DEMOGRAPHIC
DIFFERENCES
in Federal Sentencing

UNITED STATES SENTENCING COMMISSION

Demographic Differences in Federal Sentencing

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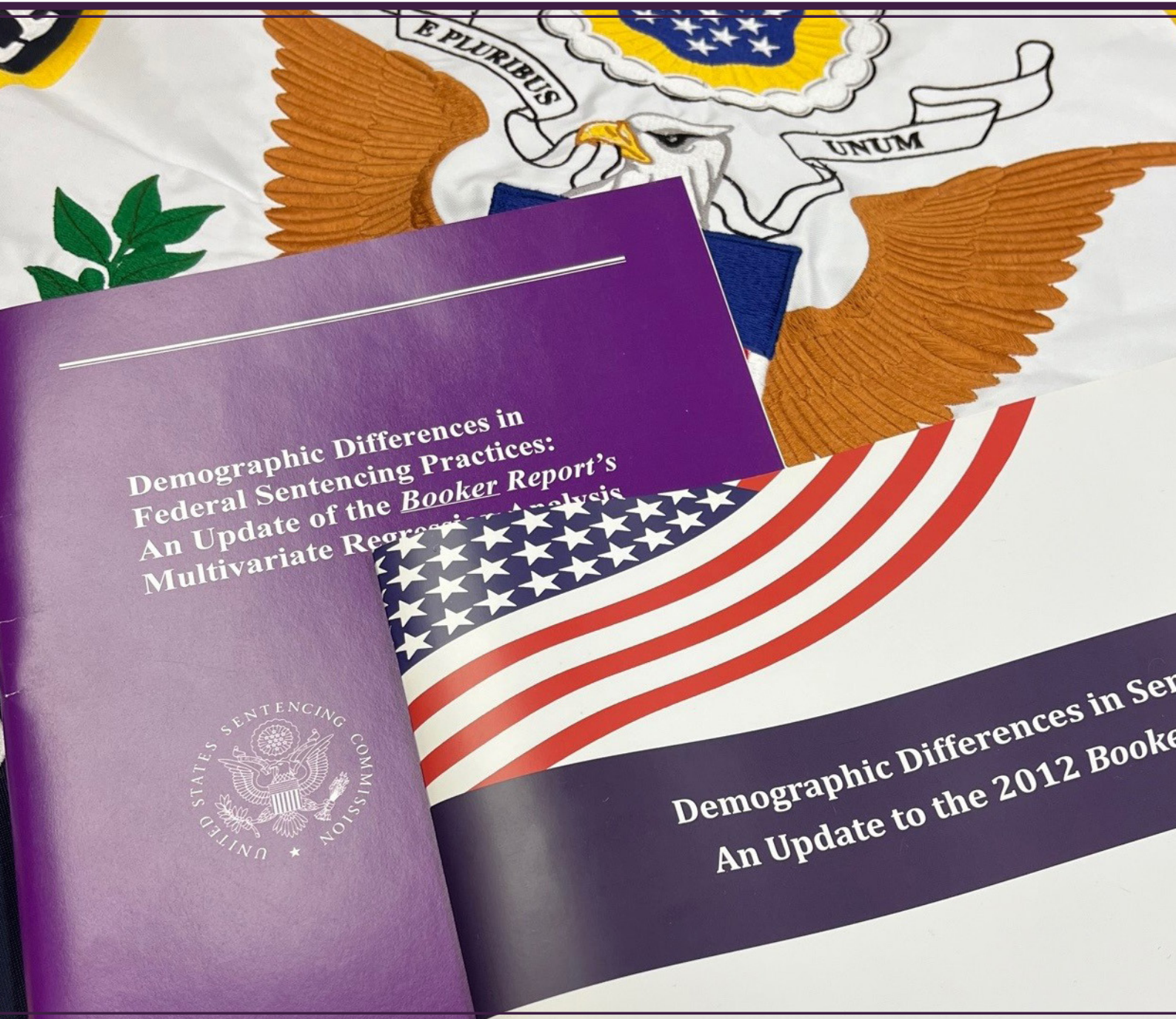Vice Chair

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November 2023

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Consistent with best practices, the Commission re-examined and refined the analytical methods used in previous reports to better understand sentencing disparity in the federal courts.

Using new analytical techniques and newly available data, this report examines federal sentencing practices in the five fiscal years after the 2017 report to determine if the differences observed in the Commission's prior reports continued to persist.

Introduction

The United States Sentencing Commission has studied the issue of demographic differences in sentencing throughout its history. This work furthers the Commission's mandates to establish sentencing policies and practices that eliminate unwarranted sentencing disparities[1] and to serve as a center for information on federal sentencing practices.[2] In four prior reports,[3] studying various time periods, the Commission has examined whether differences in the length of federal sentences imposed on individuals were associated with demographic characteristics of those individuals. Based on continued interest in this issue, the Commission continues to report on this important topic using the most recent data available and updating its prior methodology. This report presents the results of that work.

The Commission last reported on demographic differences in federal sentencing in 2017.[4] In that report, the Commission examined cases in which the individual had been sentenced between fiscal years 2012 to 2016. The Commission found that Black males continued to receive sentences that were longer than similarly situated White males. Specifically, the report found that Black males received sentences 19.1 percent longer than White males.[5]

Each of the Commission's prior reports analyzed the most recent data available. For some reports, the Commission refined the analytical methodology used, by building upon knowledge acquired from prior research, to better understand sentencing disparity in the federal courts.[6] Using additional analytical techniques and data previously unavailable, this report examines federal sentencing practices in the five fiscal years after the 2017 report (fiscal years 2017 to 2021) to determine if the differences observed in the Commission's prior reports continued to persist.
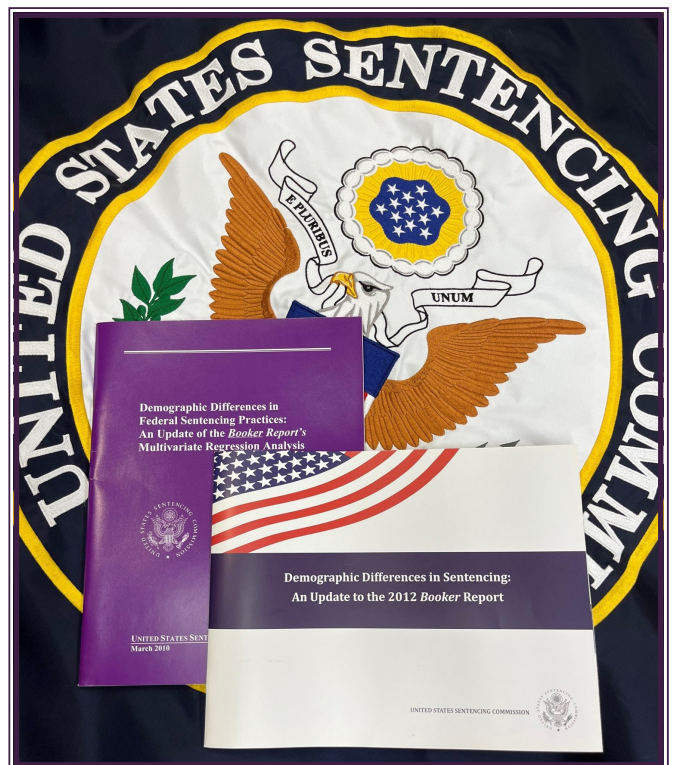
Key Findings

