Benchmarking the 2020 Q4 Vintage of the Criminal Justice Administrative Records System's Data Infrastructure

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Abstract

The goal of the Criminal Justice Administrative Records System (CJARS) is to build a data infrastructure to support individual-level research and administration of the U.S. criminal justice system. Achieving this goal requires validation of the data collected and processed by CJARS against other reliable sources of data. The purpose of this report is to convey the findings of a series of exercises that were conducted to benchmark the CJARS data infrastructure against other widely-used sources of data on justice-involved populations (i.e., Uniform Crime Report, State Court Processing Statistics, National Prisoners Statistics Program, National Corrections Reporting Program, Annual Probation Survey, and Annual Parole Survey). This involved comparing counts of events and caseload characteristics reported in these data series to similar estimates produced using CJARS. Results indicated that there was a high degree of alignment between the counts of events and caseload characteristics that were estimated using CJARS as compared to the data series that were used for benchmarking. The findings reviewed in this report provide a substantial amount of evidence in support of the efficacy of the CJARS data infrastructure.

1 Introduction

The Criminal Justice Administrative Records System (CJARS) is a data collection effort and dissemination platform, founded in 2016, aiming to modernize research and statistical reporting on the criminal justice system and to strengthen capacity for evidence-based policy making in the U.S. The data infrastructure is a partnership between the University of Michigan and U.S. Census Bureau, made possible with the generous financial support of the National Science Foundation, the Bill and Melinda Gates Foundation, the Laura and John Arnold Foundation, the Michigan Institute for Teaching and Research in Economics, and Poverty Solutions at the University of Michigan.

CJARS collects, harmonizes, and integrates administrative data across five primary domains of the U.S. justice system, which parallels the organizational structure of it's relational database architecture: arrest, adjudication, incarceration, probation, and parole. Currently, CJARS is built off of over 2 billion lines of raw data, covering over 33 million individuals, 133 criminal justice events, occurring in 18 states. The depth of historical data coverage varies by jurisdiction, but many states include series that extend back over 4 decades.

In contrast to prior data collection efforts, CJARS produces and curates individual-level criminal histories, linking the evolution of a single criminal episode across the stages of the justice system, and tracking individuals across space and time to fully capture the sum total of their contact with the justice system. CJARS can then be linked at the individual-level with a range of socio-economic data held in the Census Bureau's Federal Statistical Research Data Center (FSRDC) network, including self-reported demographic characteristics, evolving family composition and place of residence, employment and earnings behavior, take-up of public benefit programs, and mortality.[1]

The U.S. lacks uniform rules across state and local jurisdictions on the privacy afforded to justice-involved individuals and what criminal justice contact is deemed public information. Likewise, there is substantial heterogeneity in the development of data access mechanisms for researchers across the country. Lacking authority to compel data provision, CJARS relies on multiple strategies for opportunistic data acquisition. These include data use agreements, public records requests, web scraping, bulk data downloads, and data donations.[2] Data arrives in provider-specified formats and structures, which then have to be reconciled by staff at the University of Michigan.

The nature of CJARS data collection provides the project flexibility and agility in response to changing legal and regulatory environments for criminal justice data across jurisdictions and over time. But, it also creates a number of serious challenges, including: (1) numerous distinct native data layouts, (2) inconsistent value codes or free entry fields for categorical variables, (3) inadequate unique identifiers for individuals across data providers, and (4) potential duplicative coverage of individual criminal justice events when receiving data from multiple providers with overlapping

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[1]A list of restricted-use U.S. Census Bureau data that can be linked to CJARS records is provided here: https://www2.census.gov/about/linkage/data-file-inventory.pdf.

[2]More details about data collection and data documentation can be found on the CJARS website: https://cjars.isr.umich.edu/.

jurisdiction or when receiving multiple rounds of data over time from the same agency.

CJARS has endeavored to tackle these challenges head-on, developing innovative solutions that enhance the data product and strengthen the research community overall. All data goes through an extensive harmonization process, bringing local data structures into a common national schema, to facilitate integration of records across jurisdictions.[3] Offense fields are processed through a novel hierarchical machine learning model that our team has pioneered to translate 4.1 million unique descriptions into 271 distinct offense types. Personally identifying information is compared across records, using our own newly developed random forest algorithm trained on biometrically linked data to determine which records from the hundreds of jurisdiction we cover belong to the same person.[4] Finally, we employ an extensive deduplication process in our harmonization algorithm to ensure that individual events are not represented multiple times when sourced from multiple agencies with overlapping data coverage.[5]

Due to the variation in data collection methods and the numerous creative solutions required to coherently process the data, there is a fundamental need to benchmark CJARS against other available data series, mainly published by the Bureau of Justice Statistics, to both validate the strengths of CJARS and to highlight its potential weaknesses. Researchers should have a resource to gauge the credibility and reliability of CJARS, especially when alternative forms of aggregate statistical reporting already exist.

In this report, we will compare CJARS-based statistics to other widely used statistical series on the U.S. criminal justice system. We evaluate CJARS against the following data collection efforts: Uniform Crime Report (UCR), State Court Processing Statistics (SCPS), National Prisoners Statistics (NPS) Program, National Corrections Reporting Program (NCRP), Annual Probation Survey, and Annual Parole Survey. These federal data series provide common reference across states and localities included in the CJARS data infrastructure, and considerable historical data to assess changing data quality over time. Our focus is on benchmarking the CJARS data at the state-level rather than aggregating across all CJARS states whenever possible because the U.S. criminal justice system is a largely decentralized system. This is reflected in CJARS data collection practices and harmonization efforts.

Our analysis focuses on reproducing caseload count and flow estimates (e.g., yearly entries into prison as measured in the NPS), as well as caseload characteristics and outcomes (e.g., demographic traits of defendants in SCPS data) in CJARS-covered jurisdictions. While no statistical reporting should ever be viewed as inherently indefectible, CJARS-based estimates that closely corroborate existing federal estimates provide important evidence on the quality and accuracy of our nascent data infrastructure endeavor and the non-sampled, linkable micro-data that the CJARS-based

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[3]More information on this process can be found in the CJARS data documentation: https://cjars.isr.umich.edu/data-documentation-download/.

[4]Findings from algorithm development and validation efforts can be found here: https://cjars.isr.umich.edu/entity-resolution-download/.

[5]More information on deduplication can be found in the CJARS data documentation: https://cjars.isr.umich.edu/data-documentation-download/.

estimates are built off of.

The remainder of this report is organized as follows. Sections 2 through 6 respectively address benchmarking performance on arrest, adjudication, incarceration, probation, and parole statistics. Section 7 provides a discussion and conclusion. Finally, it should be noted that this benchmarking reporting will remain a living document, updated on a periodic basis as CJARS refines its data processing algorithms and new states are added to the platform.[6]

2 CJARS Arrests and the UCR

Arrest and booking information in CJARS is constructed primarily from data collected from law enforcement agencies such as police departments and sheriff's offices. This database is recorded at the arresting/booking charge-level and contains information on arrest/booking dates and offense type. To evaluate the accuracy of these records, we rely on the UCR.

The focus of the exercises conducted here was to compare records of arrest in CJARS to arrests reported to the UCR. It is also worth mentioning that there is a substantial amount of data on bookings in CJARS that has been collected from 16 counties in the U.S. This data on bookings was not compared to the UCR arrest counts because differences in the nature of the two types of events prevents meaningful comparisons.

Uniform Crime Reports (UCR)

The UCR program collects information from law enforcement agencies on arrests, clearances, trends, and law enforcement employee data. Data are collected from about 18,000 law enforcement agencies. These include city, university and college, county, state, tribal, and federal law enforcement agencies.

The UCR program collects data on the incidence of arrests and classifies counts of reported arrests into a pre-defined offense classification schema. Agencies are asked to report offense information on the most serious arresting offense (if there were multiple) using the UCR program's hierarchy rule.[7] Part I offenses are classified into a number of categories, including: criminal homicide, rape, robbery, aggravated assault, burglary, larceny-theft (except motor vehicle theft), motor vehicle theft, and arson. The FBI publishes a wide range of crime statistics each year using UCR data.[8]

The FBI has several systems in place to ensure quality and accuracy of the data submitted by the different agencies. First, the FBI provides these agencies with training and education opportunities on participation in the UCR program. Second, the FBI has a system called Quality Assurance

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[6]Readers with ideas for additional validation exercises are encouraged to contact us at cjars-staff@umich.edu.

[7]More details about the hierarchy rule can be found in this UCR user manual: https://www.fbi.gov/file-repository/ucr/ucr-srs-user-manual-v1.pdf/view

[8]For an example of the *Arrests* table, see: https://ucr.fbi.gov/crime-in-the-u.s/2015/crime-in-the-u.s.-2015/tables/table-69

Review that assesses data quality and accuracy. Third, the FBI publishes extensive user manuals that provide agencies with a significant amount of information regarding participation in the UCR program.

Comparing CJARS Arrests to the UCR

The count of arrests by offense type that occur in a county can be estimated using both CJARS and the UCR, providing a useful source of external validation for CJARS arrest data. It is important to note that there is no expectation that arrest records in CJARS will cover all arrests in a given county where data has been collected because CJARS collects arrest data from individual policing agencies that have jurisdiction over a city/township (e.g., Los Angeles Police Department). This means that the counts of arrests within the CJARS data for a given county will not reach those reported in the UCR because CJARS data does not cover all jurisdictions within the county. For example, while the Los Angeles Police Department represents a substantial proportion of the arrests that occur in the county, there are many arrests that occur within the county that are not conducted by the Los Angeles Police Department.

Figure 1 documents the yearly percentage of arrests in CJARS relative to the aggregated county-level counts reported by the FBI using UCR program data.[9] Each line represents a different Part I offense, including an overall measure for any type of offense (which excludes traffic offenses as per UCR data collection practices). Each panel focuses on a county where CJARS has collected data from a policing agency or agencies.

The four counties in Figure 1 include Kern County, Los Angeles County, San Diego County, and San Joaquin County (all counties in California). Data in Kern County are from the Bakersfield Police Department, data in Los Angeles County are from Los Angeles and Long Beach Police Departments, data in San Diego County are from the San Diego Police Department, and data in San Joaquin County are from the Stockton Police Department.

There are several meaningful patterns worth discussing in these four graphs. First is what appears to be a difference in coverage between any type of offense and the Part I offenses in Los Angeles County. This difference is due to the fact that prior to 2013, offense type descriptions in the data from the Los Angeles Police Department are mostly missing. Because the offense type was missing for most arrests, the arrests could not be categorized by offense type. However, the any type of offense category does not rely on offense type and so it was possible to track arrests in this all-encompassing category. As can be seen from the figure for Los Angeles County, counts of arrests in the CJARS data represent about half of the arrests that take place in Los Angeles County that are reported to the UCR from year to year.

Second, there are some instance where certain offense types fall above 100%, indicating that there are more arrests for these type of offense in CJARS data as compared to the UCR. There

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[9]In conformance with UCR practice, the charge-level CJARS arrest records are deduplicated to retain only the most serious offense associated with a given arrest.

are several factors that could contribute to this. One is incomplete coverage of agencies within the UCR or imputation problems. This is a known shortcoming of county-level UCR arrest data (Maltz & Targonski, 2002)[1]. Another plausible explanation is the quality of offense descriptions as recorded by an agency. CJARS uses a machine learning algorithm to categorize the vast array of free-form manually entered offense descriptions seen in the raw data it collects from agencies.[10] Poor quality offense descriptions recorded by agencies could lead to issues with identifying the appropriate arresting offense. Related, differences in offense classification between an agency's classification strategy and CJARS could lead to variation in classification as well.

Finally, there is variation that exists between the coverage across different types of offenses. This could be due to the fact that the police agencies covered in CJARS are not representative of crime as a whole in the county where they reside. A better indicator of coverage of arrests as a whole is the line in each graph which represents any type of offense. Examining the any type of offense category also forgoes issues related to the quality and coding of offense descriptions.

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[10]Extensive effort was put into the development and validation of this offense classification algorithm using a large amount of training data. Validation of the algorithm showed very high performance.

Figure (1)   Percentage of Arrests Reported to the UCR Covered by CJARS

(a) Kern County, CA
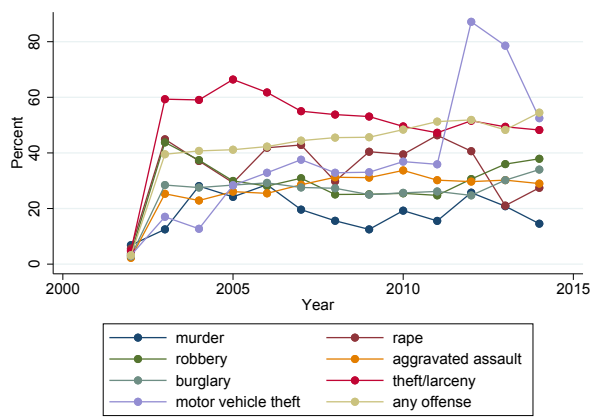
(b) Los Angeles County, CA
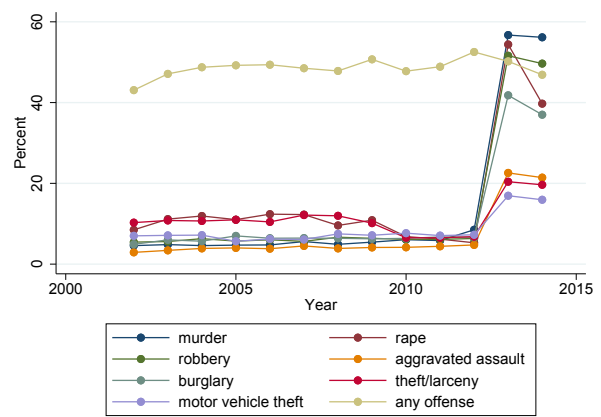
(c) San Diego County, CA
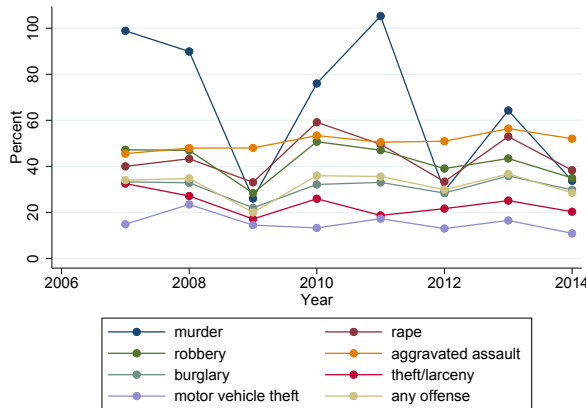
(d) San Joaquin County, CA
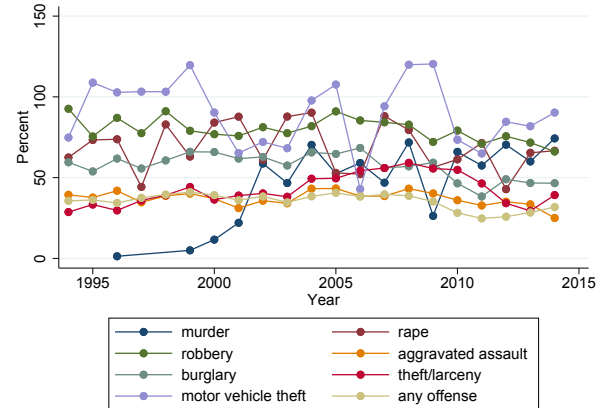
3   CJARS Adjudication and SCPS

The adjudication information in CJARS is constructed primarily by data collected from court systems. Data are recorded at the charge-level and include information on numerous types of event dates (e.g., offense, charge, disposition, sentencing), offense description, disposition outcomes, and types of sentences imposed. To assess accuracy of these records, we use SCPS data.

