity. They may commit a crime when they are in their 20s, but may avoid crime when they are older due to a sense of maturity or deterrence from a past punishment.

Figure 4.1.6. Time to Arrest-By Age Category



4.2. Cox Proportional Hazard Model

For our hazard analysis, we utilize a cox proportional hazard model. In the model we control for offender characteristics that we believe influence the risk of recidivating. We control for whether the offender is Black or not, Hispanic or not, male or not, their original crime, criminal history, age, and whether or not the offender is repeated in the sample. We also control for latent county demographics and characteristics with county random effects[5]. We allow for the effect of age on recidivism to peak if the offender is in their 20s, and dampen as they get older, by including both age and age squared. We see some individuals multiple times in the data. If we see an individual more than once that means that they first appear in our data when they are released from incarceration or sentenced to probation at some point from 1998 through 2012. Then, they recidivate at a later date such that they serve an incarceration sentence and are released before the end of 2012, or are sentenced to a probation term that starts before the end of 2012. A repeated individual may have a higher risk to recidivate since they have already recidivated. We create an indicator for individuals that appear more than once and include that in the hazard model.

Table 4.2.1 illustrates the race/ethnicity and criminal history makeup of the individuals we analyze. 77 percent of these individuals are White, 7 percent are Black, and 14 percent are Hispanic. 78 percent of these individuals are male and the average age is just over 33 years old. About 28 percent of individuals in the data appear more than once. We can identify the most serious type of crime that the offender committed that caused them to enter the data. 24 percent of individuals committed a drug possession crime and 25 percent committed a property crime. A smaller proportion of individuals committed other types of crimes. There is a wide range in arrest history scores. Most individuals have a moderate number of arrests in the five years leading up to when they enter the sample, as indicated by the mean score of 7.98. Few have scores exceeding 15, but scores range up to 124.[6] The individuals who have scores over 15 were arrested frequently and proximately to when they enter our data.

[5] Please note that even though we observe differences between Parole-PPS and Probation cohort recidivism in tables 3.1 and 3.2, we do not include an indicator for whether or not someone is part of one of these two groups. Including this indicator would violate the proportional hazards assumption. Subset analysis with Parole-PPS and Probation do not yield coefficients differentially greater than or less than one.

[6] This range in arrest history scores is a statistical challenge. Few individuals have scores in the high end of the range meaning the distribution of arrest history scores is skewed. To reduce the effect of outliers in our survival analysis we take a natural log transformation of the arrest history score and include that in our preferred model.

Table 4.2.1. Summary Statistics

Variable	Mean/Proportion	Standard Deviation	Min	Max
White	77%		0.0	1.0
Black	7%		0.0	1.0
Hispanic	14%		0.0	1.0
Asian	1%		0.0	1.0
Native American	2%		0.0	1.0
Unknown Race/Ethnicity	<1%		0.0	1.0
Male	78%		0.0	1.0
Age	33.15	10.78	13.89	92.47
Repeated Individual	28%		0.0	1.0
Drug Non-Possession	13%		0.0	1.0
Drug Possession	24%		0.0	1.0
Person Crime	14%		0.0	1.0
Property Crime	25%		0.0	1.0
Sex Crime	5%		0.0	1.0
Other Crime	16%		0.0	1.0
Arrest History Score	7.98	6.99	0.10	124.00

Table 4.2.2 displays the results of our cox proportional hazard model[7]. All variables (listed in the far left column of Table 4.2.2) that equal either zero or one have a question mark "?" next to their variable name. For example, the variable "Black?" takes the value of zero if the individual is not Black, and the value one if the individual is Black. Age and arrest history score are the only continuous variables included in the analysis. If the coefficient reported in Table 4.2.2 is less than one then the variable is associated with lower recidivism risk, holding all other included variables constant. Holding all other included variables constant means that only the variable of interest changes (for example, whether the individual is Black or not) and all other variables remain constant (their sex, original crime type, criminal history, age, and repeated). If the coefficient is greater than one, then the variable is associated with increased risk, holding all other included variables constant.[8]

[7] We use the Stata package stcox. The reported coefficients are hazard ratios. Also, please note that we experiment with two methods of determining ties: Brenslow and Efron, the two most efficient options. We do not get fundamentally different results. In Table 4.2.2 we report the results of the Brenslow method. We also did extensive sensitivity analysis to covariate inclusion, which is available upon request. We test all relevant assumptions for the cox proportional hazard model, including the proportionality assumption that is expressed visually in the Kaplan-Meier curves. The proportionality assumption means that ratio of the hazards for any two individuals is constant over time. The cox model also assumes that each variables makes a linear contribution to the model and that no one observation is more influential than others. We tested the two other assumptions and they are not violated.

[8] A good online resource with an explanation of hazard ratios is LaMorte's found at: http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_Survival/BS704_Survival6.html

Table 4.2.2. Cox Proportional Hazard Model

	Time to Arrest	Time to Conviction	Time to Incarceration
Black?	1.212***	1.188***	1.255***
	(0.0136)	(0.0139)	(0.0227)
Hispanic?	0.606***	0.612***	0.676***
	(0.00569)	(0.00612)	(0.0105)
Male?	1.261***	1.215***	1.665***
	(0.00885)	(0.00895)	(0.0214)
Drug Non-Possession Crime?	0.818***	0.821***	0.839***
	(0.00888)	(0.00945)	(0.0157)
Drug Possession Crime?	1.194***	1.197***	1.062***
	(0.0104)	(0.0110)	(0.0157)
Person Crime?	0.977*	0.948***	1.022
	(0.0101)	(0.0105)	(0.0179)
Property Crime?	1.043***	1.059***	1.240***
	(0.00917)	(0.00978)	(0.0178)
Sex Crime?	0.921***	0.899***	1.050
	(0.0141)	(0.0151)	(0.0276)
Log Arrest History Score†	1.380***	1.514***	1.533***
	(0.00482)	(0.00583)	(0.00937)
Age	0.988***	0.993***	0.993*
	(0.00167)	(0.00181)	(0.00307)
Age^2	1.000***	1.000***	1.000***
	(0.0000232)	(0.0000251)	(0.0000439)
Repeated?	1.323***	1.088***	1.379***
	(0.00812)	(0.00706)	(0.0136)
N	198,671	198,671	198,671
County Random Effects?	Yes	Yes	Yes