Consistent with its previous reports, the Commission found, after controlling for available personal and offense characteristics, that there continue to be differences in sentence length when comparing demographic groups of individuals sentenced for a federal offense.

1 **Sentencing differences continued to exist across demographic groups when examining all sentences imposed during the five-year study period (fiscal years 2017–2021). These disparities were observed across demographic groups—both among males and females.**

Specifically, Black males received sentences 13.4 percent longer, and Hispanic males received sentences 11.2 percent longer, than White males.

Hispanic females received sentences 27.8 percent longer than White females, while Other race females received sentences 10.0 percent shorter.

2 **The sentencing differences in the data the Commission examined largely can be attributed to the initial decision of whether the sentence should include incarceration at all rather than to the length of the prison term once a decision to impose one has been made. In particular, the likelihood of receiving a probationary sentence varied substantially by gender and race.**

Black males were 23.4 percent less likely, and Hispanic males were 26.6 percent less likely, to receive a probationary sentence compared to White males.

Similar trends were observed among females, with Black and Hispanic females less likely to receive a probation sentence than White females (11.2% percent less likely and 29.7% less likely, respectively).

3

The sentencing differences were less pronounced when the analyses focused solely on cases in which a sentence of imprisonment was imposed, which comprise 94 percent of all cases sentenced during the five-year study period.

Focusing solely on these cases, Black males received lengths of incarceration 4.7 percent longer, and Hispanic male received lengths of incarceration 1.9 percent longer, than White males.
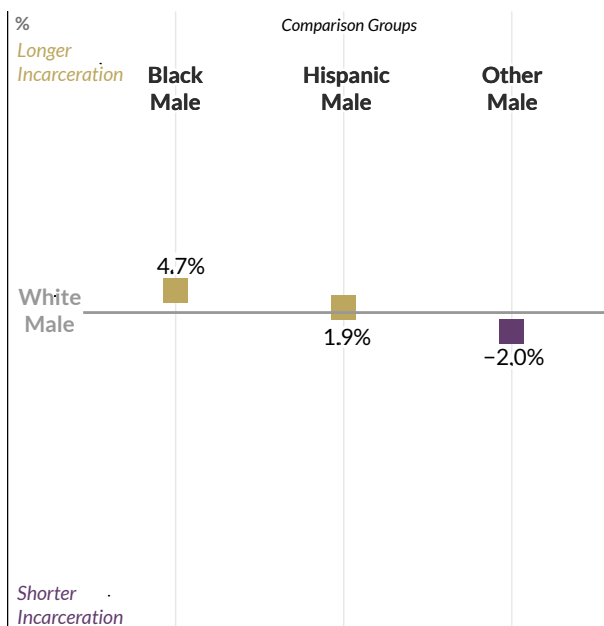
There was little difference among females receiving a sentence of imprisonment. The only statistically significant difference in the length of imprisonment among females was among Hispanic females, who received lengths of incarceration 5.9 percent shorter than White females.

4

Differences in the length of imprisonment across demographic groups were concentrated among individuals who received relatively short sentences.

Among individuals sentenced to 18 months or less incarceration, Black males received lengths of incarceration 6.8 percent longer than White males. The difference narrowed to 1.3 percent for individuals who received sentences of greater than 18 months to 60 months; but for sentences longer than 60 months, Black males received lengths of incarceration approximately one percent shorter than White males. Few differences were statistically significant when comparing sentences for females.

5

Across all analyses, females received sentences that were shorter, on average, than males.

When examining all sentences imposed, females received sentences 29.2 percent shorter than males. Females of all races were 39.6 percent more likely to receive a probation sentence than males. When examining only sentences of incarceration, females received lengths of incarceration 11.3 percent shorter than males.

The Commission's Regression Model

Multiple Regression

As it has done for past demographic reports, the Commission used multiple regression to analyze the relationship between demographic factors and sentencing outcomes. The principal benefit of multiple regression is that it allows researchers to explore complex social phenomena where multiple variables impact a single outcome. This methodology allows researchers to separate out the effects of individual variables and examine the unique contribution of each variable on the outcome studied. The Commission's research uses multiple regression to provide an estimate of the effect of explanatory variables of interest (*e.g.*, race and gender) on an outcome variable (*e.g.*, sentence length) while controlling for the effects of many other variables that also affect that outcome (*e.g.*, offense type).[7]

Prior Commission research has established that many factors are related to the sentence imposed. Consequently, multiple regression is an appropriate tool for exploring the relationship between sentence length and demographic factors, while including appropriate control variables.[8] In identifying potential control variables, the Commission considered many factors, including the type of offense, the sentencing range calculated using the Commission's *Guidelines Manual,*[9] and whether a statutory mandatory minimum penalty applied. The Commission tested these control variables in the multiple regression model and, if determined to be statistically significant, retained them as control variables in the analysis.

Researchers often cannot control for all possible factors that might affect the outcome being studied, typically because of limitations in the data available. Although such limitations are inherent in this type of analysis,[10] the Commission has extended its data collection capabilities to acquire information potentially relevant to this study. For example, the Commission noted in past reports that some potentially relevant factors could not be included in its analyses, such as whether the individual's criminal history included violent criminal conduct.[11] To that end, the Commission now collects comprehensive criminal history data, including an individual's violent prior offending, which were available to be included in the analysis for this report. Even so, data on other possible factors—such as decisions by law enforcement officers and prosecutors, and additional relevant factors related to the history and characteristics of the individual being sentenced—are not readily available to be considered for this report.