State Court Processing Series (SCPS)

Data collection for SCPS began in 1990 and occurred during even numbered years through 2006 and then occurred one additional time in 2009. SCPS was a Bureau of Justice Statistics (BJS) program. BJS decided to end data collection in 2009 due to limited utility of the data produced by the project.

The scope of SCPS data coverage was limited to the 75 most populous counties in the United States, but data was only actually collected in 40 of the counties. This data collection strategy was chosen because the 75 most populous counties in the United States account for an estimated half of all reported crimes. Two other limitations of SCPS data are that (1) only information on felony cases is collected and (2) only information on cases that were filed in the month of May of each year of data collection is included.[11]

SCPS includes information regarding charges at the time of arrest, defendant demographic characteristics, defendant criminal history, pretrial release and detention, disposition, and types of sentences. Data collected as part of SCPS was reported in the BJS publication series titled *Felony Defendants in Large Urban Counties.*[12]

3.0.1   Comparing CJARS Adjudication and SCPS

Various characteristics of caseload composition and case processing metrics can be calculated using both CJARS and SCPS which provides the opportunity to benchmark the CJARS adjudication data. It is also important to explain that the scope of the CJARS adjudication data has coverage far beyond what is covered in SCPS, and so there is no appropriate data points to benchmark much of the CJARS data. For this reason, we cannot benchmark a large majority of the CJARS adjudication data because they either are not from major metro areas, are not from the sampled years from SCPS, or they are not for felony cases, all which define the SCPS sampling design. As a result, our focus is on validating the subset of CJARS data that overlaps with the definition of the scope of SCPS. This still provides useful information on gauging the quality of the algorithms applied to all of our data.

Figure 2 provides scatter plots where comparable SCPS and CJARS statistics (e.g., average age of felony defendants) are plotted onto the y and x-axes, respectively. The color/shape of a point in a scatter plot represents a specific year. The expectation is that the plotted points will cluster around the reference line which has a slope equal to one. Clustering around the line indicates that the statistics generated using CJARS and SCPS are comparable. Scatter plots in Figure 2 are provided for comparisons made between average defendant age (years), racial composition of defendants (proportion by race/ethnicity), composition of defendants by gender (proportion by gender), disposition outcome (proportion by type of outcome), time between disposition and sentencing or "adjudication duration" (proportion by binned time category), average incarceration sentence length (months), average probation sentence length (months), and offense type (proportion by offense type category).

The are several examples where the statistics estimated using CJARS very closely match the same estimate from SCPS data. A good example is the graph for the composition of defendants by

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[11]These same exclusionary criteria were applied to the CJARS adjudication data to create comparable SCPS and CJARS samples of data.

[12]The *Felony Defendants in Large Urban Counties* reports are available here: https://www.bjs.gov/index.cfm?ty=pbse&sid=27

gender. In this graph, the proportion of defendants in each gender group are plotted for CJARS and SCPS on the x and y-axis, respectively. As can be seen from this graph in Figure 2, there is a high degree of clustering of points on the reference line. The two separate clusters are caused by the wide gap in the percentage of male versus female defendants. The cluster of points on the lower end of the graph are the yearly female percentages while the cluster of points on the higher end of the graphs are the yearly male percentages. These clusters are labeled in the graph.

Other examples of close correspondence between CJARS and SCPS include age, disposition outcome, and incarceration length. More variation exists for race/ethnicity, the timing of sentencing, and probation length. For example, the race/ethnicity graph shows that there were two clusters of points that show some deviation from the reference line. These two clusters represent plotted points for the percent of White and Hispanic defendants (labeled in the graph). The cluster of points on the far left of the graph represent points plotted for the yearly percentage of Hispanic defendants. The cluster of points nearest to the middle of the graph represent points plotted for the yearly percentage of White defendants. These differences likely arise from the jurisdictional differences in coverage between CJARS and SCPS.

Figure (2)   Correspondence Between CJARS and SCPS by Outcome

(a) Age

(b) Race/Ethnicity

(c) Gender

(d) Disposition Type
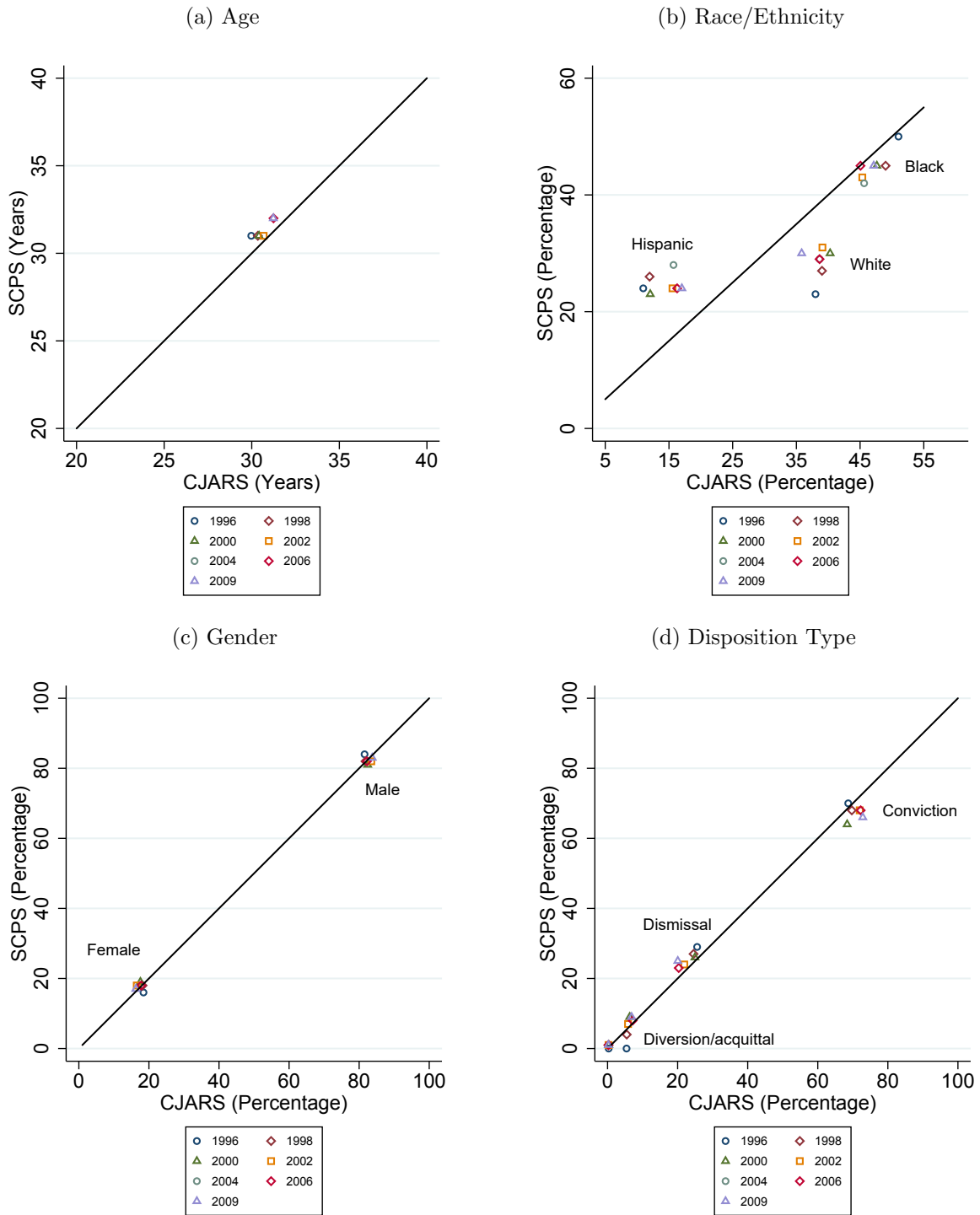
The next figure, Figure 3, provides a combined graph with all data points that were plotted in each of the graphs from Figure 2. All of the data points from the graphs in Figure 2 were standardized so that they could be plotted onto a single graph. The color/shape of the point

Figure (2)   Correspondence Between CJARS and SCPS by Outcome *continued*

(e) Adjudication Duration
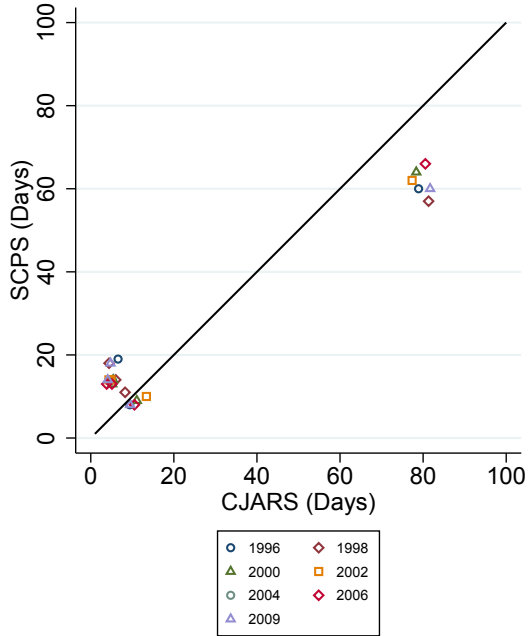
(f) Incarceration Length
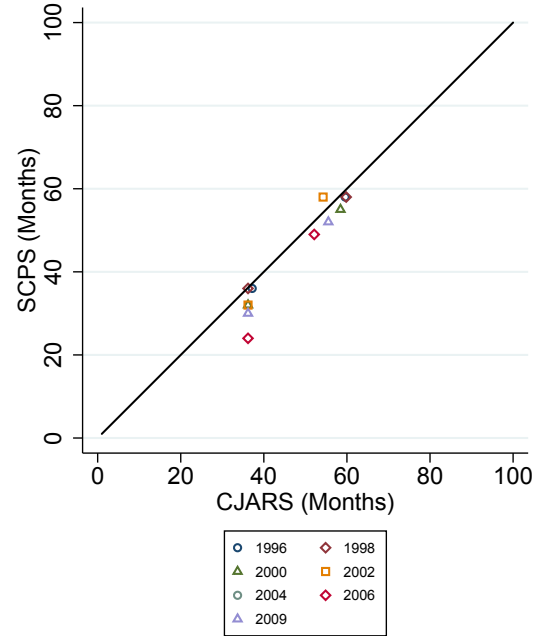
(g) Probation Length
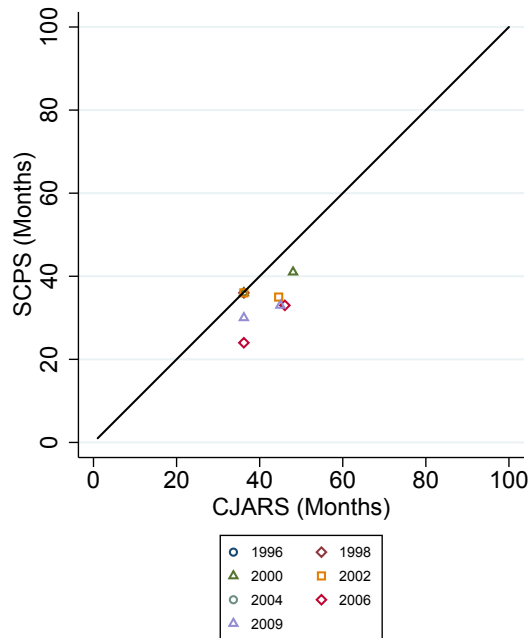
(h) Offense Type
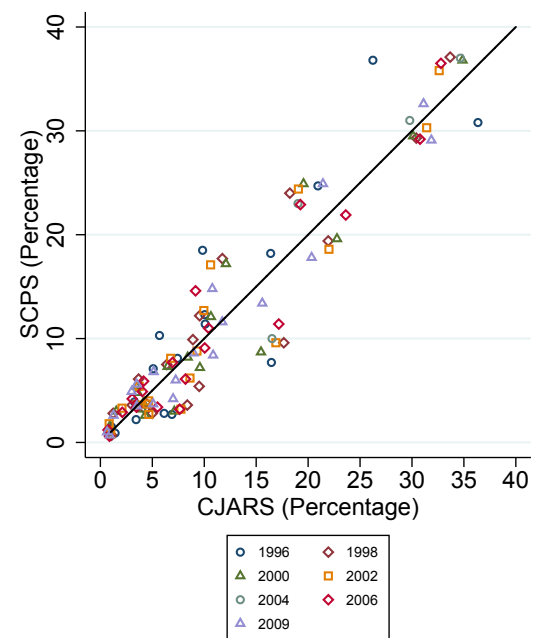
indicates which type of outcome it represents (e.g., offense type). Inspecting the graph shows that there is a high degree of clustering of points very near to the reference line. Some deviation exists as would be expected based on the results from the individual graphs in Figure 2. But taken as a whole, this graph shows that there is strong correspondence between CJARS and SCPS.