Notes: Exponentiated coefficients; Standard errors in parentheses. Omitted crime type is "Other".
† For a full explanation of why we take the natural log of this variable, please refer to footnote 5.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The cox proportional model largely confirms what we observe in the Kaplan-Meier graphs. All but two included variables are statistically significant in determining recidivism risk of all three types. The coefficient for Black is greater than one for all types of recidivism: arrest, conviction, and incarceration. This means that if an offender is Black, holding all other included variables constant, they have a higher risk of recidivism than an offender who is not Black. We cannot identify the exact reason why a Black

offender has a higher risk than a non-Black offender, and there are several variables, like cultural appropriateness of treatment, that we cannot control for that may help explain this difference. A Hispanic offender has a lower risk of recidivism than a non-Hispanic offender in this data, holding constant all other variables included in Table 4.2.2. A male offender has a higher risk of recidivism than a female offender with the same race/ethnicity, original crime, arrest history, age, and "repeated?" indicator. Offenders who are originally incarcerated or sentenced to probation for a drug possession charge or property charge have a higher risk of recidivism than similar offenders who committed a drug non-possession crime. Offenders who originally commit a person or sex crime have a lower risk of being rearrested or reconvicted than comparable offenders, but, likely due to statistical power[9], we cannot be sure of the effect on reincarceration. A higher arrest history score is also associated with increased recidivism risk. The coefficient for age is less than one across all types of recidivism, which means that as age increases, risk to recidivate decreases. If the coefficients for age squared were greater than one or less than one that would indicate that perhaps young offenders had a low recidivism risk, middle aged offenders have a high recidivism risk, and then very old offenders have low recidivism risk again. Recidivism risk does not change direction as age increases, as indicated by the coefficient for age squared equaling one. If an offender has already recidivated during the time period we study (indicated by the "repeated?" variable), they have a higher risk of recidivating again than a comparable offender who has not recidivated before, as indicated by the coefficients for "repeated?" being greater than one across all recidivism outcomes.

The Kaplan-Meier graphs and cox proportional hazard model corroborate each other, but the cox proportional hazard model is more able to simultaneously control for differing individual characteristics. Taking the results in Table 4.2.2 together, young, Black males with a longer criminal history who have committed a property or drug possession crime and have already recidivated have a greater risk of recidivating (in any way) than others, holding all else constant. By examining statistics like those in Tables 3.1 and 3.2, or any of the Kaplan-Meier graphs, we can only compare recidivism outcomes on one offender characteristic. We can say that male offenders seem more likely to recidivate than female offenders, but that could be driven by some other underlying factor. If male offenders are also more likely to have committed a drug possession offense, that charge can complicate exactly what is driving the higher recidivism for males: Is the higher recidivism risk because males are more likely to commit drug possession crimes? Or, is the higher risk because they are male? With survival analysis we can begin to disentangle which offender characteristics are associated with increased or decreased recidivism. Further analysis[10] is needed to exactly predict outcomes for each subgroup of offender.

Due to data limitations, we can only include offender characteristics at the time they entered the sample in our model. That means that we are not evaluating any changing polices that may affect the individual's risk to recidivate. In future research we may augment our analysis by considering enforcement

[9] "Person?" and "Sex?" are both statistically insignificant in their effect on time to incarceration. We think this is likely due to sample size issues. A smaller proportion of individuals are reincarcerated than are rearrested or reconvicted (a comparison of Figures 3.1, 3.2, A.1, A.2, A.3, and A.4 supports this). Less than 20 percent of the individuals analyzed are counted as committing either a person or sex crime. So, the intersection of people who have both been reincarcerated and originally committed a person or sex crime is small (8,216 cases of the total 218,147; less than 4 percent).

[10] Perhaps future research will examine the effect of interaction terms between the variables already included in Table 4.2.2. For example to exactly identify if differences between male and female offenders are driven by underlying crime types, we could interact male with each individual crime category.

mechanisms and bill changes, however this report details the most advanced examination of factors that influence recidivism risk we have undertaken thus far.

5. Methodology

5.1. Data Processing

Table 5.1.1. Cohort Size

Cohort	Parole-PPS	Probation	Total
1998/1ST	1,974	4,788	6,762
1998/2ND	2,251	4,808	7,059
1999/1ST	2,279	4,811	7,090
1999/2ND	2,446	4,634	7,080
2000/1ST	2,429	4,917	7,346
2000/2ND	2,400	4,376	6,776
2001/1ST	2,559	4,823	7,382
2001/2ND	2,607	4,420	7,027
2002/1ST	2,437	4,772	7,209
2002/2ND	2,753	4,536	7,289
2003/1ST	2,580	4,131	6,711
2003/2ND	2,548	4,199	6,747
2004/1ST	2,753	4,620	7,373
2004/2ND	3,071	4,469	7,540
2005/1ST	2,851	4,944	7,795
2005/2ND	3,004	4,971	7,975
2006/1ST	2,996	5,407	8,403
2006/2ND	3,031	4,793	7,824
2007/1ST	2,944	4,990	7,934
2007/2ND	3,020	4,352	7,372
2008/1ST	2,904	4,526	7,430
2008/2ND	2,820	4,067	6,887
2009/1ST	2,770	4,309	7,079
2009/2ND	3,279	3,882	7,161
2010/1ST	2,882	4,084	6,966
2010/2ND	2,954	4,236	7,190
2011/1ST	2,914	4,206	7,120
2011/2ND	3,028	4,190	7,218
2012/1ST	2,961	4,537	7,498
2012/2ND	2,981	3,923	6,904
Total	82,426	135,721	218,147

We analyze a sample of 218,147 distinct events spanning from 1998 through 2012 (Table 5.1.1). An event is defined as a release from incarceration or an imposition of a probation sentence. We count the number of days until that person recidivates in the form of an arrest, conviction, or incarceration for a new crime. We call the number of days until recidivism the survival time. The survival time is the number of days that the individual "survives"—does not recidivate. If an individual does not recidivate within the follow-up period, they are censored. We cannot assume that the censored individual will never recidivate; we can only assume that they may recidivate at some later, censored, time.