In addition to examining the data available, researchers commonly explore refinements to analytical methods previously used. For example, as researchers acquire more knowledge about the subject area, they often amend statistical models to account for that new knowledge (*e.g.*, by including new variables in the model). Also, as noted, new data on additional factors hypothesized to affect the outcome variable may become available and can be included in statistical models. Researchers also refine statistical techniques or incorporate new techniques developed by other researchers which have become accepted as appropriate methods.

Consistent with this best practice, the Commission re-examined the analytical methods used in previous reports and made refinements to its model as appropriate for this report.

Refinements to the Regression Model

In developing the regression model used for the analyses described in this report, the Commission began with the model used in its recent prior analyses. The Commission then analyzed whether some of the existing variables used in the prior model should be modified, such as whether previously used dichotomous variables should be modified to continuous variables. Additionally, the Commission analyzed whether adding new variables in the regression model might assist in explaining the demographic differences in

sentencing.[12] When determining whether any changes to the model were beneficial, the Commission first assessed whether the new, or modified, variables were statistically significant and, if so, assessed whether the revised model resulted in a better fit (*e.g.*, explained more variation in the data). If so, the revised or new variables were retained in the regression model.[13]

Modifying the variables used in the prior regression model

Table 1 lists the variables used in the prior 2017 report analysis and the variables used in the analysis for this report. The Commission modified four variables included in the prior analysis (offense type, downward departure or variance, age, and education) and added six new variables (Early Disposition Program, Criminal History Category, Final Offense

Table 1. Model Variables

PRIOR MODEL VARIABLES (2017)	UPDATED MODEL VARIABLES	NEW VARIABLES
Presumptive Sentence (log)	Presumptive Sentence (log)	Early Disposition Program
Offense Type: - Drug Trafficking - Sexual Offenses - Child Pornography - Violent - Immigration - White Collar - Other Type	Offense Type: - Part in Chapter Two of the *Guidelines Manual* to which the primary sentencing guideline applied in the case (*e.g.*, Part A (Offenses Against the Person), Part B (Basic Economic Offenses), *etc.*).	Criminal History Category
Upward Departure or Variance	Upward Departure or Variance	Final Offense Level
Downward Departure or Variance	Government Sponsored Downward Departure or Variance Non-government Sponsored Downward Departure or Variance	Weapons Indicator
Substantial Assistance Departure	Substantial Assistance Departure	Prior Violent Offense
Subject to Mandatory Minimum Penalty	Subject to Mandatory Minimum Penalty	Instant Violent Offense
Conviction Type (Plea/Trial)	Conviction Type (Plea/Trial)	
Custody Status	Custody Status	
Race/Gender Pairings: - White Male - Black Male - Hispanic Male - Other Male - White Female - Black Female - Hispanic Female - Other Female	Race/Gender Pairings: - White Male - Black Male - Hispanic Male - Other Male - White Female - Black Female - Hispanic Female - Other Female	
Age (binary)	Age (continuous)	
Education (binary)	Education (four levels)	
Citizenship	Citizenship	

Level, weapons indicator, and prior or instant violent offense). A full discussion of the modifications can be found in Appendix A.

Refining the analytic framework

The Commission's prior reports have included all cases in a single regression analysis, regardless of the type of sentence imposed. As a result, information regarding the decision to incarcerate, or not incarcerate, as well as the length of incarceration imposed, were included in a single analysis. Sentences of probation, however, are relatively rare and fundamentally different than sentences of incarceration. During the five fiscal years studied for this analysis, approximately six percent of individuals sentenced for a federal offense were sentenced to probation,[14] which is reflected in the Commission's data as a sentence of zero months of incarceration.

For this report, the Commission refined its analytical framework to separately examine the disparity, if any, attributed to the decision whether to impose a sentence of probation or incarceration and the disparity, if any, attributed to length of incarceration when imposed. To accomplish this, the Commission separated the analysis into two distinct stages thereby permitting a more precise examination of where demographic differences may arise within the data examined in this analysis. In the first stage, the Commission used multiple logistic regression to assess the likelihood of receiving a "probation-only"[15] sentence as compared to incarceration, after controlling for available personal and offense characteristics.[16] In this stage, the outcome variable was a binary indicator

of whether the individual received a probation-only sentence or a sentence of incarceration. As such, the analysis provides an estimate of the extent to which there might be disparity in the decision to incarcerate.

In the second stage, individuals who received a probation-only sentence were removed, and the analysis focused solely on individuals who received an incarceration sentence. In this second stage, the outcome variable is the length of incarceration. The analysis provides an estimate of the extent to which there might be disparity in the length of incarceration imposed, after controlling for available personal and offense characteristics.

The two-stage analysis has several advantages. First, it avoids including the numerous zero values associated with probation-only sentences in a linear regression examining sentence length. Second, different model specifications can be used at each stage. Certain variables (*e.g.*, criminal history, race, gender, offense type, *etc.*) may exert different levels of influence on the decision to impose a sentence of probation-only or incarceration as compared to the determination of an appropriate length of incarceration to impose. Separating the analysis into two stages provides greater flexibility to capture nuances in each decision. Third, the two-stage analysis provides a more precise understanding of the examined data, in that it enables an assessment of the extent to which disparity is observed in the data about each stage.

Research Findings

Overview of the Analyses

Each analysis includes three subanalyses: females compared to males, an analysis of each racial group among males, and an analysis of each racial group among females.

Each subanalysis has a reference group which is the baseline for that specific analysis. For example, the analysis first compares females to males without regard to race. Then, using the race-gender pairings, the sentences for males are examined, with the reference group as White males (*i.e.*, Black males are compared to White males, Hispanic males are compared to White males, and Other race males are compared to White males). Finally, the sentences for females are analyzed, with the reference group as White females.

Tables 2-4 present the estimated effect for each subanalyses. For example, in Table 2, the estimate of -29.2 indicates that females received sentences 29.2 percent shorter than males, after controlling for personal and offense characteristics. For each comparison, the number of asterisks indicates which level of statistical significance was found to apply to the result.[17] Findings that were not statistically significant at any of the three levels are indicated by the abbreviation "(ns)".