Figure (3)   Correspondence Between CJARS and SCPS for all Outcomes Combined and Standardized
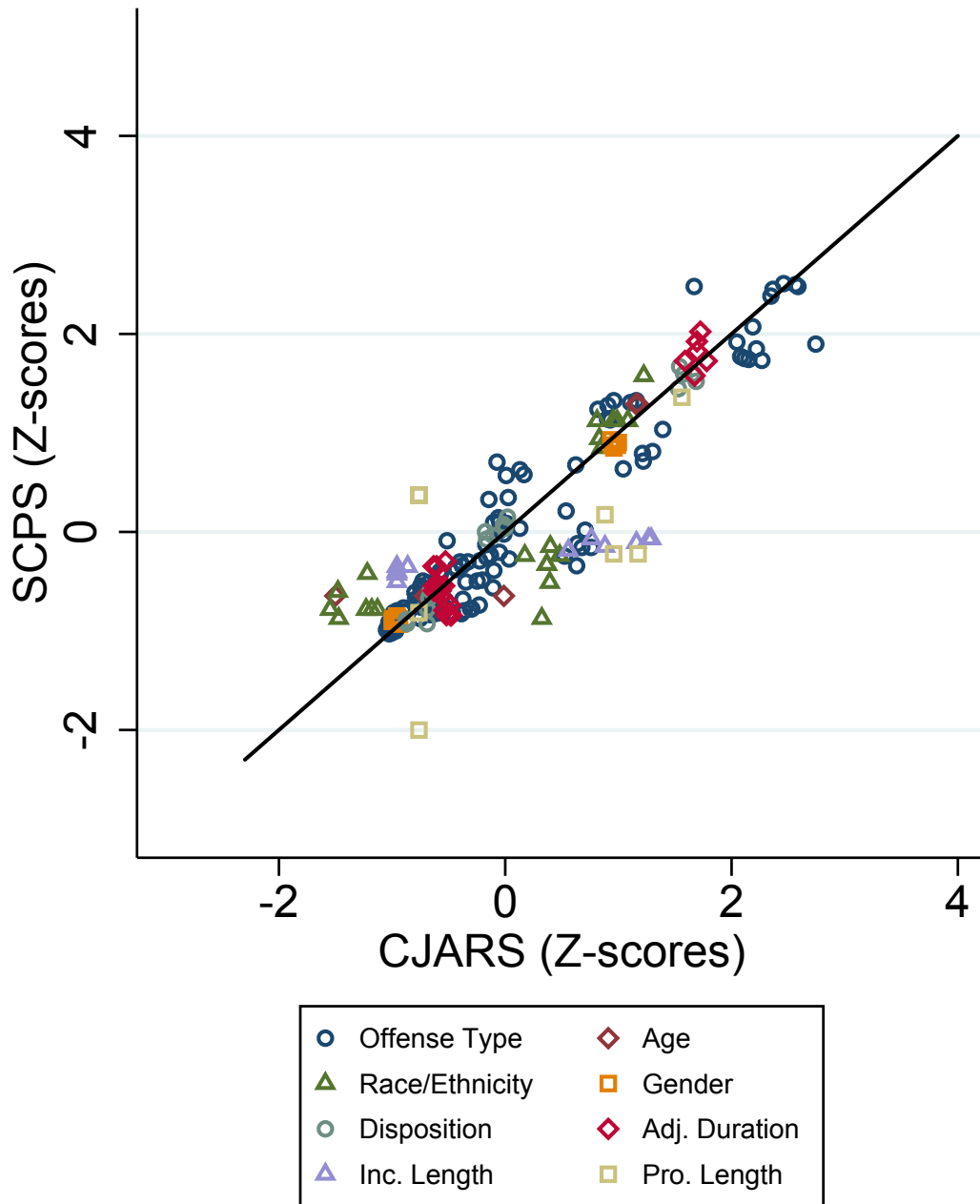
4 CJARS Incarceration and NPS/NCRP

Incarceration information in CJARS is constructed primarily from data collected from departments of corrections, but also other types of agencies that track this information such as departments of public safety. These data are recorded at the incarceration term-level and contain information on incarceration entry and exit dates, entry and exit descriptions, and type of facility information. We assess the accuracy of these records using two sources of data: the NPS and NCRP. The advantage of these exercises is that triangulation of results provides strong support for the efficacy of the CJARS incarceration data.

National Prisoner Statistics (NPS) program

The NPS program began in 1926 in response to a congressional mandate that required agencies to collect information on individuals incarcerated in state and federal prisons. The responsibility of data collection has shifted over time, but is currently under the U.S. Census Bureau.

The NPS program is an aggregate-level data series which provides information on yearly prison population counts, admissions, and releases at the state and federal level. Data are collected from numerous agencies, including the 50 state departments of corrections, Federal Bureau of Prisons, and the District of Columbia's detention facilities.

Data is collected for the NPS program through surveys that are sent to an identified contact person at each agency. The survey collects information on several aspects about the population of inmates under an agency's jurisdiction. These include: year-end population counts, admission/release counts in the specified year, system capacity, and questions about special populations of inmates. The survey also asks for further break downs of certain data by sex and race/ethnicity. Notably, all of these are aggregate counts, no individual-level data is collected.

Data from the NPS program are used in the BJS annual *Prisoners* publication.[13] The data is also used in the BJS *Corrections Statistical Analysis Tool (CSAT)*.[14]

National Corrections Reporting Program (NCRP)

In contrast to the aggregate-level data of the NPS, the NCRP collects individual-level data on inmates in state and federal prisons. BJS has administered the NCRP since 1983. In 2010, Abt Associates began data collection for the NCRP on behalf of BJS. Abt Associates is currently responsible for collecting, processing, and analyzing data collected from participating agencies.

Participation in the NCRP is voluntary and not all state agencies contribute data to the NCRP. However, 38 state agencies have contributed data since 2010, with even more agencies contributing in recent years (i.e., 47 in 2016).

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[13]The *Prisoners* reports are available here: https://www.bjs.gov/index.cfm?ty=pbse&sid=40
[14]The CSAT tools can be used here: https://www.bjs.gov/probation/ or https://www.bjs.gov/parole/

The NCRP collects data by asking participating agencies to provide information on individuals entering or leaving prison within a given year. This information is collected on an annual basis and includes details about an individual's prison entry date/prison release date and the circumstances of that individual's incarceration. Other individual-level information that is collected includes demographics, conviction offenses, sentence length, minimum time to be served, jail credit, type of admission, type of release, and the amount of time served.

Numerous publications and reports are generated by BJS and other institutions and individuals using NCRP data, such as the *Prisoners* report.

Comparing CJARS Incarceration to the NPS and NCRP

The incarceration information in CJARS provides information that can be compared to similar data from the NPS and NCRP which provides the opportunity to benchmark CJARS against multiple data series. All three data sources contain information that can be used to estimate yearly entry and exit counts as well as yearly incarcerated populations and rates. Based on 2019 incarcerated population estimates available from these data series, CJARS covers 41.7% of individuals incarcerated in state correctional facilities.[15]

Entry counts. Figure 4 provides a comparison of yearly entry counts as reported in the NPS, NCRP, and CJARS. A separate graph is given for each state that CJARS has historical data holdings from, which include: Arizona, Colorado, Florida, Michigan, Nebraska, North Carolina, Pennsylvania, Texas, Washington, and Wisconsin. In each graph, the blue line with circles represents CJARS, gray with triangles is the NPS, and black with diamonds is the NCRP.

There are several key findings apparent from the series of graphs in Figure 4. One observation is that the yearly counts seen in the CJARS data align exceptionally well in most cases with either the NCRP, NPS, or both. For example, Nebraska shows considerable alignment between CJARS, NPS, and NCRP across all years of the graph for this state. Other states where this is also true are Michigan and Pennsylvania.

In other states, CJARS aligns better with either the NPS or NCRP, but not both. This occurs due to substantial differences between the NPS and NCRP within a state. An example of this is in North Carolina. As can be seen from North Carolina's graph, CJARS and the NCRP align very closely across most years observed. However, the NPS reports much lower entry counts beginning in the late 1990s. Another example is the state of Washington where entry counts observed between CJARS and the NCRP are very similar. The NPS also reports similar entry counts in comparison to CJARS and the NCRP until the early 2000s when a large increase in entry counts is seen for the NPS.

Finally, there are some states where variation exists between entry counts reported in CJARS, NPS, and NCRP. For example, the graph for Colorado shows that when CJARS data coverage begins (approximately 2004), the entry counts seen in the CJARS data are higher than those of

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[15]This figure is based on states where CJARS has historical incarceration records.

the NPS and NCRP.[16] This gap closes however as time goes on. Another example is in Wisconsin where there is misalignment between all three data sources. Notably though, CJARS tends to fall somewhere in between the NPS and NCRP across many of the years observed.

Exit counts. Moving to Figure 5 provides a similar set of graphs as those in Figure 4, but for yearly incarceration exit counts. The key takeaway from this series of graphs is that the same state-level patterns observed for incarceration entries counts are also seen for exit counts. For example, the same states where CJARS, NPS, and NCRP show substantial alignment present the same pattern for exit counts (i.e., Michigan, Nebraska, and Pennsylvania). This was also true for the pattern seen where CJARS aligns better with either the NPS or NCRP (e.g., North Carolina) and for the pattern seen where there is variation among all three sources of data (e.g., Wisconsin).

Population counts and rates. The last two figures in this section, Figures 6 and 7, provide the annual year-end inmate population counts and incarceration rates for each state, respectively. Comparing state graphs across the two figures shows that the only difference between the two graphs is the scale of y-axis. Otherwise, the lines in accompanying state graphs are exactly the same. The two sets of graphs are presented separately however to give a sense of the absolute inmate population size as well as the rate per 100,000 of a state's population. Another important factor to make note of in these two figures is that the comparison being made is between CJARS and the NPS because there is not enough information available in the public version of the NCRP to produce the statistics presented in Figures 6 and 7.

As can be seen from the results in these two graphs, there is a high degree of similarity between population counts/incarceration rates in several states, such as Nebraska, Pennsylvania, Washington, and Wisconsin. In other states, there is a high degree of alignment across some years, but not all (e.g., Florida). It is worth noting though there were several instances when observing entry and exit counts where CJARS fell into better alignment with the NCRP as compared to the NPS. An example of this is North Carolina, where the largest difference exists when examining population counts/incarceration rates reported in CJARS and the NPS. This suggests that if these statistics were producible using the NCRP, CJARS would align better with the NCRP. Taking this into consideration, only the difference between CJARS and the NPS in Michigan cannot be explained by findings discussed earlier. The gap between CJARS and the NPS for Michigan's incarcerated population counts and incarceration rates grows as time passes.

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[16]It is important to note that large increases such as this are an indication of the beginning of coverage of events in CJARS data. Large build ups such as the one seen in Colorado are not due to data issues, rather, they are simply a reflection of the nature of data coverage. It is also worth mentioning that sharp decreases in recent years that are observed for CJARS are not due to actual decreases in event counts. Rather, this is a reflection of the fact that the data coverage stops at some point during the year which is a product of the timing of when the data were collected from an agency.

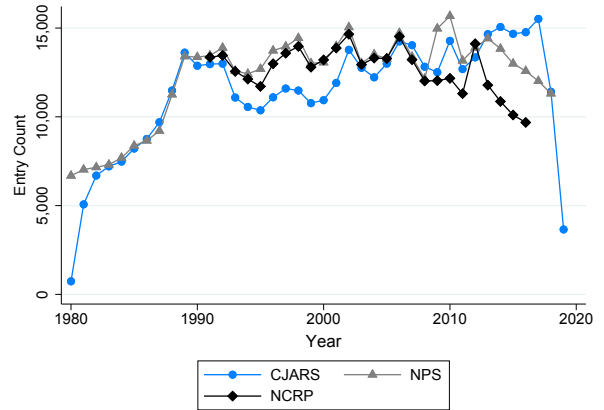Figure (4) Yearly Incarceration Entry Counts by State
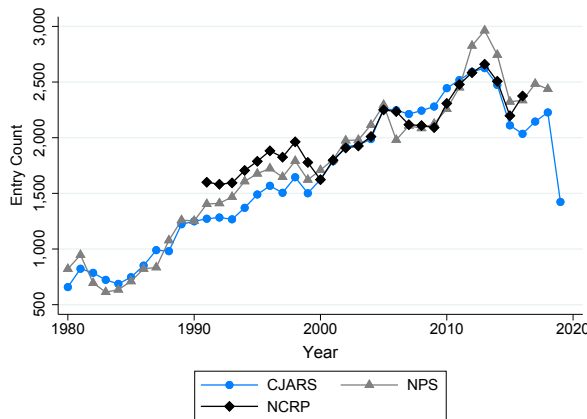
(a) Arizona
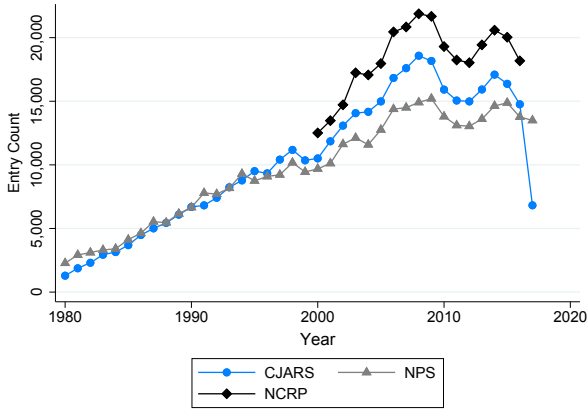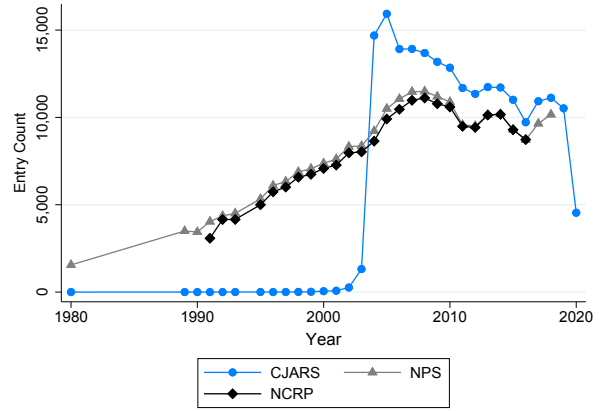
(b) Colorado
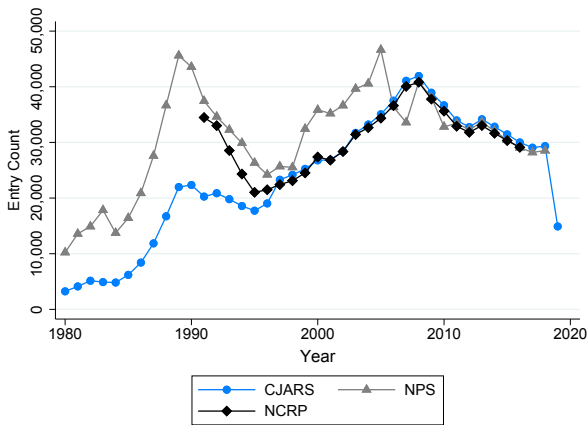
(c) Florida