For all individuals who are censored, their survival time is defined as the maximum number of days they are observed. We define this survival time to be one day after the last possible day they could have recidivated given the potential follow-up period and data availability. So, for the 2002 cohort, if an individual is censored, their time to event is fifteen years and one day. For 2007 and earlier cohorts, time to event for censored individuals is one day beyond the longest time to event of any individual who is not censored within their cohort. In cases of censoring, the true time to event is underestimated because the time to event is (by default) the time to the end of the sample period.

In our data, we see some individuals multiple times. That means that they have recidivated at least once, and been released from incarceration or completed a probation sentence an additional time. About 28 percent of people in the sample appear more than once. We conduct analyses with the whole sample, and then on the subset of the sample that excludes repeated individuals, and find similar results. However, if an individual is repeated this may increase their risk to recidivate (since they have a record of recidivating). To accommodate for this risk adjustment, we create an indicator for whether an individual appears more than once in the sample, and include that in our preferred hazard model.

Some individuals in the sample die before they can recidivate. These individuals are censored. We can identify some of the individuals who have died; their release reason is "DIED" in our data. We are missing release reason for 4.47 percent of observations. Of those who have a release reason, 1,422 individuals' release reason is "DIED". This is less than one percent of individuals who have a release reason. To test robustness, we drop the individuals who have died from our sample, and compare the results to estimates with the whole sample. The results are not significantly different.

Even though we observe differences between Parole-PPS and Probation cohort recidivism in Tables 3.1 and 3.2, we do not include an indicator for whether or not someone is part of one of these two groups in our cox proportional hazard model. Including this indicator would violate the proportional hazards assumption. Kaplan-Meier curves for Parole-PPS and Probation cross early in the follow-up period for all recidivism types. The curves are available upon request. Additionally, including an indicator for whether an individual is a member of Parole-PPS or Probation would directly compare individuals in these cohorts, which we have not done in past CJC analyses. We conduct two subset hazard analyses with only individuals in the Parole-PPS cohort and only individuals in the Probation cohort. The coefficients found for each set of analyses are not differentially greater than or less than one.

This analysis includes a new measure of arrest history that has not appeared in past CJC analyses: arrest history score. The arrest history score is a weighted history of an offender's arrests calculated at a given date. In our sample, that date is the day on which an offender is released from confinement or sentenced to probation. The exact calculation is: arrest history score = (4 * number of arrests between the date and 1 year before the date) + (2 * number of arrests between 1 year before the date and 2 years before the date) + (2 * number of arrests between 2 years before the date and 3 years before the date) + (2 * number of arrests between 3 years before the date and 4 years before the date) + (number of arrests between 4 years before the date and 5 years before the date). Any arrests that occur five years or more before the date are not counted. A maximum of one arrest per day is counted.

For all analyses described in this report, we use a corrected race/ethnicity variable. Several data sets we rely on have known discrepancies between third-party reported race/ethnicity values and self-reported race/ethnicity values. In particular, third-party reported race/ethnicity variables include a higher proportion of White observations and lower proportions of Hispanic, Native American, and Asian observations when compared to self-reported information. The full technical documentation for the race/ethnicity correction methodology is on the CJC website.[11]

Table 5.1.2. Variables with Missing Values

Variable	Number Missing	Percent Missing
Sex	16	0.01%
Age	5,829	2.67%
Arrest History Score	14,595	6.69%
Race/Ethnicity	86	0.04%
Crime Category	5,827	2.67%

Despite the richness of the data the CJC has access to, there are some limitations. We cannot identify the exact date that someone was released from confinement or sentenced to probation for less than 3 percent of the data. For these individuals we cannot calculate the time to recidivism and they are therefore censored. Our hazard model can accommodate for censoring without adjustment. Also, for some observations, we are missing offender characteristics (Table 5.1.2). These gaps in the data do not affect how we calculate recidivism rates, however for our hazard analyses, we must restrict the sample to include only individuals who we have complete data for. So for example, if we include sex as a variable of interest that may affect the time to recidivate, our model will drop 16 observations which do not have a recorded sex. We run a

[11] https://www.oregon.gov/cjc/CJC%20Document%20Library/RaceCorrectionTechDocFinal-8-6-18.pdf

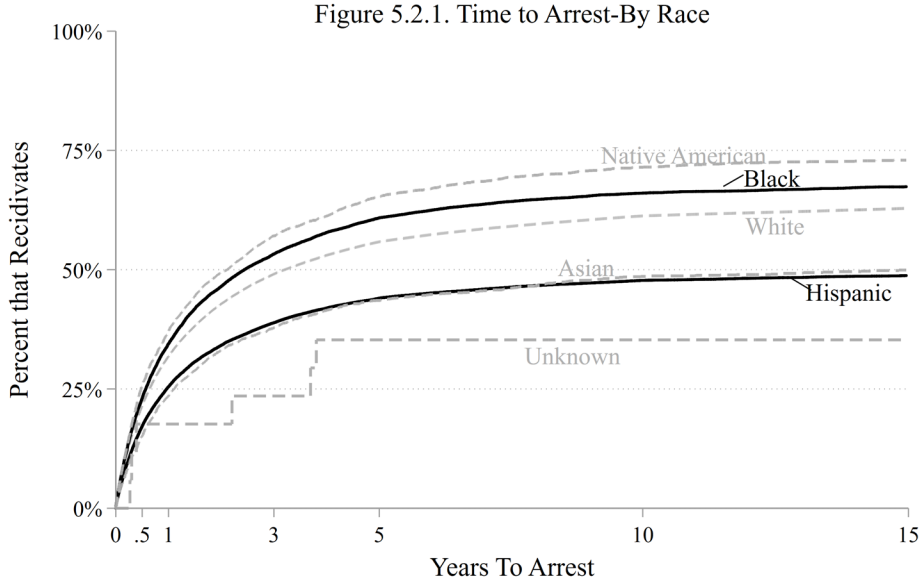
simplified survival analysis including only race/ethnicity, sex, and the "repeated?" indicator. We believe that the occasionally incomplete covariates are important in explaining recidivism risk for those individuals we have data on. So, we include all covariates listed in Table 5.1.2 in our preferred model even though we lose up to 14,595 people out of the sample.