Fiscal Years 2017–2021

Analysis 1
All Cases
Sentence Length

Analysis 2
Likelihood of
Probation–Only
Sentence

Analysis 3
Length of
Incarceration

Subanalyses
Females vs. Males
Male Racial Groups (Black, Hispanic, Other Race) vs. White Males
Female Racial Groups (Black, Hispanic, Other Race) vs. White Females
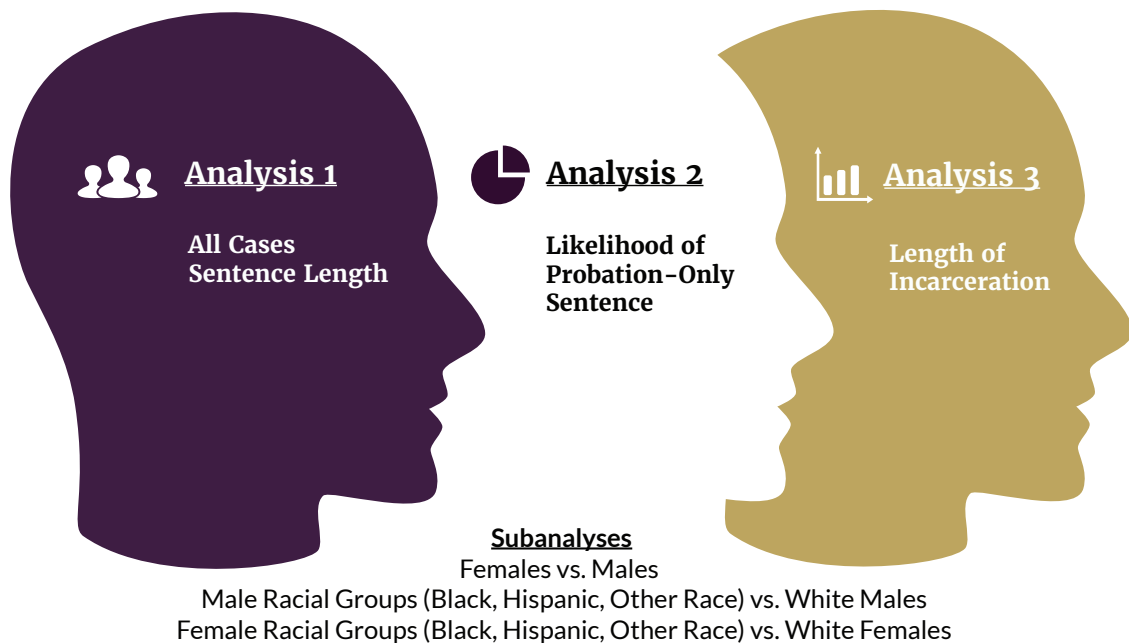
Graphical Depiction

Before each table is a three-part figure that graphically presents the same analysis. For each analysis, the gray horizontal line represents the baseline for the reference group and the square points indicate the estimate for the specific analysis (see example figure below).

In Figures 2 and 4, estimates above the baseline indicate longer sentences for that group while estimates below the baseline indicate shorter sentences. In Figure 3, estimates above the baseline indicate greater odds of receiving probation while estimates below the baseline indicate lower odds of receiving probation.

Example Figure.
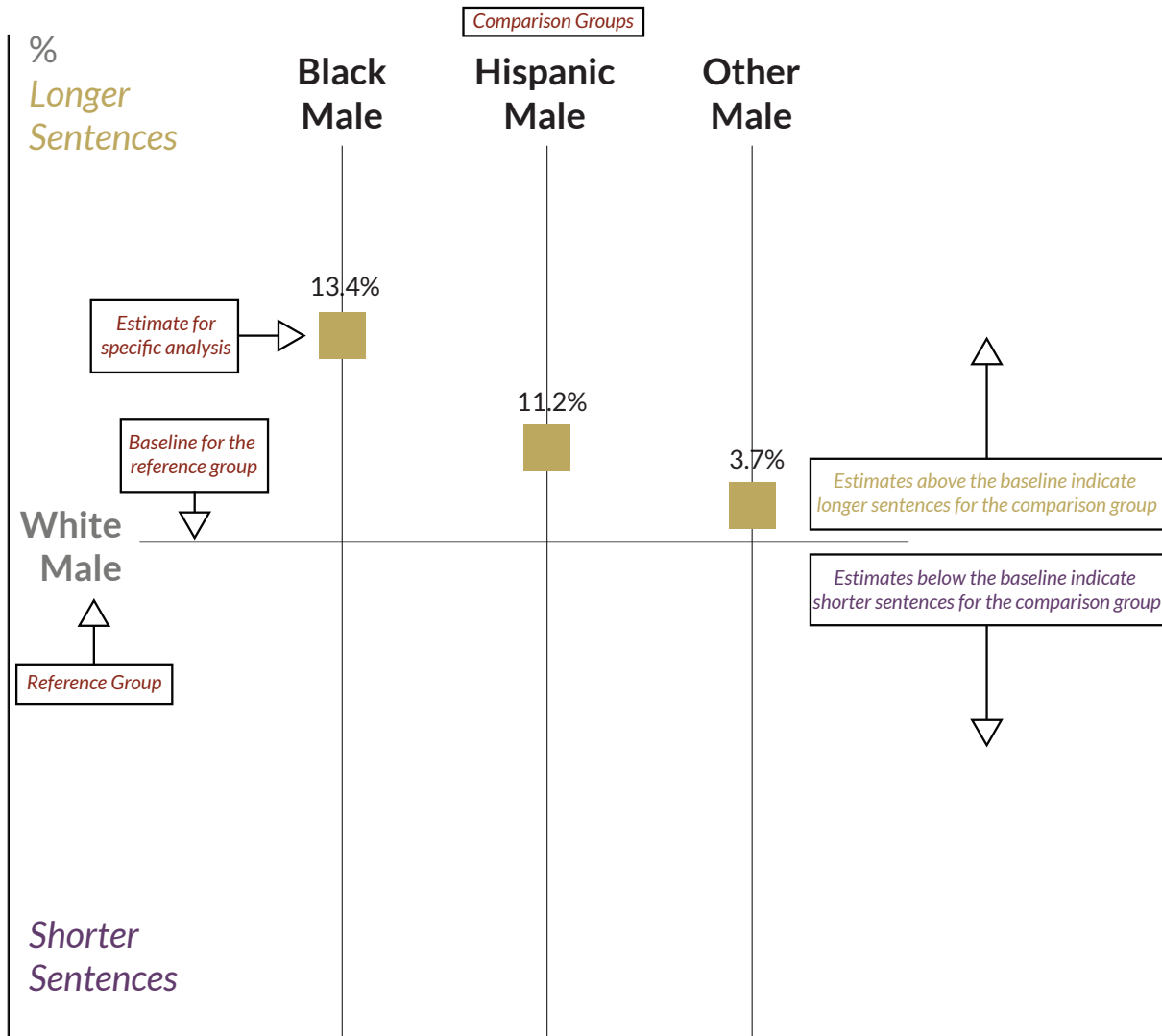
Analysis of All Cases (Fiscal Years 2017–2021)

Before discussing the results of the two-stage analysis, the Commission first provides an analysis of the disparity in sentence length for all cases, similar to the analysis discussed in the 2017 Demographics Report.[18] This threshold analysis provides an estimate of the overall demographic disparity in federal sentences in the data examined. The results of the two-stage analytical approach are then presented to determine more precisely where within the data the disparity is more pronounced.