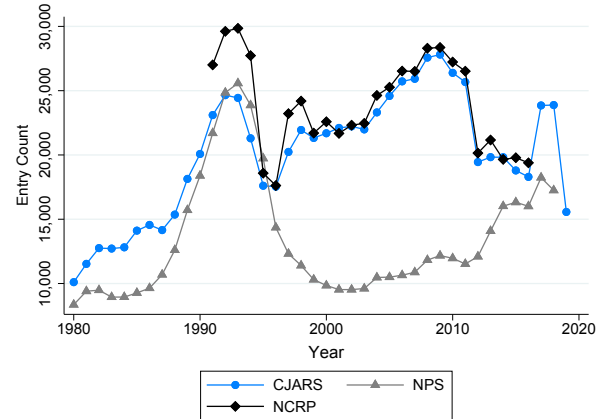(d) Michigan

(e) Nebraska

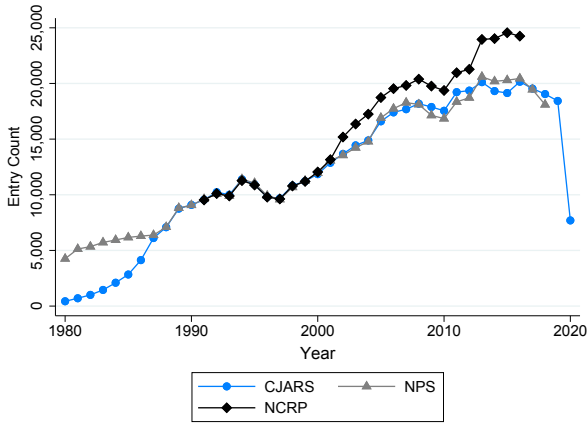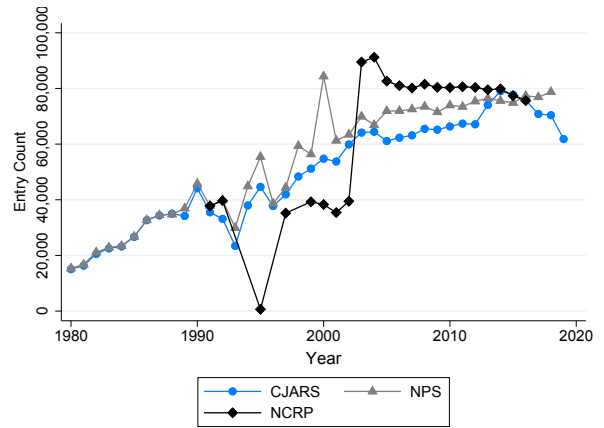(f) North Carolina

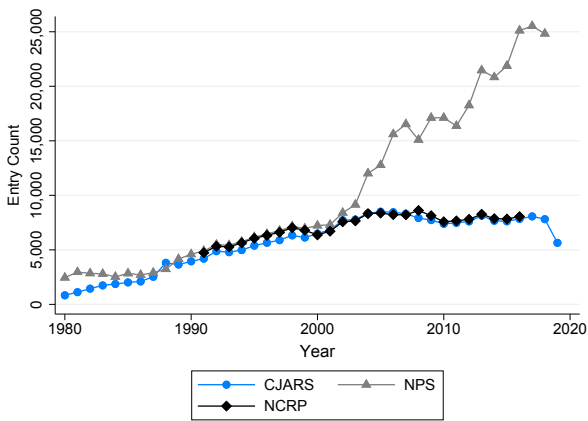Figure (4)   Yearly Incarceration Entry Counts by State *continued*

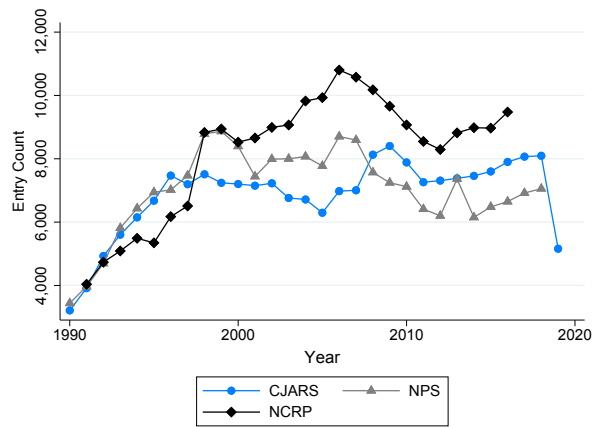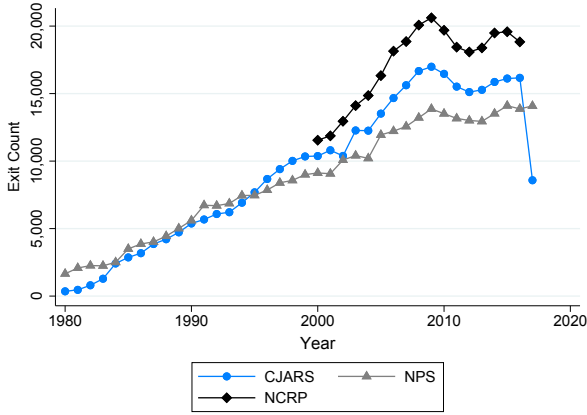(g) Pennsylvania

(h) Texas
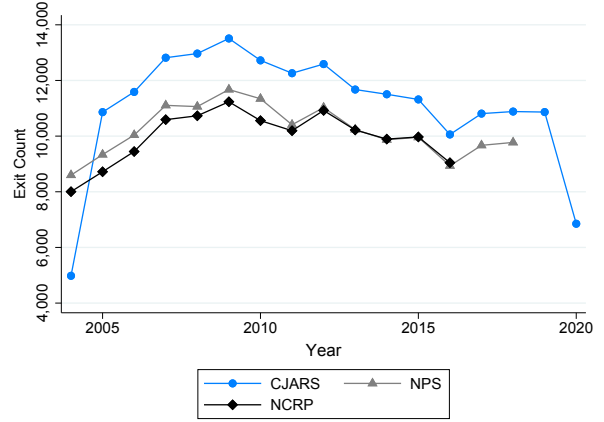

(i) Washington

(j) Wisconsin

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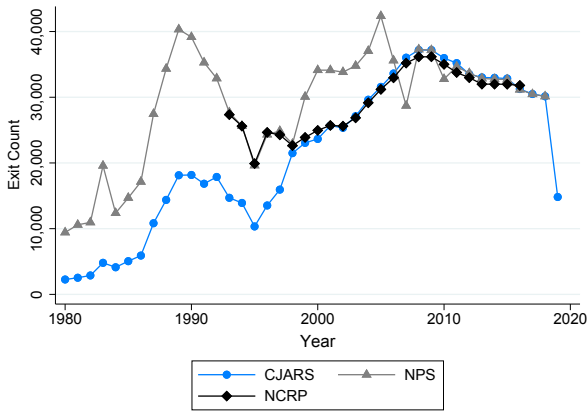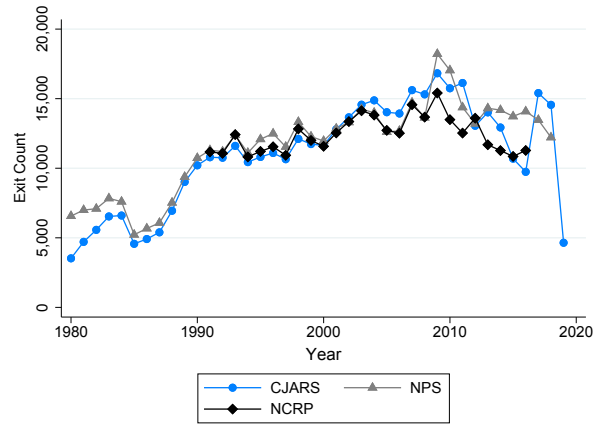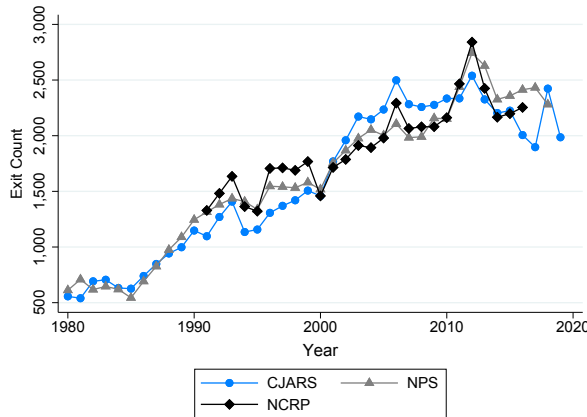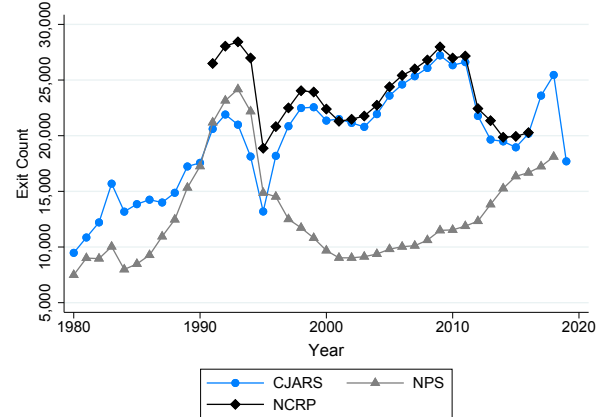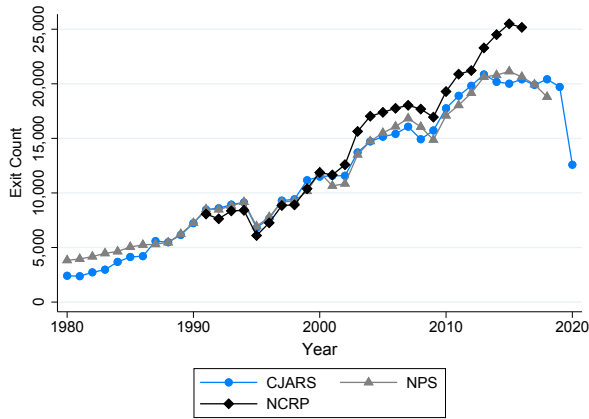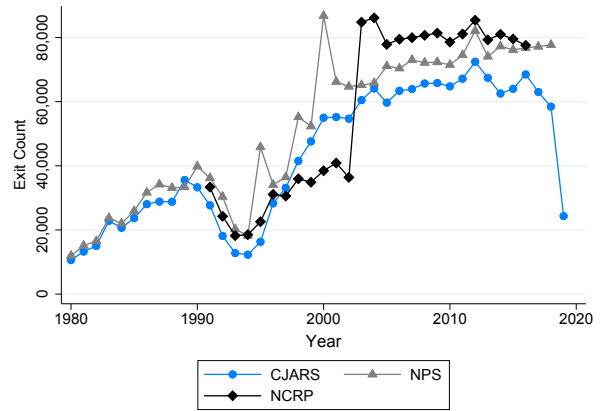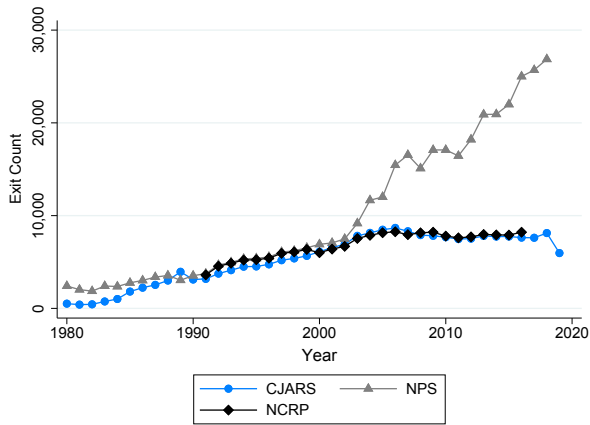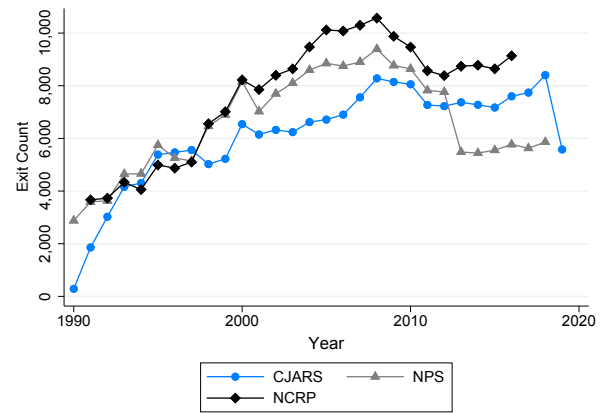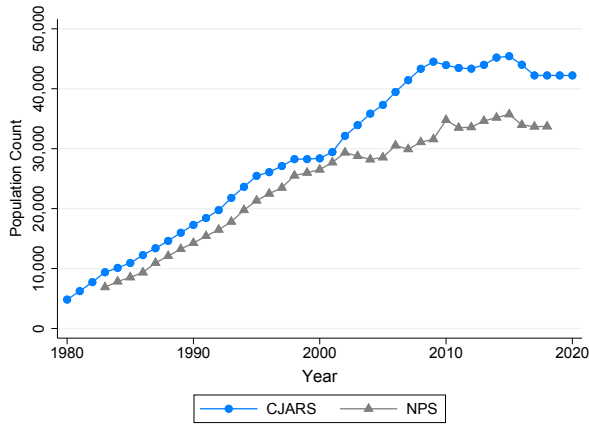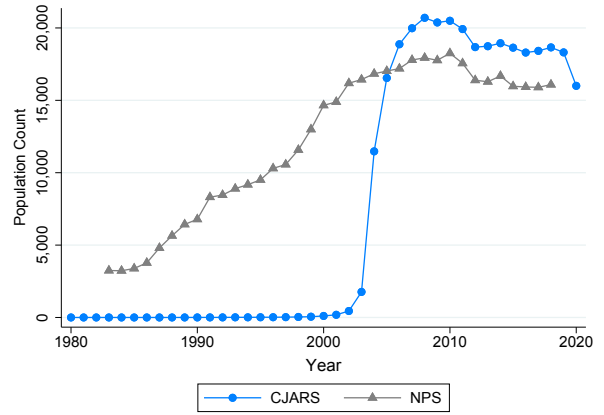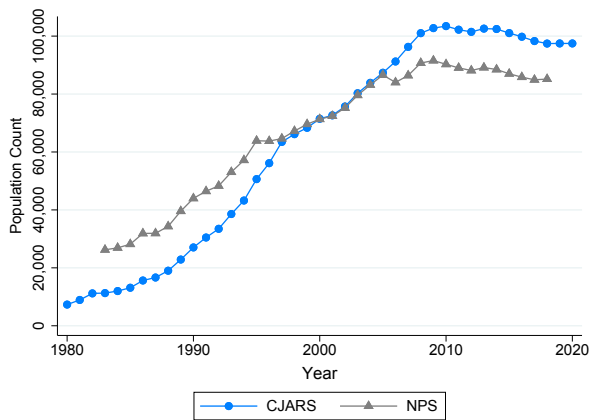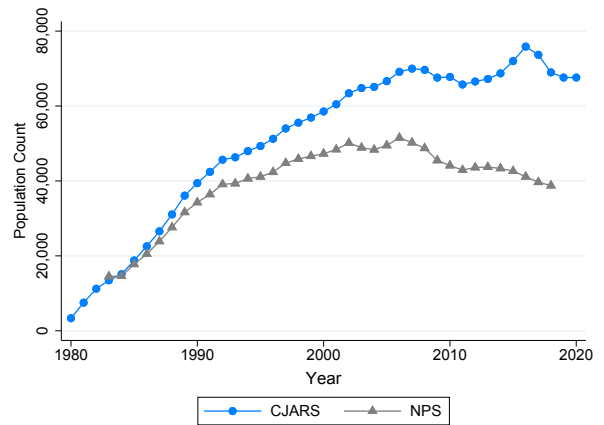Figure (5)   Yearly Incarceration Exit Counts by State