5.2. Challenges with Race/Ethnicity Variable

In our preferred model we use Black, Hispanic, and Other as our race/ethnicity categories as they are the most detailed race/ethnicity variables that we can use while avoiding some of the problems laid out in this section.

Figure 5.2.1 displays the Kaplan-Meier curves for our detailed race/ethnicity variable. A high percentage of Asian and Hispanic offenders are never rearrested, compared to Black and Native American offenders. There are very few Native American offenders in the sample, so this effect could be driven by few people.

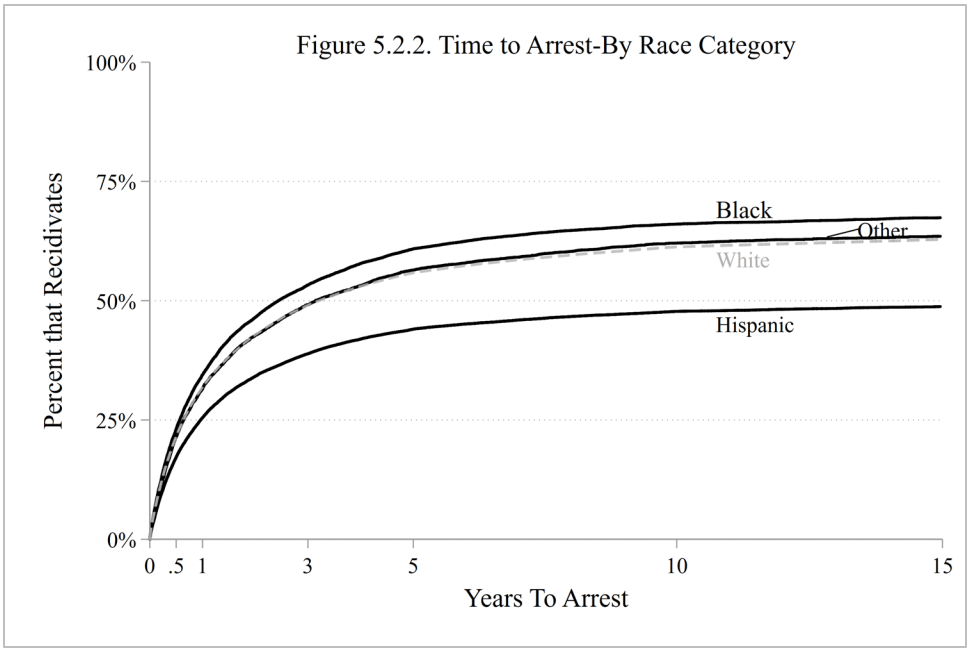
Figure 5.2.1. Time to Arrest-By Race



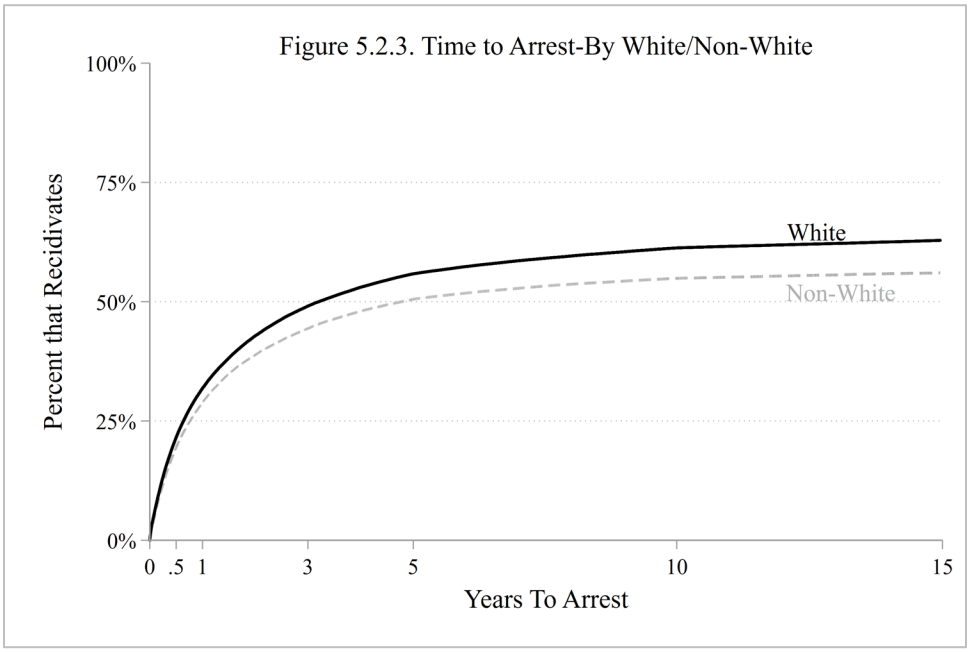
However, Figure 5.2.1 exposes two problems with including this detailed race/ethnicity variable in our survival model. The unknown curve is not smooth. .01 percent of the sample is of unknown race/ethnicity. That means we do not have sufficient power to identify any differences between unknown race/ethnicity and any other race/ethnicity. It is also a problem that the Asian and Hispanic Kaplan-Meier curves cross. Kaplan-Meier curves serve as a way to test an important assumption for the cox proportional hazard model. If any of the Kaplan-Meier curves cross, that violates the proportionality assumption, and we cannot include that variable in our analysis while maintaining validity of the model. So, as seen in Figure 5.2.1, we cannot define race/ethnicity as falling into six categories: White, Black, Hispanic, Asian, Native American, and Unknown.