The full analysis examined 309,411 individuals sentenced for a felony or Class A misdemeanor between fiscal years 2017 and 2021[19] for whom complete sentencing information was received.[20] The Commission found that sentence length was associated with some demographic factors. When compared to White males, males from all other racial groups received longer sentences, on average. Specifically, Black males received sentences 13.4 percent longer than White males. Hispanic males received sentences approximately 11.2 percent longer than White males (Table 2).

Figure 2. Differences in Overall Sentence Length

2A

% Longer Sentences

Comparison Group
Female

Male ———————— *Reference Group*

−29.2%

Shorter Sentences

2B

% Longer Sentences

Comparison Groups

Black Male   **Hispanic Male**   **Other Male**

13.4%   11.2%

3.7%

White Male ———————— *Reference Group*

Shorter Sentences

2C

% Longer Sentences

Comparison Groups

Black Female   **Hispanic Female**   **Other Female**

27.8%

White Female ———————— *Reference Group*

−6.0%

−10.0%

Shorter Sentences

Table 2. Summary of Findings
Analysis of All Cases (Fiscal Year 2017–2021)

FIGURE	COMPARISON GROUP	REFERENCE GROUP	ESTIMATE
2A	FEMALE	vs. MALE	-29.2 ***
2B	BLACK MALE	vs. WHITE MALE	13.4 ***
	HISPANIC MALE		11.2 ***
	OTHER MALE		3.7 (ns)
2C	BLACK FEMALE	vs. WHITE FEMALE	-6.0 (ns)
	HISPANIC FEMALE		27.8 ***
	OTHER FEMALE		-10.0 *

p-values * p ≤ .05; ** p ≤ .01; *** p ≤ .001

The Commission found that females received sentences that were shorter, on average, than males. Specifically, females received sentences 29.2 percent shorter than males, after controlling for all other factors. Further, the Commission also found that sentence length was associated with some demographic factors among females. When compared to White females, Black and Other race females received shorter sentences while Hispanic females received longer sentences. Specifically, Hispanic females received sentences 27.8 percent longer, and Other race females received sentences 10.0 percent shorter, than White females (Table 2).

> **When compared to White males, individuals from all other racial groups received longer federal sentences, on average.**

Analysis of the Likelihood of Receiving a Probation–Only Sentence

The first stage of the Commission's updated analysis examines whether there is disparity in the likelihood of receiving a probation-only sentence. This analysis includes only individuals for whom a probation sentence was legally permissible. Consequently, for this analysis, individuals were excluded who were convicted of a Class A or B felony,[21] convicted under a statute which prohibits the imposition of a probation sentence,[22] or subject to a mandatory minimum penalty at sentencing.[23] After these exclusions, 229,444 individuals remained in the analysis.

As shown in Table 3, the Commission found that the likelihood of receiving a probation-only sentence is associated with some demographic factors. In this analysis, the number in each row indicates the likelihood of receiving a probation sentence compared to individuals in the reference group, after controlling for all other available sentencing and demographic factors.

Among males, the Commission found that the likelihood of receiving a probation-only sentence was associated with some demographic factors. Compared to White males, individuals of all races were less likely to receive a probation-only sentence. Specifically, Black males were 23.4 percent less likely, and Hispanic males were 26.6 percent less likely, to receive a probation sentence compared to White males.

Figure 3. Differences in Likelihood of Probation–Only Sentence

3A

%
More Likely

Comparison Group
Female   ■ 39.6%

Male ————————— *Reference Group*

Less Likely

3B

%
More Likely

Comparison Groups
Black Male   **Hispanic Male**   **Other Male**

White Male ————————————————— *Reference Group*

−8.1%

−23.4%

−26.6%

Less Likely

3C

%
More Likely

Comparison Groups
Black Female   **Hispanic Female**   **Other Female**

5.4%

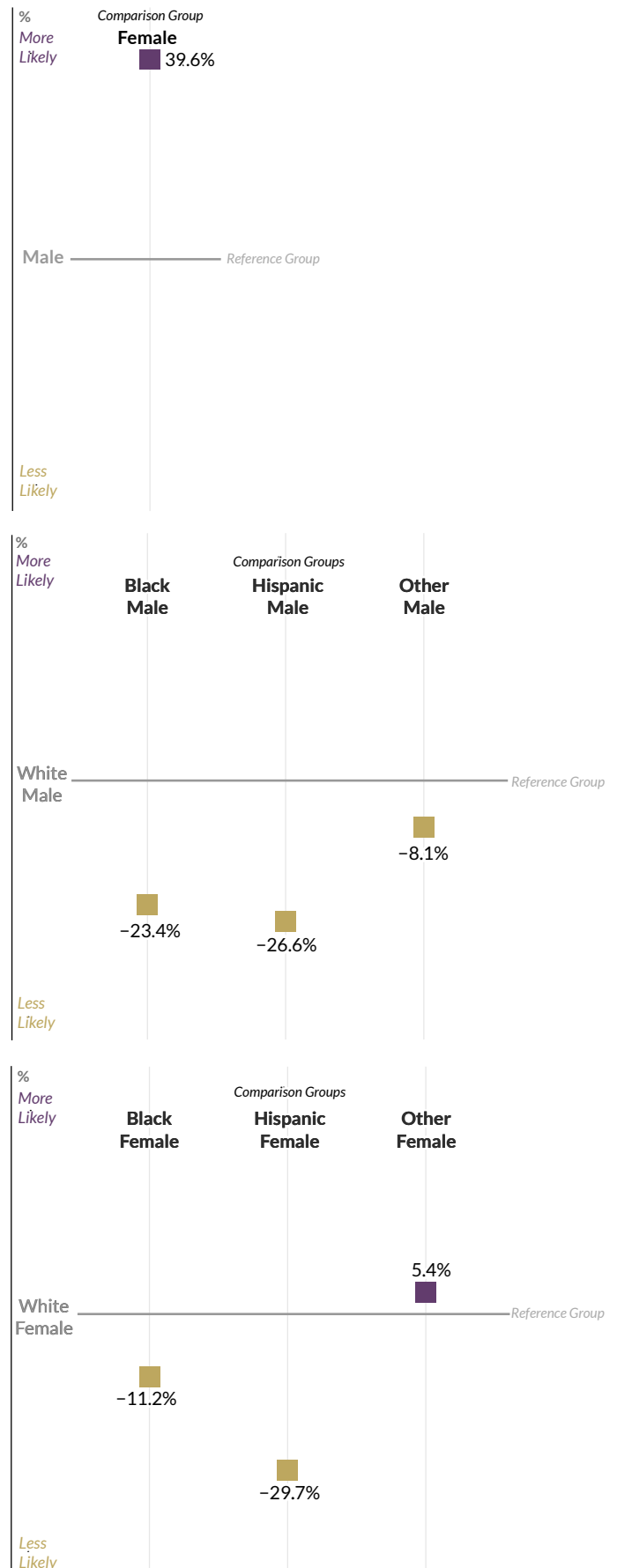White Female ————————————————— *Reference Group*