(a) Arizona

(b) Colorado

(c) Florida

(d) Michigan

(e) Nebraska

(f) North Carolina

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Figure (5)   Yearly Incarceration Exit Counts by State *continued*

(g) Pennsylvania

(h) Texas

(i) Washington

(j) Wisconsin

Figure (6)   Annual Year-end Incarcerated Population Counts by State
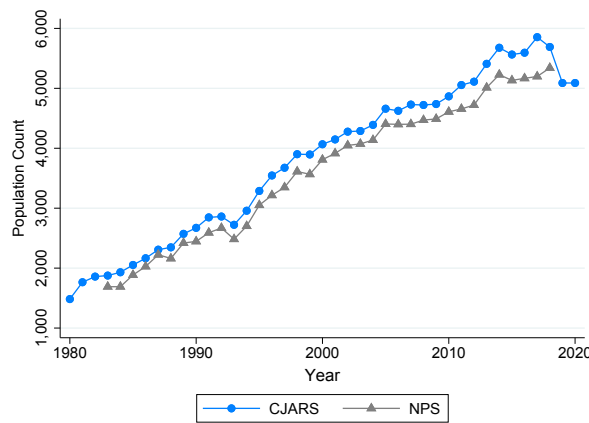
(a) Arizona

(b) Colorado

(c) Florida

(d) Michigan

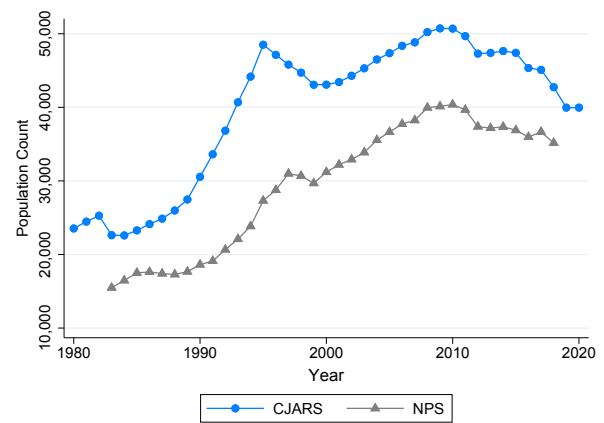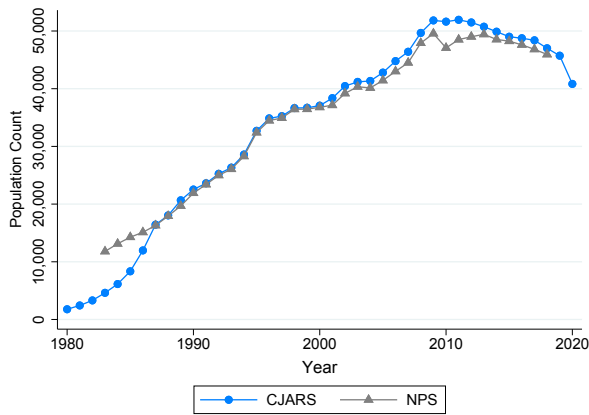(e) Nebraska

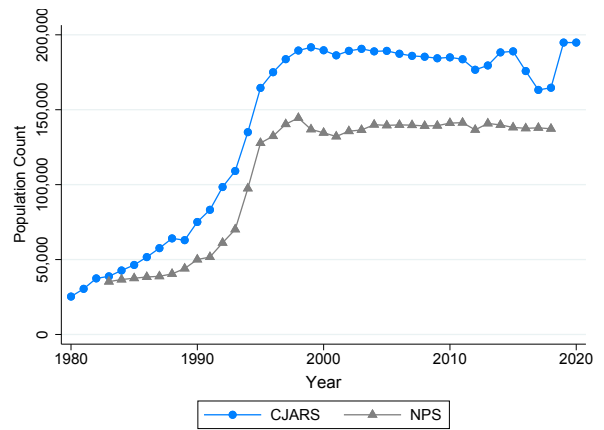(f) North Carolina

Figure (6)   Annual Year-end Incarcerated Population Counts by State *continued*
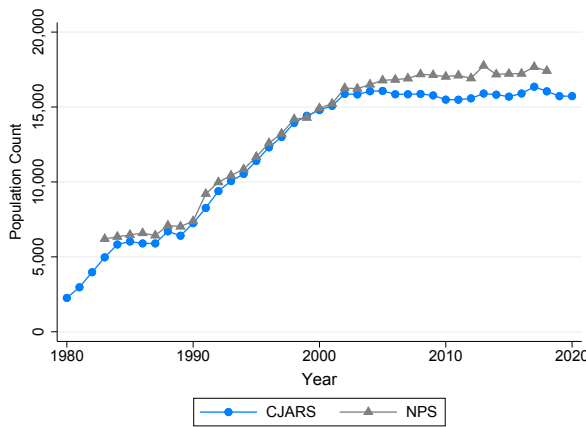
(g) Pennsylvania

(h) Texas

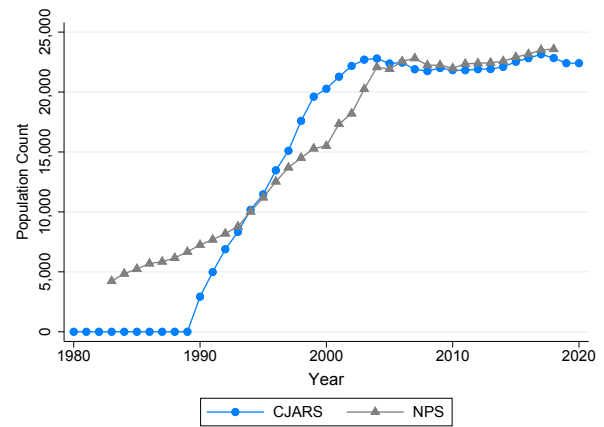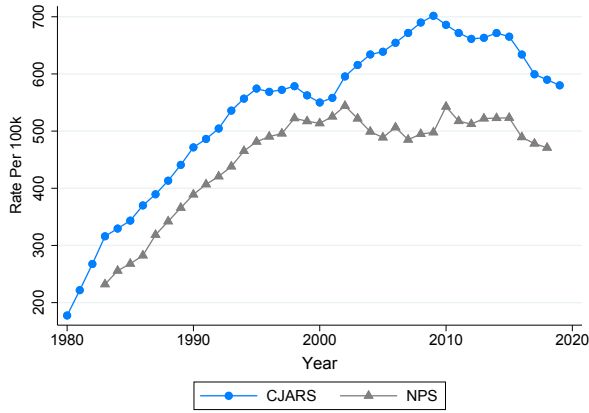

(i) Washington
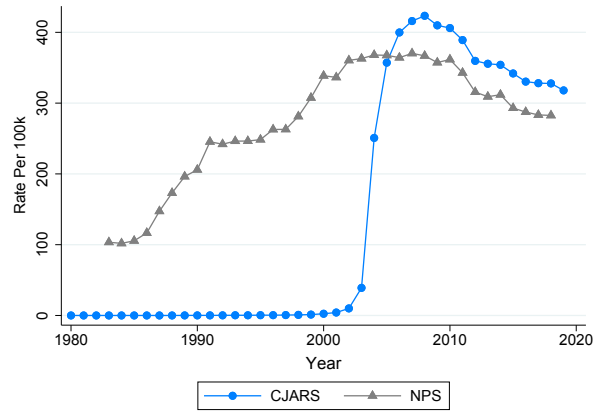

(j) Wisconsin

Figure (7)   Annual Year-end Incarceration Rates Per 100,000 of Population by State

(a) Arizona

(b) Colorado

(c) Florida

(d) Michigan

(e) Nebraska

(f) North Carolina

Figure (7) Annual Year-end Incarceration Rates Per 100,000 of Population by State *continued*
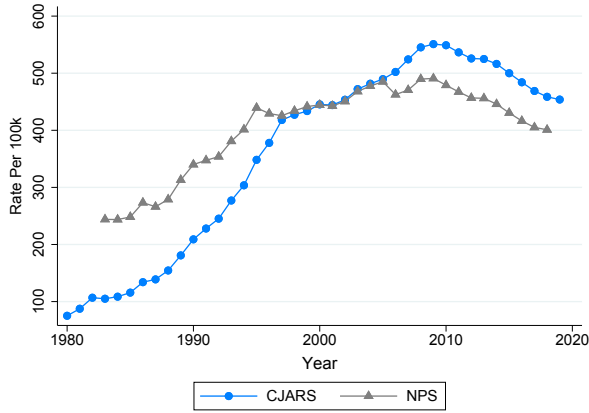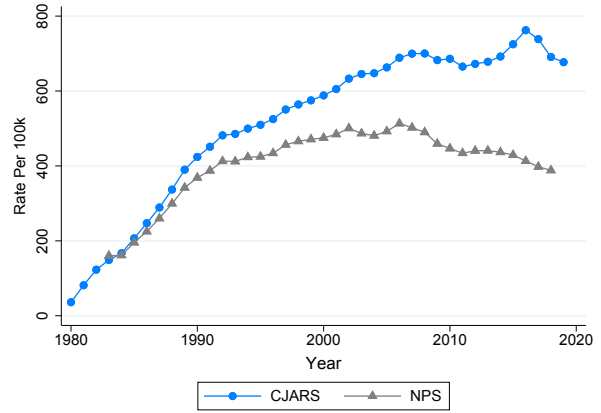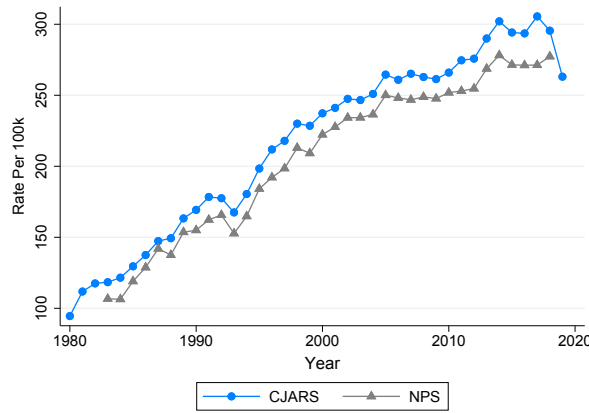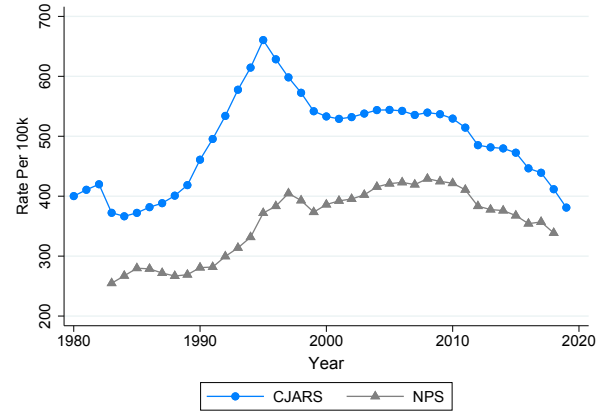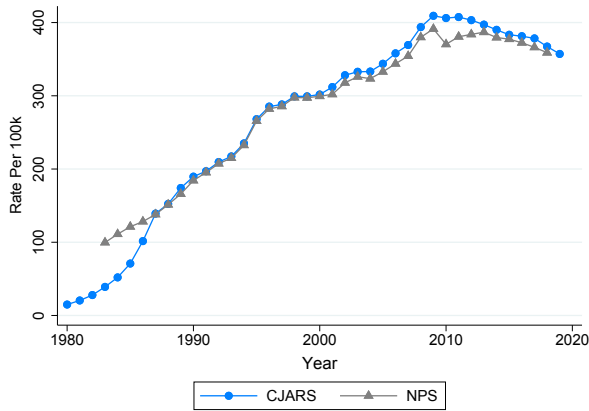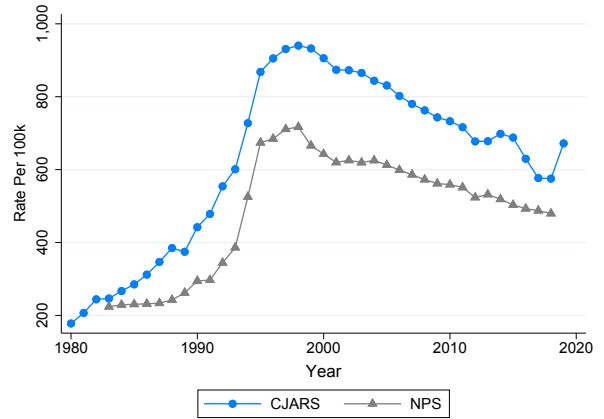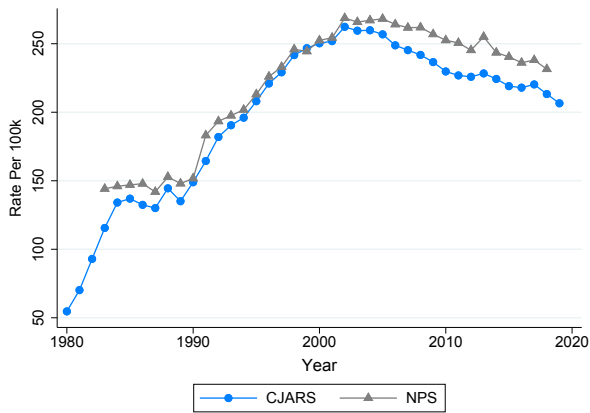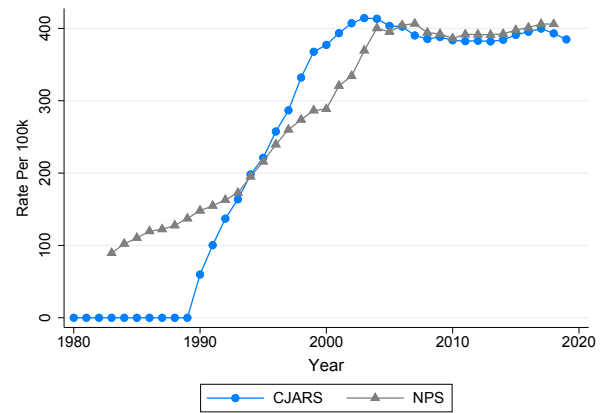
(g) Pennsylvania

(h) Texas

(i) Washington

(j) Wisconsin

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5 CJARS Probation and Annual Probation Survey

Probation information in CJARS is constructed from data collected from departments of corrections, court systems with the responsibility of supervising probationers, and other community corrections agencies. These data are recorded at the probation term-level and include information on entry and exit dates, entry and exit status, and probation conditions when available. The accuracy of these records are evaluated using the Annual Probation Survey.