To circumvent the statistical challenge of small sample sizes we consider aggregating up the race/ethnicity variables into the categories: White, Black, Hispanic, and Other. However, the Kaplan-

Meier curves for White and Other cross (Figure 5.2.2). That means we cannot use this race/ethnicity classification either, as the proportional hazards assumption of the cox proportional hazard model will be violated.



We consider using another race/ethnicity aggregation: White, non-White. For these classifications, the Kaplan-Meier curves do not cross (Figure 5.2.3). When we aggregate up race/ethnicity into just White and non-White, the proportion of White offenders that recidivate is higher than the proportion of non-White offenders that recidivate. This is a problem because a higher proportion of both Black and Native American offenders recidivate when compared to White offenders. By aggregating up our race/ethnicity variables into just White and non-White, the low proportion of Hispanic and Asian offenders that recidivate washes out any effect of Black and Native American offenders.



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7. Appendix

7.1. Tables

Table A.1. Statewide Recidivism Rates for Probation Cohort

	Arrest Rate					Conviction Rate					Incarceration Rate				
Cohort	1-Year	3-Year	5-Year	10-Year	15-Year	1-Year	3-Year	5-Year	10-Year	15-Year	1-Year	3-Year	5-Year	10-Year	15-Year
1998/1ST	32%	48%	54%	61%	63%	38%	51%	56%	63%	64%	5%	12%	15%	20%	22%
1998/2ND	30%	47%	53%	61%	63%	36%	49%	55%	62%	64%	5%	11%	14%	19%	21%
1999/1ST	29%	46%	53%	61%	63%	34%	47%	53%	60%	63%	5%	11%	15%	20%	22%
1999/2ND	31%	46%	52%	60%	62%	34%	47%	53%	61%	63%	5%	11%	14%	19%	21%
2000/1ST	30%	46%	53%	60%	62%	31%	45%	51%	59%	61%	4%	11%	15%	20%	22%
2000/2ND	31%	46%	53%	59%	61%	32%	46%	52%	59%	61%	5%	11%	14%	19%	21%
2001/1ST	29%	44%	51%	58%	61%	31%	44%	51%	58%	60%	5%	11%	15%	20%	22%
2001/2ND	29%	45%	51%	59%	61%	32%	46%	52%	58%	61%	5%	12%	15%	20%	22%
2002/1ST	29%	45%	51%	59%	62%	31%	45%	51%	58%	61%	6%	13%	16%	21%	23%
2002/2ND	27%	44%	51%	58%	61%	27%	42%	49%	56%	59%	4%	12%	15%	19%	22%
2003/1ST	28%	45%	51%	58%		25%	41%	47%	55%		5%	11%	15%	19%	
2003/2ND	29%	46%	52%	60%		28%	43%	50%	57%		6%	13%	16%	20%	
2004/1ST	31%	47%	54%	62%		28%	44%	50%	59%		6%	13%	17%	21%	
2004/2ND	32%	48%	54%	62%		27%	43%	49%	57%		6%	13%	16%	20%	
2005/1ST	32%	48%	55%	62%		28%	44%	50%	57%		7%	13%	17%	21%	
2005/2ND	30%	46%	53%	60%		27%	43%	49%	56%		6%	12%	15%	20%	
2006/1ST	30%	46%	53%	60%		26%	41%	49%	56%		5%	12%	15%	20%	
2006/2ND	31%	46%	52%	60%		26%	40%	47%	54%		6%	11%	14%	19%	
2007/1ST	28%	44%	51%	59%		23%	38%	45%	54%		5%	10%	14%	19%	
2007/2ND	27%	43%	50%	58%		23%	38%	45%	52%		4%	10%	13%	18%	
2008/1ST	25%	41%	49%			21%	36%	43%			4%	10%	13%		
2008/2ND	25%	42%	49%			22%	37%	43%			4%	10%	13%		
2009/1ST	25%	42%	49%			21%	36%	42%			4%	9%	13%		
2009/2ND	27%	44%	50%			22%	37%	44%			5%	10%	13%		
2010/1ST	29%	45%	53%			23%	38%	45%			5%	11%	15%		
2010/2ND	29%	45%	52%			24%	38%	45%			4%	11%	14%		
2011/1ST	30%	46%	52%			25%	39%	46%			6%	12%	16%		
2011/2ND	29%	46%	53%			25%	40%	47%			6%	13%	17%		