−11.2%

−29.7%

Less Likely

Table 3. Summary of Findings
Analysis of Likelihood of Probation–Only Sentence

FIGURE	COMPARISON GROUP	REFERENCE GROUP	ESTIMATE
3A	FEMALE	vs. MALE	39.6 ***
3B	BLACK MALE	vs. WHITE MALE	-23.4 ***
	HISPANIC MALE		-26.6 ***
	OTHER MALE		-8.1 (ns)
3C	BLACK FEMALE	vs. WHITE FEMALE	-11.2 *
	HISPANIC FEMALE		-29.7 ***
	OTHER FEMALE		5.4 (ns)

p-values * p $\leq$ .05; ** p $\leq$ .01; *** p $\leq$ .001

> **Females were 39.6% more likely to receive a probation–only sentence compared to males.**

The Commission found that females were more likely to receive a probation-only sentence compared to males. Specifically, females were 39.6 percent more likely to receive a probation sentence than males. Further, among females, the Commission found that the likelihood of receiving a probation sentence was associated with some demographic factors. Compared to White females, Black and Hispanic females were less likely to receive a probation sentence. Specifically, Black females were 11.2 percent less likely, and Hispanic females were 29.7 percent less likely, to receive a probation sentence (Table 3).

Analysis of the Length of Incarceration

The second stage of the updated analysis examines disparity in the length of incarceration imposed. As discussed above, this analysis includes only those individuals who received a sentence of imprisonment and where the length of the imprisonment was known.[24] The Commission found that length of imprisonment was associated with some demographic factors, but the magnitude of their impact on length of incarceration was very different than when all individuals were analyzed together, regardless of whether a probation-only sentence or a sentence of imprisonment had been imposed (Table 4).

Among males who were sentenced to a term of incarceration, the Commission found that the length of incarceration continued to be associated with some demographic factors, although to a much lesser extent than when all cases were included in the analysis. Black males received lengths of incarceration 4.7 percent longer, and Hispanic males received lengths of incarceration 1.9 percent longer, than White males. Other race males received lengths of incarceration 2.0 percent shorter than White males.

Figure 4. Differences in Length of Incarceration
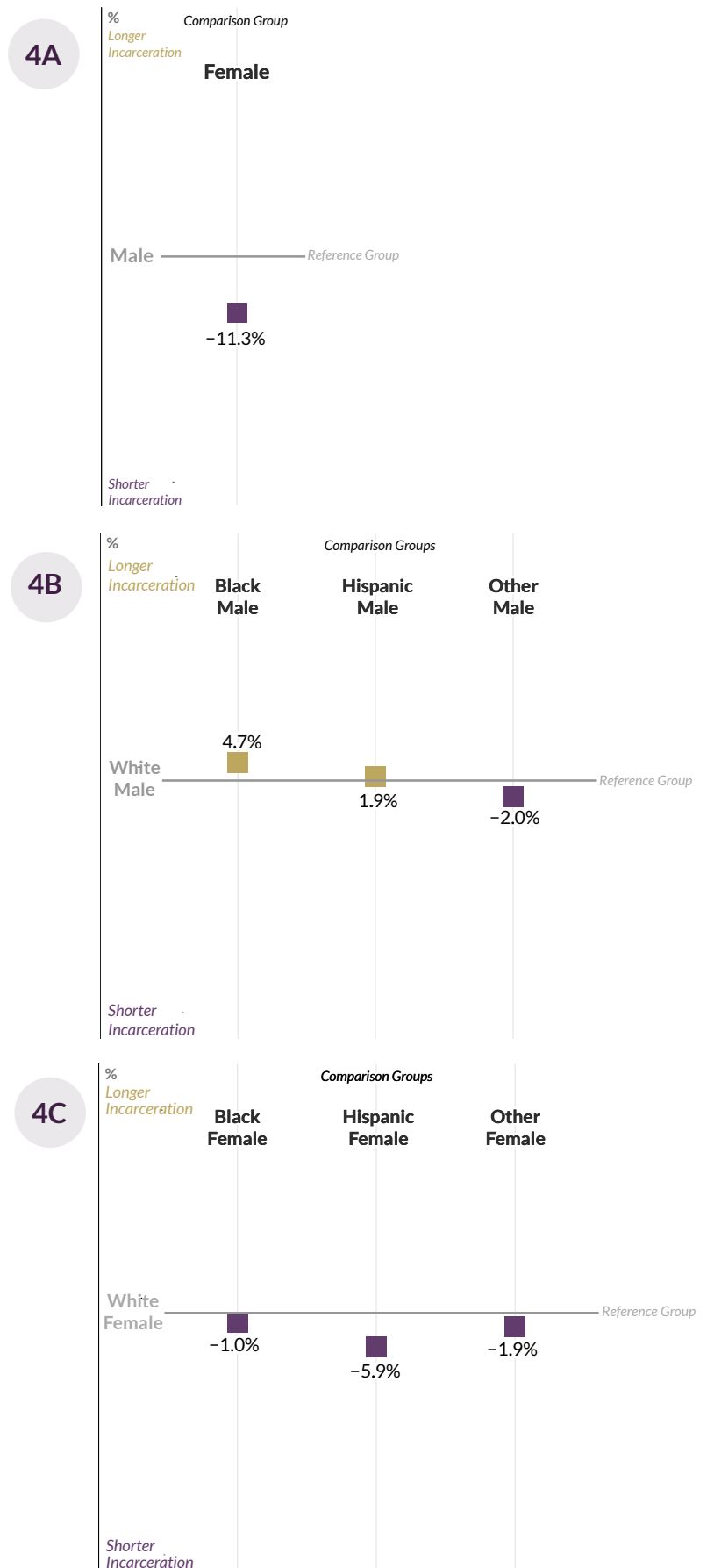
Table 4. Summary of Findings
Analysis of Length of Incarceration