Annual Probation Survey

BJS began data collection of the Annual Probation Survey in 1980 and has conducted the survey annually since. BJS relies on voluntary participation from participating agencies. Because community supervision is not always a centralized process, BJS works with a variety of agencies for data collection that span state departments of corrections, county community supervision agencies, and court systems. Data is collected from these agencies by use of a survey that is sent to the identified contact at each agency.[17]

Data from agencies is collected at the aggregate-level. Information is collected about year-end population counts and admission/release counts in the specified year. The information collected from these surveys is used by BJS for publications such as *Correctional Populations in the United States* and *Probation and Parole in the United States*.[18] The data is also used in the BJS *Corrections Statistical Analysis Tool (CSAT)*.

Comparing CJARS Probation to the Annual Probation Survey

The probation information in CJARS provides information that can be compared to similar data from the Annual Probation Survey. Both CJARS and the Annual Probation Survey can be used to estimate yearly entry and exit counts as well as yearly probationer populations and rates.

Entry counts. Figure 8 shows a comparison between probation entry counts observed in CJARS as compared to the Annual Probation Survey for each state where CJARS has historical data holdings (Michigan, North Carolina, Texas, and Wisconsin). The graphs show substantial alignment in North Carolina. There also appears to be good alignment in Michigan, but there is considerable instability from year to year entry counts in the Annual Probation survey leading to large increases and decreases. In comparison, the CJARS data from Michigan provide much more stable counts from year to year.

The graph for Texas in Figure 8 shows similarities when coverage in the CJARS data begins (early 2000s). However, a gap forms over time in which more entries are observed in the CJARS data.

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[17]An example survey can be found here: https://www.bjs.gov/content/pub/pdf/cj8_2018.pdf

[18]These reports can be downloaded here: https://www.bjs.gov/index.cfm?ty=dcdetail&iid=271

Lastly, the Wisconsin graph shows marked differences up until 2011. Prior to this, CJARS entry counts fall far below the counts being reported to the Annual Probation Survey. There is a reliability issue in the Wisconsin data provided to CJARS which is known and documented that accounts for this difference.

Exit counts. Moving to Figure 9 provides yearly probation exit counts by state. Notably, North Carolina is excluded from this graph because the data that CJARS collects from this agency does not include exit dates. For the other states, similar patterns are seen as compared to those observed in the graphs of yearly entry counts. The only small exception is in Texas where the difference between CJARS and the Annual Probation Survey closes over the period of time where CJARS has coverage of probation spells (rather than opens as it does for entries).

Population counts and rates. The last two figures in this section, Figures 10 and 11, provide the annual year-end probationer population counts and supervision rates for each state, respectively. The patterns seen in the graphs in these two figures can be explained when considering the patterns observed for the graphs presented for probation entry and exit counts in Figures 8 and 9. For example, population counts and probationer rates in Wisconsin remain low up until 2011. This is a result of the low entry and exits counts observed during the same period of time.

In addition, the divergence seen in Texas is understandable considering the divergence in yearly entry and exit counts in Texas. Finally, there are differences apparent in Michigan where there is a clear build up of counts in the CJARS data up until the mid-2000s where it intersects with and then surpasses the Annual Probation Survey. The differences seen in Michigan may be a result of the source and coverage of the data being used to generate information on probation spells in this state and is not an indication of unreliable data, but rather a reflection of the nature of the data system where the records are queried from. Specifically, probation records in Michigan are sourced from a statewide repository of court records. The nature of coverage of probation records is a reflection of the build up in coverage of county-level agencies in the Michigan court data repository over time.

Figure (8)   Yearly Probation Entry Counts by State
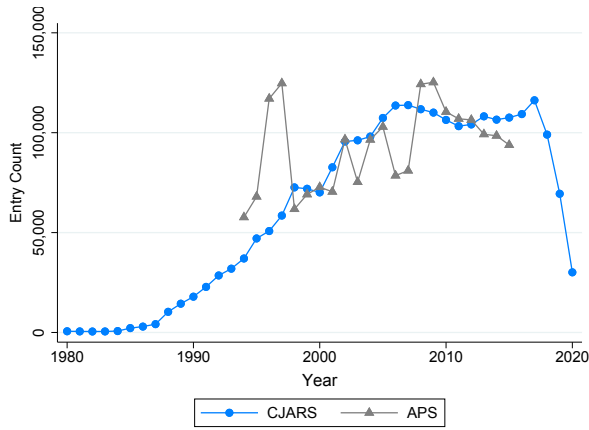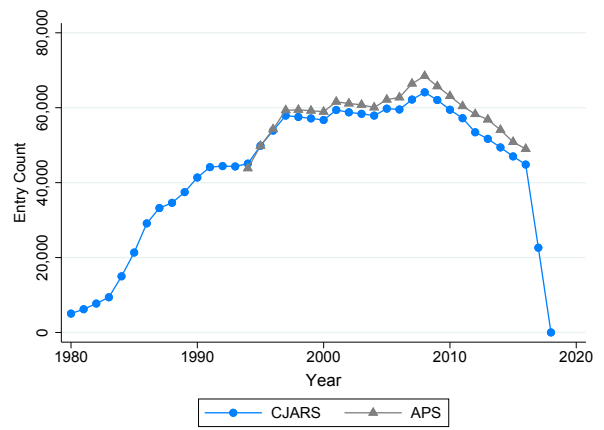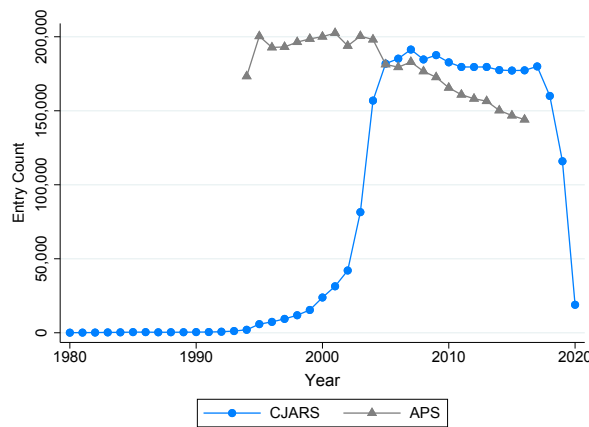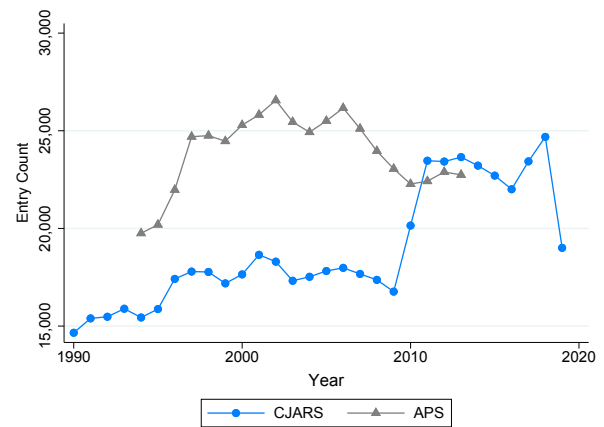
Figure (9)   Yearly Probation Exit Counts by State

(a) Michigan
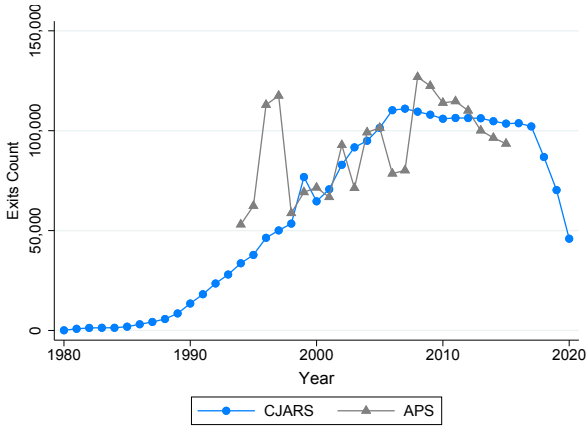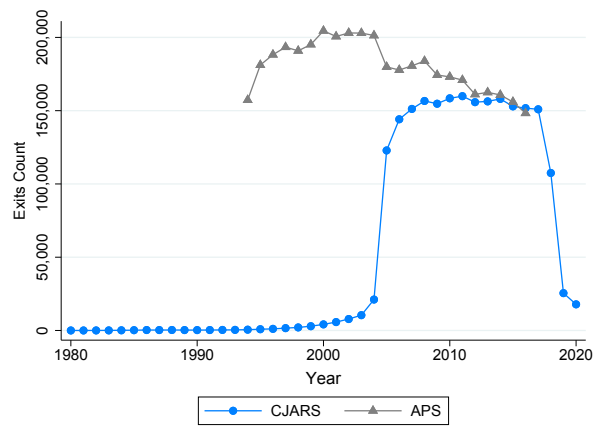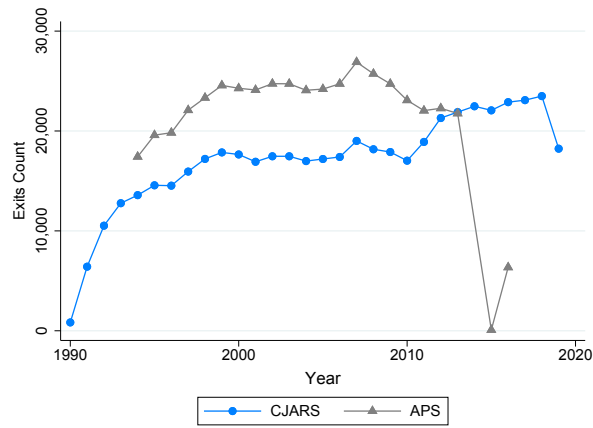
(b) Texas

(c) Wisconsin

Figure (10)   Annual Year-end Probationer Population Counts by State

(a) Michigan
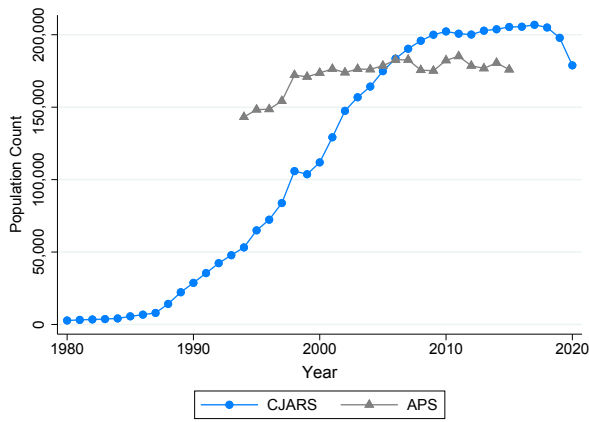
(b) Texas
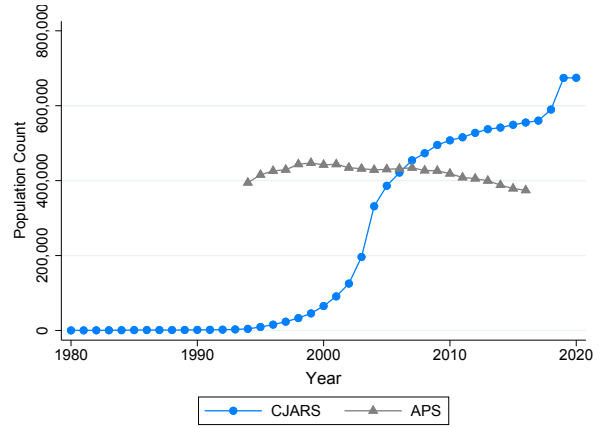
(c) Wisconsin
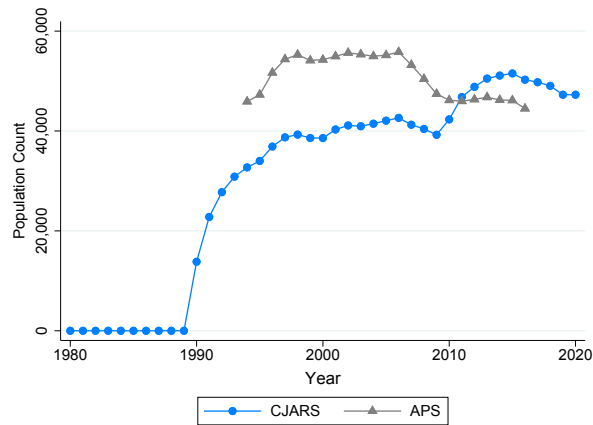
Figure (11) Annual Year-end Probationer Rates Per 100,000 of Population by State