2012/1ST	29%	45%	52%	24%	39%	46%	5%	12%	16%
2012/2ND	31%	47%	54%	25%	41%	48%	6%	13%	17%

Table A.2. Statewide Recidivism Rates for Parole Cohort

	Arrest Rate					Conviction Rate					Incarceration Rate				
Cohort	1-Year	3-Year	5-Year	10-Year	15-Year	1-Year	3-Year	5-Year	10-Year	15-Year	1-Year	3-Year	5-Year	10-Year	15-Year
1998/1ST	31%	49%	55%	60%	62%	18%	37%	45%	53%	56%	4%	13%	19%	26%	28%
1998/2ND	33%	52%	58%	64%	66%	20%	39%	48%	58%	61%	5%	15%	21%	28%	31%
1999/1ST	36%	55%	62%	67%	70%	23%	44%	53%	61%	64%	6%	16%	22%	29%	33%
1999/2ND	38%	57%	64%	71%	73%	23%	45%	54%	63%	66%	6%	18%	24%	31%	35%
2000/1ST	36%	55%	61%	68%	70%	20%	44%	53%	62%	65%	6%	16%	22%	30%	32%
2000/2ND	36%	55%	61%	68%	71%	23%	44%	53%	62%	65%	6%	17%	24%	31%	34%
2001/1ST	36%	54%	61%	67%	70%	22%	42%	52%	61%	65%	7%	17%	23%	30%	33%
2001/2ND	36%	54%	61%	67%	69%	21%	43%	53%	61%	64%	5%	17%	24%	31%	35%
2002/1ST	36%	53%	60%	66%	68%	21%	42%	51%	60%	62%	6%	16%	23%	30%	33%
2002/2ND	32%	53%	60%	67%	69%	18%	41%	51%	60%	63%	6%	18%	24%	31%	34%
2003/1ST	34%	52%	59%	65%		20%	41%	50%	59%		7%	18%	24%	32%	
2003/2ND	34%	51%	57%	64%		20%	40%	49%	58%		6%	18%	23%	29%	
2004/1ST	35%	53%	59%	66%		21%	43%	51%	59%		6%	19%	24%	30%	
2004/2ND	38%	54%	61%	66%		22%	44%	52%	60%		7%	18%	23%	29%	
2005/1ST	35%	54%	60%	67%		21%	42%	51%	59%		7%	17%	22%	30%	
2005/2ND	36%	53%	59%	67%		21%	42%	50%	59%		6%	16%	22%	29%	
2006/1ST	38%	53%	59%	66%		20%	40%	49%	58%		6%	16%	21%	28%	
2006/2ND	34%	51%	58%	64%		20%	39%	48%	57%		6%	15%	20%	27%	
2007/1ST	35%	53%	59%	67%		19%	40%	49%	58%		6%	15%	21%	28%	
2007/2ND	32%	51%	58%	64%		19%	39%	48%	56%		6%	16%	21%	28%	
2008/1ST	32%	50%	56%			19%	40%	47%			5%	15%	21%		
2008/2ND	31%	50%	57%			18%	38%	47%			5%	15%	20%		
2009/1ST	32%	50%	56%			16%	36%	45%			5%	14%	20%		
2009/2ND	32%	50%	56%			19%	38%	46%			5%	14%	20%		
2010/1ST	30%	49%	55%			19%	37%	46%			5%	14%	21%		
2010/2ND	34%	52%	58%			20%	39%	48%			5%	16%	22%		
2011/1ST	34%	51%	57%			20%	38%	46%			5%	15%	21%		
2011/2ND	35%	52%	58%			21%	40%	47%			7%	17%	22%		
2012/1ST	35%	53%	58%			20%	40%	47%			5%	16%	23%		
2012/2ND	37%	55%	60%			21%	41%	49%			6%	17%	23%		

Table A.3. Recidivism Rate for Probation Cohort (2007, Second Six Months)

Crime Type	*Follow-up Period* 1 Year	3 Years	5 Years	10 Years
		Arrest Rate		
Drug Possession	29.9%	46.4%	54.2%	61.0%
Drug Sale/Transport	28.1%	44.3%	51.3%	58.4%
Person	23.2%	38.4%	46.8%	54.2%
Property	29.8%	48.3%	55.9%	63.0%
Sex	19.7%	30.6%	40.1%	49.7%
Other	24.4%	41.1%	48.4%	58.1%
		Conviction Rate		
Drug Possession	26.9%	42.2%	48.8%	55.2%
Drug Sale/Transport	24.1%	39.3%	45.7%	52.1%
Person	19.8%	31.3%	40.5%	47.9%
Property	25.7%	43.9%	50.8%	58.5%
Sex	20.4%	27.9%	32.7%	40.1%
Other	19.5%	35.4%	42.9%	50.7%
		Incarceration Rate		
Drug Possession	3.7%	9.5%	13.5%	18.1%
Drug Sale/Transport	3.4%	9.1%	12.8%	17.1%
Person	3.6%	8.4%	11.4%	18.3%
Property	6.2%	13.8%	17.5%	23.2%
Sex	2.7%	6.8%	7.5%	12.9%
Other	3.7%	8.4%	11.2%	16.4%

Table A.4. Recidivism Rate for Parole Cohort (2007, Second Six Months)

Crime Type	*Follow-up Period* 1 Year	3 Years	5 Years	10 Years
		Arrest Rate		
Drug Possession	43.4%	60.4%	67.3%	75.0%
Drug Sale/Transport	38.1%	56.4%	63.4%	70.4%
Person	29.7%	49.9%	57.7%	64.5%
Property	35.6%	57.0%	63.7%	68.8%
Sex	19.2%	35.3%	43.5%	48.6%
Other	35.9%	57.6%	65.6%	72.5%
		Conviction Rate		
Drug Possession	27.8%	49.8%	58.1%	66.8%
Drug Sale/Transport	24.0%	45.4%	53.5%	62.2%
Person	16.1%	36.3%	47.0%	56.3%
Property	22.7%	47.5%	55.5%	63.7%
Sex	8.2%	19.6%	29.0%	36.9%
Other	20.3%	40.4%	52.5%	62.3%
		Incarceration Rate		
Drug Possession	7.2%	16.5%	21.6%	27.5%
Drug Sale/Transport	6.0%	16.0%	20.7%	26.8%
Person	5.8%	15.0%	19.6%	27.4%
Property	7.7%	20.0%	27.2%	34.9%
Sex	2.4%	6.7%	10.6%	18.4%
Other	8.3%	19.2%	24.6%	33.9%