FIGURE	COMPARISON GROUP	REFERENCE GROUP	ESTIMATE
4A	FEMALE	vs. MALE	-11.3 ***
4B	BLACK MALE		4.7 ***
	HISPANIC MALE	vs. WHITE MALE	1.9 ***
	OTHER MALE		-2.0 **
4C	BLACK FEMALE		-1.0 (ns)
	HISPANIC FEMALE	vs. WHITE FEMALE	-5.9 ***
	OTHER FEMALE		-1.9 (ns)

p-values * p ≤ .05; ** p ≤ .01; *** p ≤ .001

Females, regardless of their race, received shorter lengths of imprisonment than males. Specifically, females received lengths of incarceration 11.3 percent shorter than males. The Commission also found that length of incarceration was associated with some demographic factors among some females. Compared to White females, Hispanic females received lengths of incarceration 5.9 percent shorter.
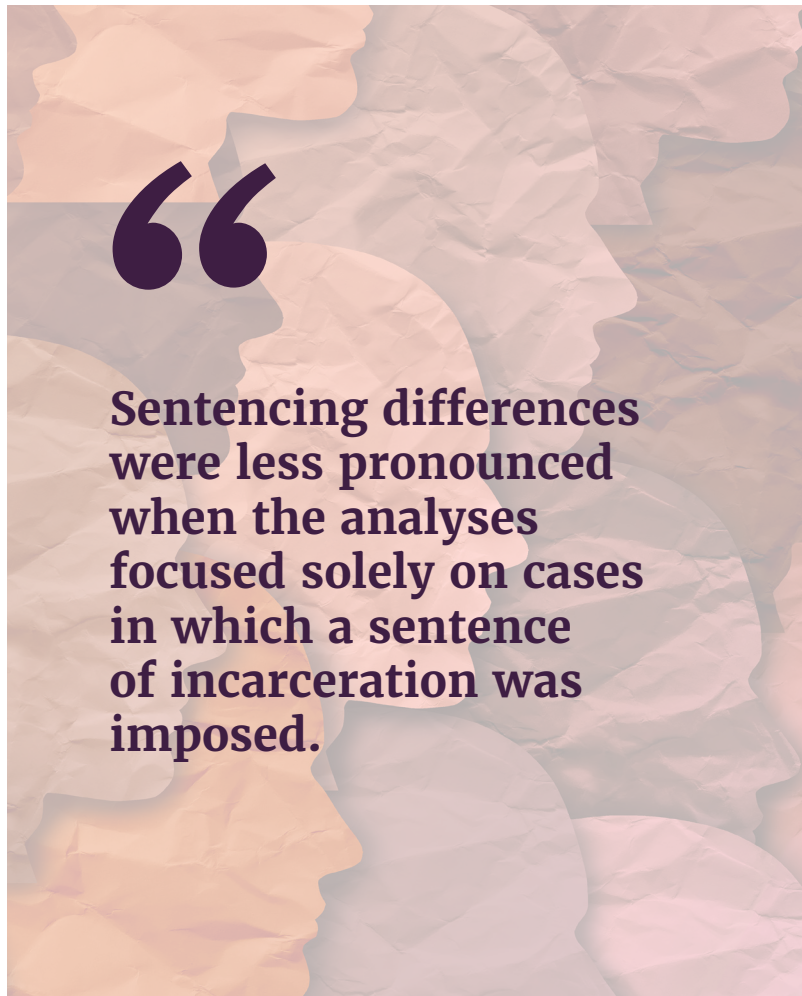
> "
> **Sentencing differences were less pronounced when the analyses focused solely on cases in which a sentence of incarceration was imposed.**

Additional Analyses

In its past reports, the Commission found that other demographic factors also had some association with the sentences imposed. Appendix B provides the full results of the Commission's updated analysis of the impact of age, citizenship, and education on sentencing. In summary, however, the Commission found that each of these demographic factors continued to be associated with the sentences imposed. In particular, length of incarceration increased with the age of the individual. Also, individuals who had not completed high school were less likely to receive a probation sentence and received slightly longer sentences of incarceration. Additionally, non-citizens received sentences of incarceration slightly longer than citizens, after controlling for all other factors.

The Commission also provides analyses of the sentencing disparity within specific crime types. Appendix C provides the results of the Commission's updated analysis of the demographic factors and sentences imposed in drug trafficking, firearms, and fraud cases. Demographic differences were found in all three crime types, but were most pronounced in firearms offenses, where Black males were 40.4 percent less likely than White males to receive a probation sentence and Black females were 31.6 percent less likely than White females to receive a probation sentence.

Finally, the Commission also analyzed whether disparity was observed in incarceration sentences across sentences of different lengths (Appendix D). In sentences of incarceration of 18 months or less, Black males had 6.8 percent longer sentences than White males. Also, among all individuals sentenced to 18 months or less incarceration, females received sentences that were 10.5 percent shorter than those for males. When the length of incarceration increased, sentencing disparity related to demographic characteristics were either small or not statistically significant.

Conclusion

The Commission's most recent research provides a new understanding regarding possible sources of demographic disparity in federal sentencing. The Commission focused on two important decisions at sentencing: (1) whether to impose a sentence of probation or a sentence of incarceration and (2) when imposing a sentence of incarceration, the length of imprisonment. New refined analyses reveal that greater demographic disparities can be attributed to the initial decision whether the sentence should include incarceration at all than to the length of a prison term once a decision to impose one has been made.

In particular, the likelihood of receiving a probationary sentence varied substantially by race. Black males were 23.4 percent less likely, and Hispanic males were 26.6 percent less likely, to receive a probationary sentence compared to White males, after controlling for all other factors. Although probationary sentences account for only six percent of sentences imposed during the five-year period studied, they significantly impact the study of disparity.

When examining all sentences imposed during the five-year period studied, the results are very consistent with the Commission's prior reports: Black males received sentences that were 13.4 percent longer, and Hispanic males received sentences that were 11.2 percent longer, than White males. However, when probationary sentences were excluded and the analysis focused solely on the 94 percent of cases in which a sentence of imprisonment was imposed, the demographic differences were less pronounced. In particular, Black males received lengths of incarceration 4.7 percent longer, and Hispanic males received lengths of incarceration 1.9 percent longer, than White males after controlling for other factors. Further, these differences were concentrated among individuals who received relatively short sentences of incarceration. Among individuals sentenced to 18 months or less of incarceration, Black males received lengths of incarceration 6.8 percent longer than White males. The difference narrowed to 1.3 percent for inividuals who received sentences of greater than 18 months to 60 months, and for sentences longer than 60 months Black males received lengths of incarceration approximately one percent shorter than White males.