(a) Michigan

(b) Texas

(c) Wisconsin
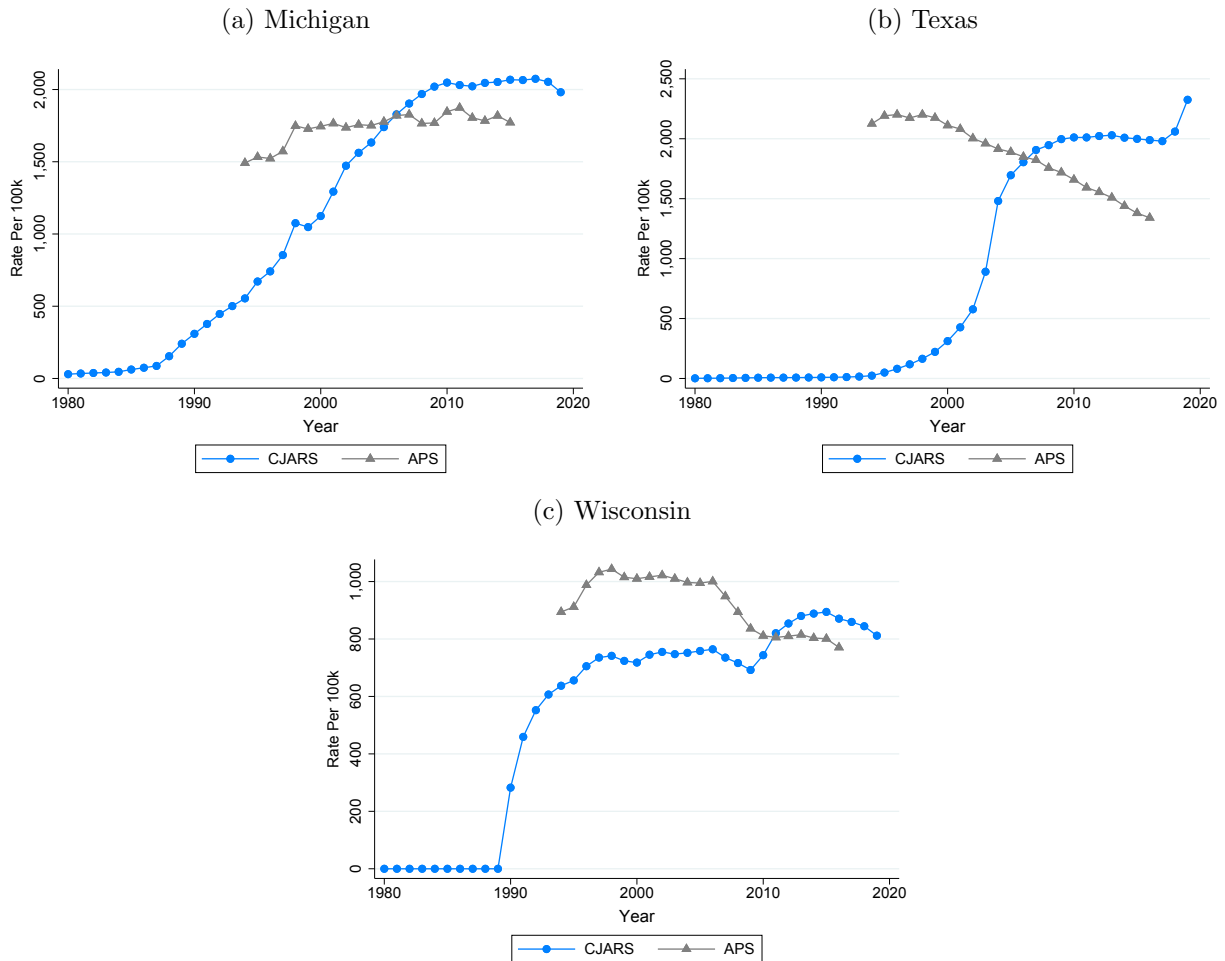
6 CJARS Parole and Annual Parole Survey

Parole information in CJARS is constructed primarily from data collected from departments of corrections, but also other types of agencies that track this information such as departments of public safety. Parole data are recorded at the parole term-level and contain information on parole entry/exit date and exit description. We assess the accuracy of these records using the Annual Parole Survey.

Annual Parole Survey

Data collection for the Annual Parole Survey occurs in tandem with the Annual Probation survey and employs the same data collection strategy. See the above description on the Annual Probation Survey for further details on the data collection efforts for the Annual Parole Survey.

Comparing CJARS Parole to the Annual Parole Survey

The parole information in CJARS provides information that can be compared against the same types of information gathered as part of the Annual Parole Survey. Both sources of parole data can be used to estimate yearly entry and exit counts as well as yearly parolee populations and rates.

Entry counts. Figure 12 shows a comparison between parole entry counts observed in CJARS as compared to the Annual Parole Survey for each state where CJARS has historical data holdings (Colorado, Florida, Michigan, Nebraska, North Carolina, and Texas). As can be seen in this figure, entry counts in CJARS and the Annual Parole Survey line up exceptionally well in almost all states. The one state where there is a slight difference is Nebraska where the counts of events in CJARS are slightly lower than those reported in the Annual Parole Survey. However, the difference is consistent across years and so the trends of changes in entry counts over time align between CJARS and the Annual Parole Survey.

Exit counts. Moving to Figure 13 provides yearly parole exit counts by state. Similar to the favorable findings observed for parole entry counts, consistent trends are seen in parole exit counts when comparing CJARS to the Annual Parole Survey. One omission from Figure 13 as compared to Figure 12 is the exclusion of Texas. This is due to the fact that most parole exit dates are not available in the data that Texas agencies provide to CJARS.

Population counts and rates. The last two figures in this section, Figures 14 and 15, provide the annual year-end parolee population counts and supervision rates for each state, respectively. In most cases, there is a high degree of alignment between CJARS and the Annual Parole Survey. One exception is Nebraska where population counts and rates are consistently low in the CJARS data as compared to the Annual Parole Survey. This is consistent with similar findings for parole entry and exit counts. Another exception is for Michigan where population counts and rates are consistently higher than the Annual Parole Survey.

Figure (12)   Yearly Parole Entry Counts by State

(a) Colorado
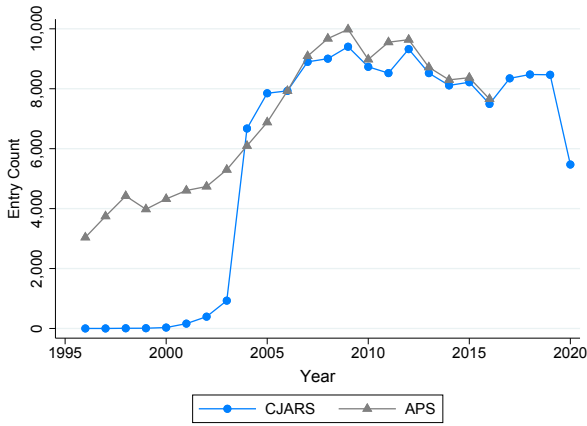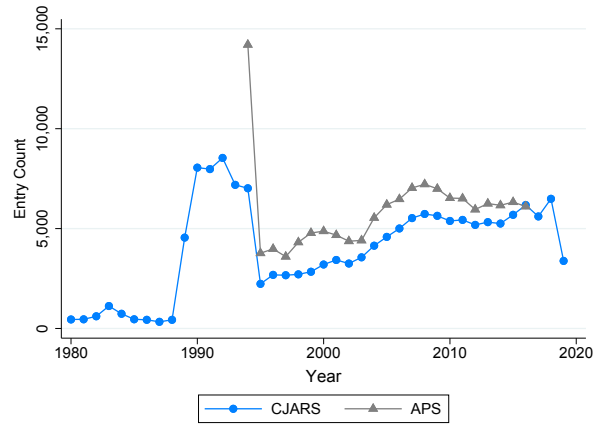
(b) Florida
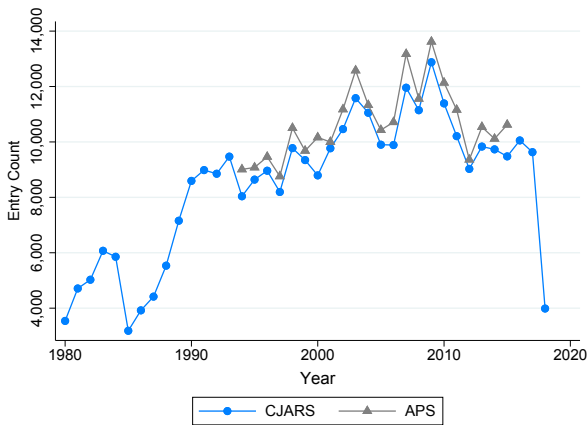
(c) Michigan
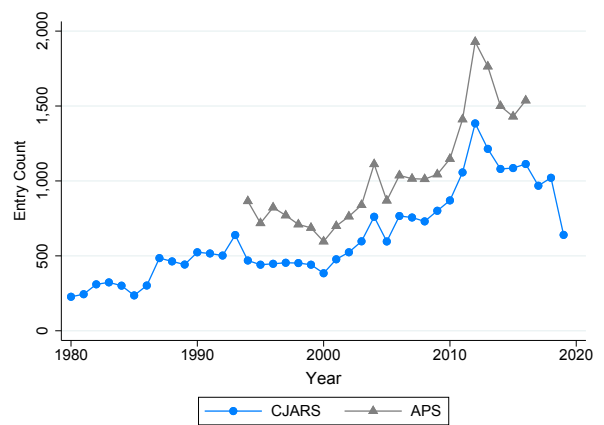
(d) Nebraska
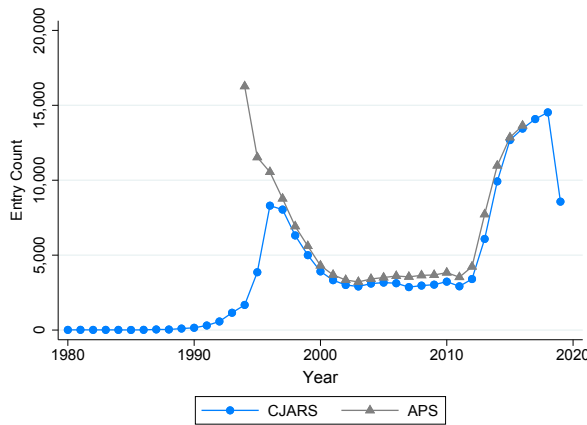
(e) North Carolina

(f) Texas
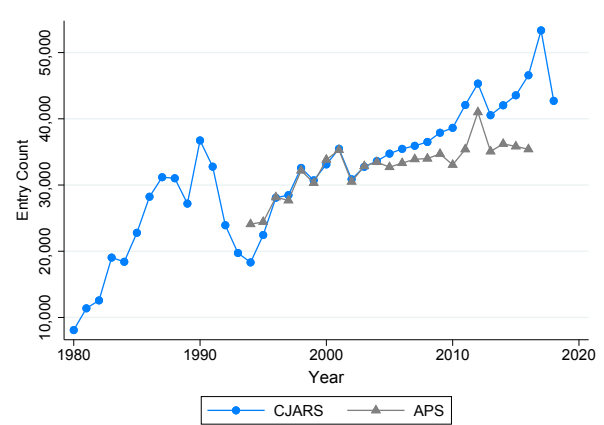
Figure (13)   Yearly Parole Exit Counts by State

(a) Colorado
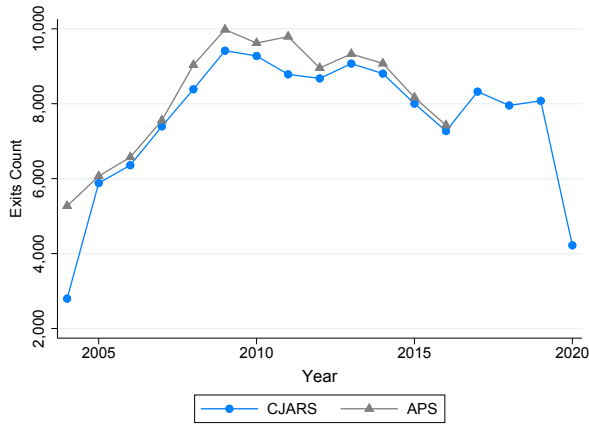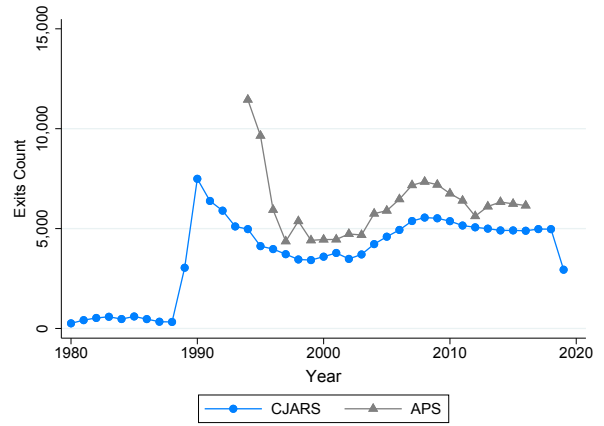
(b) Florida
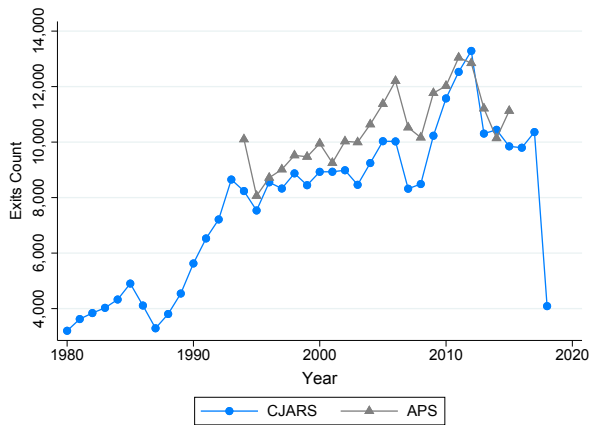
(c) Michigan
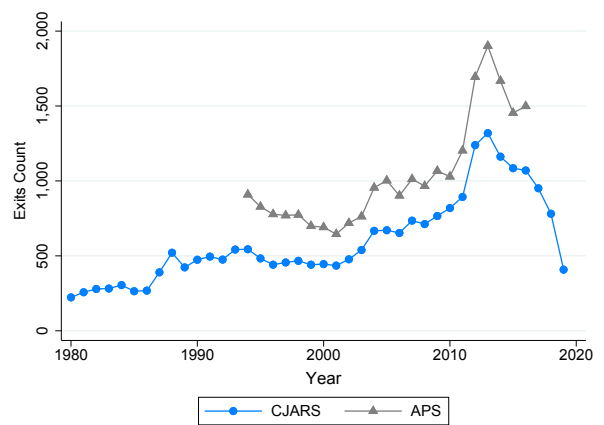
(d) Nebraska
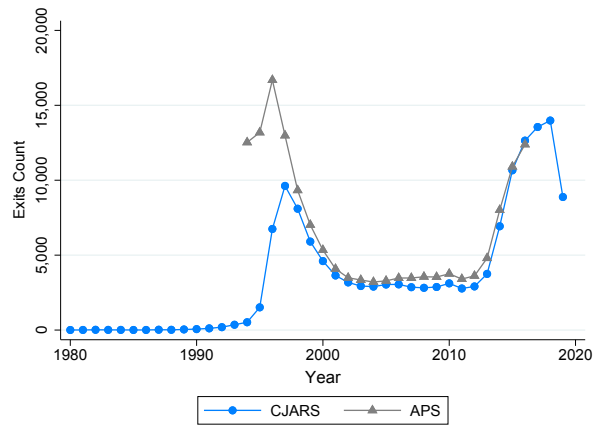
(e) North Carolina