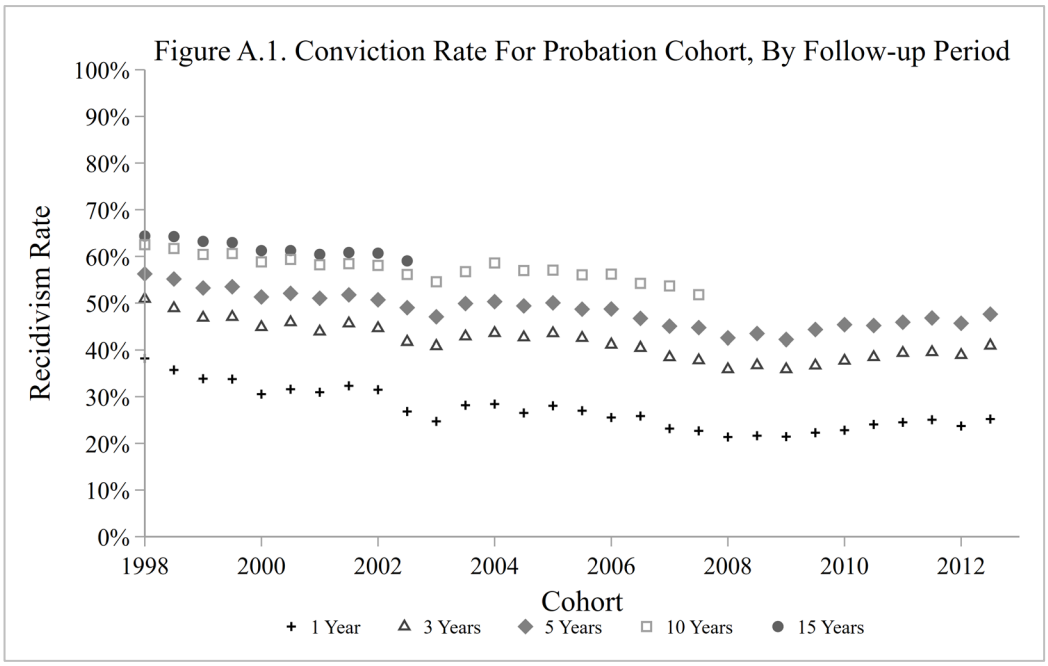
Table A.5. Recidivism Rate for Probation Cohort (2012, Second Six Months)

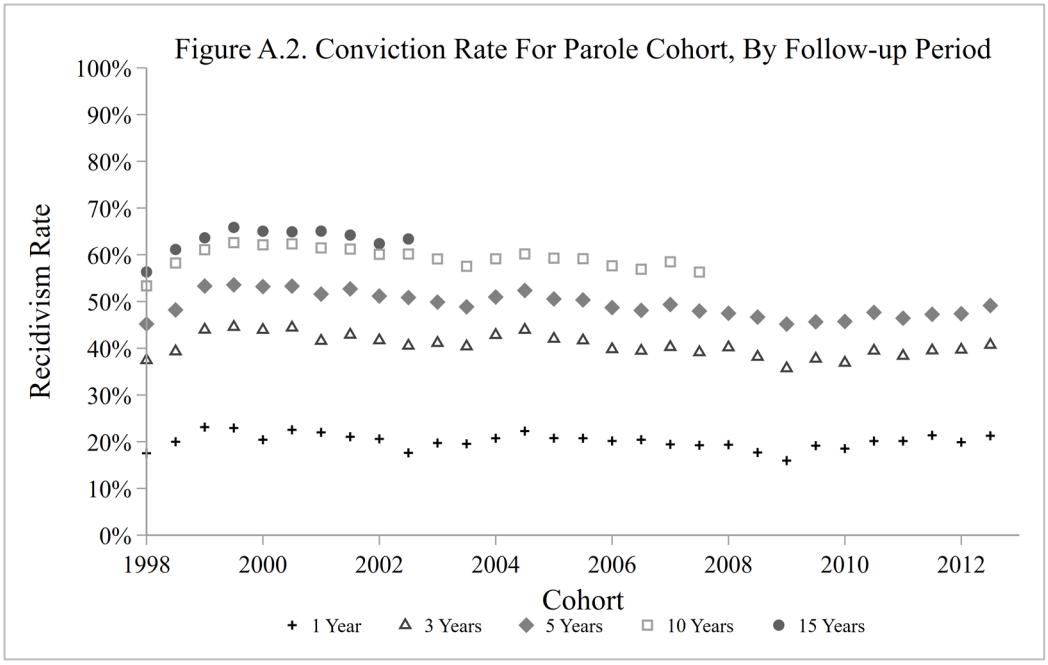
Crime Type	*Follow-up Period* 1 Year	3 Years	5 Years
	Arrest Rate		
Drug Possession	41.2%	57.2%	63.2%
Drug Sale/Transport	36.2%	51.0%	57.5%
Person	25.1%	42.7%	49.5%
Property	33.6%	49.1%	56.9%
Sex	11.9%	28.8%	34.7%
Other	27.9%	46.2%	53.1%
	Conviction Rate		
Drug Possession	34.1%	51.2%	57.3%
Drug Sale/Transport	29.5%	45.5%	51.1%
Person	18.5%	33.5%	40.7%
Property	28.6%	44.7%	51.3%
Sex	12.7%	26.3%	33.1%
Other	20.5%	37.1%	45.9%
	Incarceration Rate		
Drug Possession	7.3%	16.1%	20.1%
Drug Sale/Transport	6.6%	14.1%	17.8%
Person	4.1%	10.7%	14.6%
Property	7.2%	14.3%	19.6%
Sex	5.1%	8.5%	12.7%
Other	5.2%	11.1%	16.2%