Figure (14)   Annual Year-end Parolee Population Counts by State

(a) Colorado
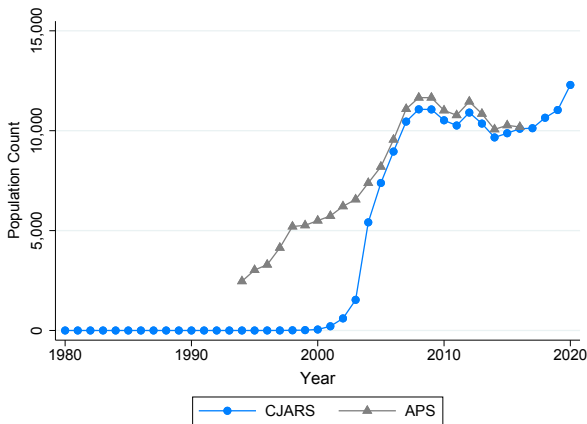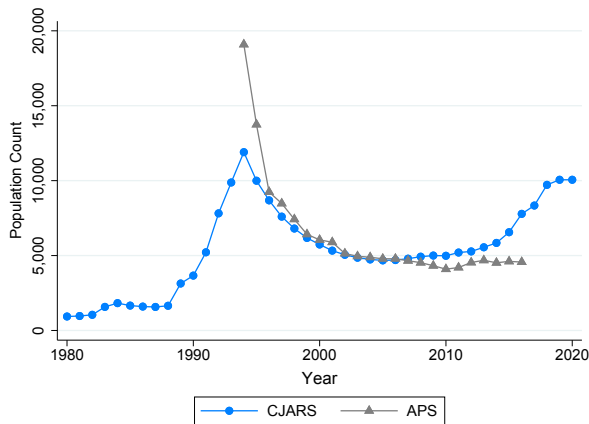
(b) Florida
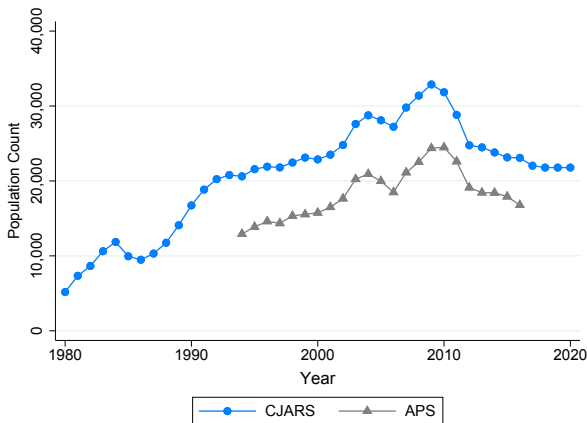
(c) Michigan
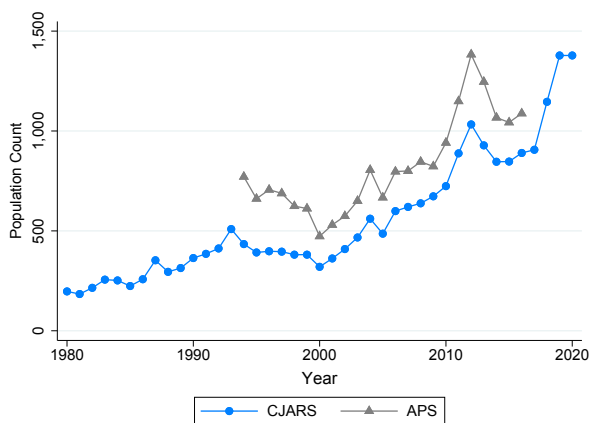
(d) Nebraska
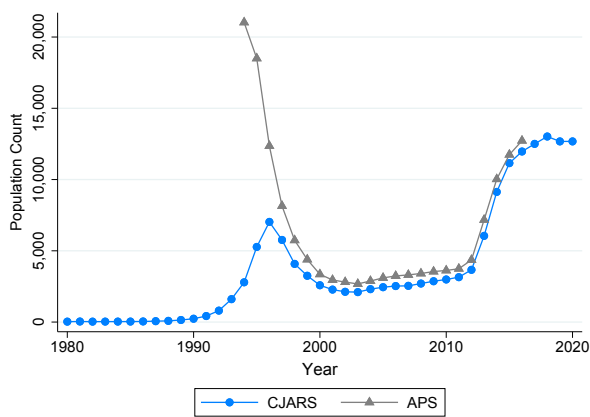
(e) North Carolina

Figure (15)   Annual Year-end Parolee Rates Per 100,000 of Population by State

(a) Colorado
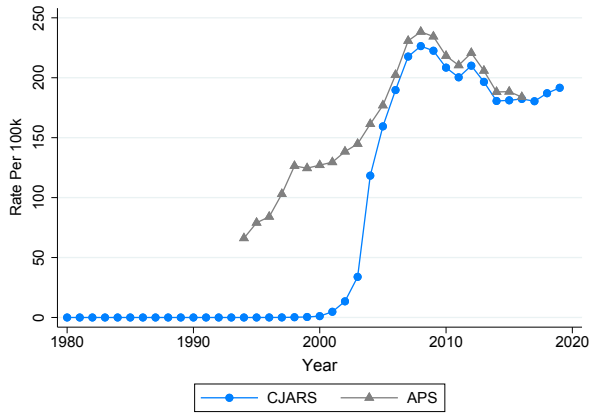
(b) Florida
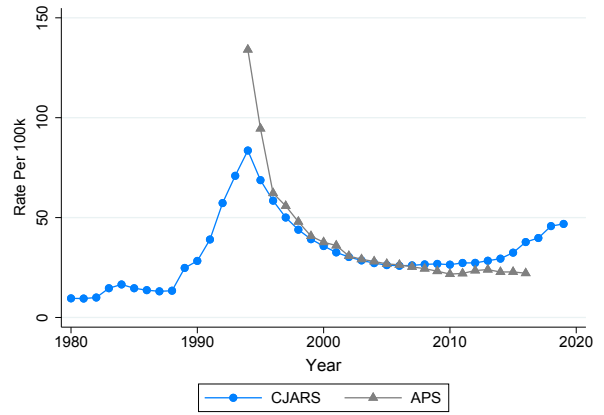
(c) Michigan
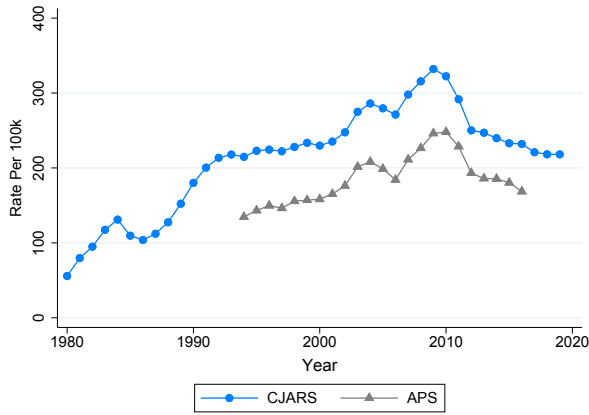
(d) Nebraska
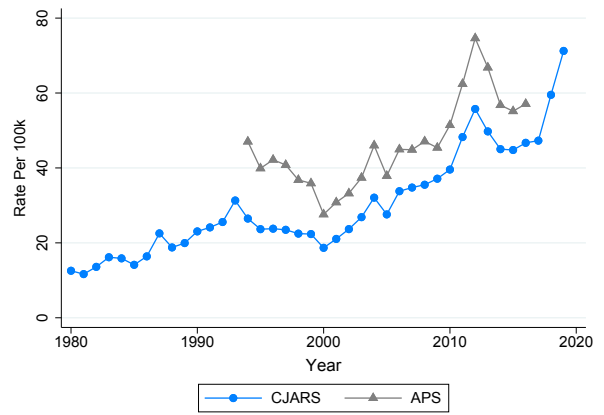
(e) North Carolina
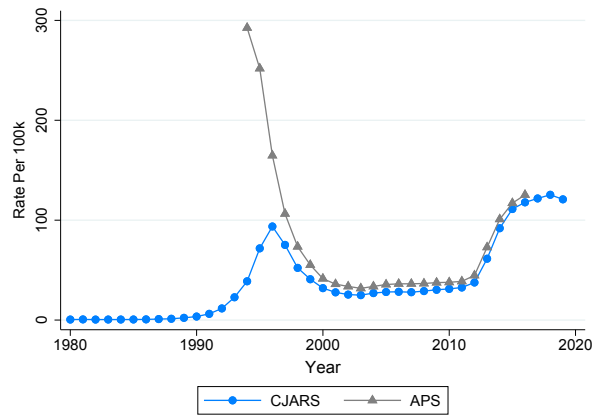
7   Discussion

The purpose of this report was to assess the efficacy of the CJARS data infrastructure. The validation exercises conducted in this report were necessary for several reasons. First, CJARS collects data using numerous strategies (e.g., data use agreements, web scraping). There is inherently variation in the nature of data collected using different opportunistic strategies. Second, the data CJARS collects comes from a multitude of agencies, each with its own unique way of storing and managing its data. The lack of uniform rules across state and local jurisdictions creates nearly endless variation in disparate sources of data. Third, the significant variation in the way data is stored and managed by agencies has caused CJARS to implement creative strategies to process and harmonize the data it collects. These strategies were developed to overcome the various data layouts encountered, inconsistencies in value codes and free entry fields, lack of unique identifiers across data providers, and duplicative record coverage across overlapping jurisdictions. Each of these processes creates a great deal of complexity which CJARS must surmount in order to create a valid and reliable source of micro-level data on the U.S. justice system. Since these complexities are inherent to the structure of the U.S. justice system, CJARS will continue to periodically update this report as data is continually collected and harmonized.

Validation exercises are presented in this report which compare CJARS to other widely used data series that are publicly available and contain information that could be used as points of comparison for benchmarking purposes. The data series that were used for benchmarking included the UCR, SCPS, NPS, NCRP, and Annual Probation and Parole Surveys. Comparisons included the following: CJARS arrests to the UCR, CJARS adjudication to SCPS, CJARS incarceration to both the NPS and NCRP, CJARS probation to the Annual Probation Survey, and CJARS parole to the Annual Parole Survey. These data series provided the opportunity to benchmark various event counts and other caseload characteristics that can be estimated using CJARS. The comparisons that were conducted provided substantial evidence in support of the efficacy of the CJARS data infrastructure.

Benchmarking CJARS arrest data involved comparing the counts of arresting events observed in CJARS to similar counts of events reported in the UCR. This was done for FBI Part I offenses. Due to the decentralized nature of record collection and storage by law enforcement agencies, CJARS has relied on collecting arrest and booking records from individual agencies, such as police departments and sheriff's offices. For this reason, there was no expectation that counts of arrests in CJARS would cover all arrests reported in the county-level UCR data. With this in mind, the counts of arrests observed in CJARS covered a substantial amount of arrests reported to the UCR in the counties where CJARS has coverage of arrests. Coverage in the four counties included in this report varied, but reached a consistent coverage of 80% year over year for certain types of offenses. Focusing on the any type of offense category showed that coverage typically fell between one-third and one-half of arrests covered by CJARS.

The CJARS adjudication data was benchmarked against SCPS by comparing characteristics of caseloads and case processing statistics. Overall, the statistics that have been reported in publications using SCPS were re-created with a high degree of accuracy using CJARS. For instance, plotting the various characteristics of court caseloads (e.g., sex and age of defendants) in SCPS against CJARS resulted in extremely similar distributions seen across all years examined. Consistency also existed when comparing various aspects of case processing and case outcomes. The differences that were seen can be explained by the differences in sampling between CJARS and SCPS. For example, differences in racial composition of defendants is likely a result of the differences between the counties that comprised the CJARS and SCPS samples. Differences in geographic coverage are more likely to impact racial composition of a caseload than other caseload characteristics that were examined (e.g., composition of defendants by sex). This explains the high degree of similarity seen for sex, but the variation that was seen for race.

Benchmarking CJARS incarceration data involved comparing counts of entries/exits and population counts/incarceration rates in CJARS, NPS, and NCRP. The advantage of this set of benchmarking exercises was having two data series that could be used for comparisons purposes. Triangulation of results provides even stronger evidence for data accuracy, especially given the fact that the two data series that CJARS were benchmarked against have very different ways of collecting and reporting data (surveys to collect aggregate statistics versus the collection of individual-level data). In fact, the results elucidated some differences seen between the NPS and NCRP. These differences have also been observed in other past research using these two data series (Pfaff, 2010)[2]. Regardless of the difficulties in the interpretation of findings that arose due to differences between the NPS and NCRP, there was still considerable evidence to support the CJARS incarceration data. For instance, many states showed marked similarities between CJARS and both the NPS and NCRP (e.g., Pennsylvania). In cases where the NPS and NCRP provided divergent event counts, CJARS was almost always in alignment with at least one of these data series (e.g., North Carolina). In yet another scenario, the NPS and NCRP diverged, but CJARS typically fell somewhere in the middle of the event counts reported in the two data series (e.g., Arizona). There are no examples where CJARS differed substantively from both the NPS and NCRP.

Finally, benchmarking CJARS probation and parole data involved comparing counts of entries/exits and population counts/supervision rates in CJARS to those reported in the Annual Probation and Parole surveys, respectively. Similarities in the Annual Probation and Parole surveys and benchmarking exercises conducted using these two data series facilities discussing results together. Comparisons made to benchmark probation events showed misalignment in some states between the event counts, population counts, and supervision rates between CJARS and the Annual Probation Survey. For example, there are known reliability issues for a portion of time in the data that CJARS receives from Wisconsin. The cause of this reliability issue is explained in the CJARS data documentation so that data-users are aware and can assess how to use the data appropriately. In contrast, there was a very high degree of consistency between the event counts,

population counts, and supervision rates observed in the CJARS parole data and those reported in the Annual Parole Survey. There were very few exceptions to this (e.g., Nebraska), and even when differences existed for parole, the differences were relatively minor.

All of the findings reviewed in this report provide a substantial amount of evidence in support of the efficacy of the CJARS data infrastructure. This provides strong evidence in support of the methods that CJARS uses to process and harmonizes the data that it collects. These results are important given the overall complexity of the process and the numerous steps taken between data collection and the final data product that CJARS makes available for researchers to request through the Census Bureau's FSRDC network. This situates CJARS as a premier source of linkable micro-data that researchers can merge at the person-level to socio-economic records and leverage to conduct research on the justice system. It also suggests that CJARS can be used as a source of data for statistical reporting that can be used for policy-making and administration of the justice system. Researchers should use this report to help gauge whether CJARS is the best-suited data platform to conduct their research and analysis, and can be cited as evidence in support of the credibility of their CJARS-based empirical work.

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