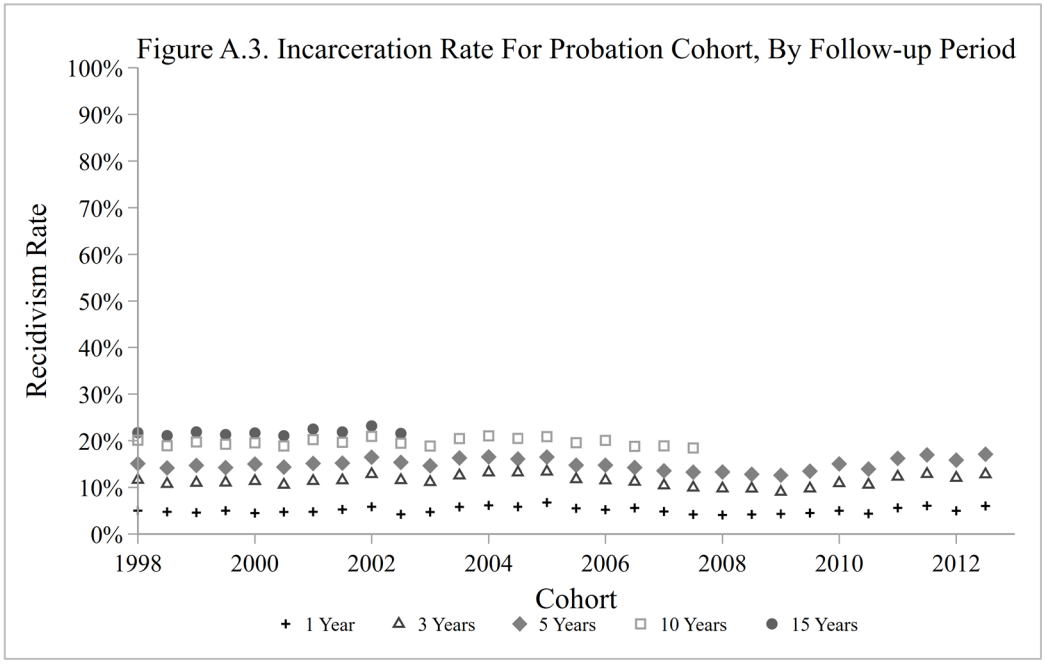
Table A.6. Recidivism Rate for Parole Cohort (2012, Second Six Months)

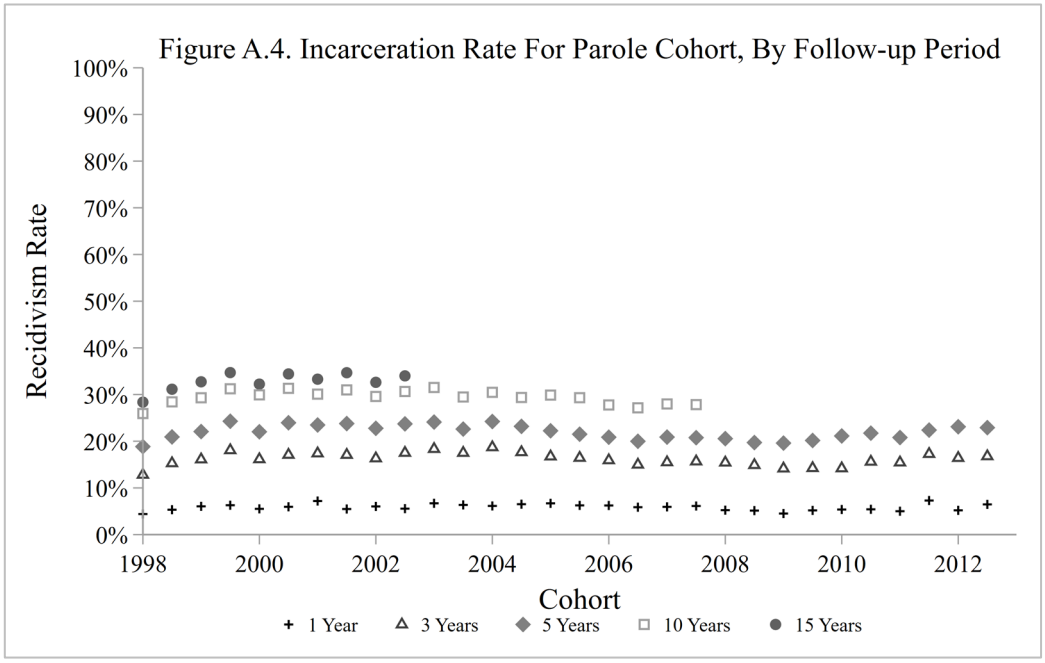
Crime Type	*Follow-up Period* 1 Year	3 Years	5 Years
	Arrest Rate		
Drug Possession	54.8%	71.0%	75.8%
Drug Sale/Transport	45.4%	61.7%	66.3%
Person	30.0%	49.0%	56.1%
Property	41.3%	60.8%	67.4%
Sex	22.0%	38.1%	42.9%
Other	37.3%	56.9%	64.3%
	Conviction Rate		
Drug Possession	34.8%	53.5%	61.8%
Drug Sale/Transport	27.9%	46.8%	54.6%
Person	15.4%	33.3%	43.5%
Property	24.4%	49.0%	58.9%
Sex	8.6%	22.0%	28.4%
Other	21.2%	43.1%	51.3%
	Incarceration Rate		
Drug Possession	10.2%	21.2%	27.3%
Drug Sale/Transport	7.8%	17.7%	23.9%
Person	4.6%	14.4%	21.5%
Property	8.1%	21.3%	29.2%
Sex	2.2%	7.1%	10.1%
Other	7.2%	19.6%	24.9%

7.2. Figures


Figure A.1. Conviction Rate For Probation Cohort, By Follow-up Period
Recidivism Rate
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1998
2000
2002
2004
2006
2008
2010
2012
Cohort
1 Year
3 Years
5 Years
10 Years
15 Years


Figure A.2. Conviction Rate For Parole Cohort, By Follow-up Period
Recidivism Rate
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1998
2000
2002
2004
2006
2008
2010
2012
Cohort
1 Year
3 Years
5 Years
10 Years
15 Years


Figure A.3. Incarceration Rate For Probation Cohort, By Follow-up Period
Recidivism Rate
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1998
2000
2002
2004
2006
2008
2010
2012
Cohort
1 Year
3 Years
5 Years
10 Years
15 Years


Figure A.4. Incarceration Rate For Parole Cohort, By Follow-up Period
Recidivism Rate
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1998
2000
2002
2004
2006
2008
2010
2012
Cohort
1 Year
3 Years
5 Years
10 Years
15 Years