Demographic differences in federal sentencing were also observed among females. When examining all sentences imposed during the five-year period studied, the Commission found that females received sentences 29.2 percent shorter than males. Further, females of all races were 39.6 percent more likely to receive a probation sentence than males and, when incarcerated, received lengths of incarceration 11.3 percent shorter than males. In addition to comparing females and males, for the first time, the Commission examined demographic differences in sentencing among females. The Commission found that Black females were 11.2 percent less likely, and Hispanic females were 29.7 percent less likely, to receive a probation sentence than White females. The only statistically significant difference in the length of imprisonment among females was found among Hispanic females, who received 5.9 percent shorter sentences than White females.

This report sought to determine whether demographic differences in sentencing persist and, if so, where in the sentencing process this disparity might occur. This report does not attempt to identify a cause of the differences observed within the data examined or suggest any remedies. Future research may provide greater insight into the observed differences if data not readily available to the Commission at the time of this report were collected on such factors as charging and plea-bargaining decisions, and additional data about the history and characteristics of the individual being sentenced. Understanding the effects of these and possibly other factors may clarify the extent to which demographic factors impact the sentences imposed and, if such impact continues to be observed, at which stage(s) of the federal criminal justice process they occur. Additional research also is needed to determine the role of laws, policies, and practices that may be sources of demographic disparity in sentencing. Due to these limitations, the results of this or any regression analysis should be used with caution.

Appendix A. Modifications to the Commission's Regression Model

As discussed in the text of this report, the Commission analyzed whether modifying some of the existing variables would increase the overall precision of the regression model and whether the inclusion of new variables could further refine the regression model. The modifications and additions to the Commission's regression model are discussed in this appendix.

Modifying Existing Control Variables

Offense Type Classification

As shown by the Commission's prior research, the nature of the offense for which a person is sentenced has a substantial effect on the length of any sentence imposed.[25] To account for this, the Commission's prior research on demographic differences in sentencing grouped the offense of conviction into one of seven offense categories: violent offenses, sexual offenses, pornography, drug trafficking, white-collar offenses, immigration offenses, or all "other" offenses. Offenses were sorted into these broad categories to ensure an adequate number of cases would fall into each category to perform the analysis. In this report, the Commission explored whether more categories would improve upon its analysis of the impact of demographic factors while still maintaining an adequate number of cases in each category to perform the analysis.

The federal sentencing guidelines are divided into the 18 "parts" of Chapter Two (Offense Conduct) of the *Guidelines Manual*, with the guidelines applying to similar crimes grouped in the same part.[26] For the regression analysis used in this report, the Commission developed offense type categories that more closely matched the categorization used in the *Guidelines Manual*. For example, if the sentencing guideline in an individual's case was determined to be a "Part A" offense, which applies to "Offenses Against the Person," the offense type for that case was classified as a Part A offense; if the sentencing guideline was a "Part B" offense, which applies to "Basic Economic Offenses," the offense type for that case was classified as a Part B offense. By expanding the offense type scheme from the seven offense types used in the Commission's prior reports to 18 categories that follow the structure of the *Guidelines Manual*,[27] the regression model better reflected the primary offense involved in each case. The new variables also achieved a better fit of the regression model to the data.

Age

In the Commission's prior analysis, age at sentencing was accounted for through one dichotomous variable, which identified whether the individual was over the age of 25 at the time of sentencing. That age was used as the demarcation point in response to research that suggests brain development does not end until the mid-20s. The Commission has used this same age framework in its prior reports on other subjects.[28] However, recent Commission research on recidivism has shown that individuals sentenced for a federal offense recidivate at different rates based on their age at release, and that these differences continue well beyond the age of 25.[29] In light of these findings, the Commission explored whether courts might take age into account beyond a demarcation of above and below age 25. Consequently, for this report, the Commission modified age from a dichotomous to a continuous variable. The new variable achieved a better fit of the regression model to the data.

Education

The Commission's prior analysis assessed the impact that education might have on the sentences imposed. In its prior regression model, the Commission used a dichotomous variable for education, identifying whether the individual had any education beyond high school. This level of education was chosen, in part, to reflect the emphasis that the Federal Bureau of Prisons places on having a high school education in its rehabilitation programs.[30] However, the education

data the Commission routinely collects is more detailed. In its annual statistical compilations, the Commission regularly divides individuals into four education categories: those who had not completed high school, those who had completed high school or its equivalent, those with some college education, and those who had completed a college degree.[31] The Commission analyzed whether courts might take the specific level of educational attainment into consideration at sentencing. To account for this, the Commission has expanded the education variable to the same four categories used in its regular statistical compilations. The new variables also achieved a better fit of the regression model to the data.

Departures and Variances

In its prior regression work, the Commission accounted for whether the sentence imposed was a departure or variance from the guideline range that applied in the case. As part of its ongoing research, however, the Commission has noted that the extent of a departure or variance below the guideline range often differs depending on whether the government sought the sentence below the guideline range or did not seek a below range sentence.[32] To account for these differences, the Commission bifurcated the variable that controls for sentences below the guideline range into two separate variables: one when the government sought the downward departure or variance, and the other when the government did not seek the sentence below the guideline range. Together, the new variables achieved a better fit of the regression model to the data.

Race–Gender Pairings

The Commission's prior reports analyzed demographic differences by pairing race and gender. White males were used as the baseline for comparisons with all other race-gender pairings. This approach, however, does not provide an estimate of the differences in sentences between males and females generally, or permit comparisons among females of different races. Therefore, in this report, separate baseline reference groups were used for some analyses. Using the two different approaches to study the impact of race and gender permits a fuller assessment of differences in sentencing based on gender (males versus females) while still permitting analyses based upon race-gender pairings when appropriate (e.g., White females compared to Black females, White males compared to Black males, *etc.*).

Adding Additional Control Variables

Early Disposition Programs

The Commission regularly reports on the sentences imposed relative to the guideline range and groups cases below the applicable guideline range into two broad categories, departures or variances.[33] Departures are cases in which the court cited a departure provision in the *Guidelines Manual* as a reason for the sentence imposed. Departures are further subdivided into four categories. They include those under §5K1.1 for providing substantial assistance to the government in the investigation or prosecution of another individual, those in which the government

has sought a downward departure for other reasons, and departures for other reasons in which the government did not seek the departure.[34] The fourth category are cases in which the individual has agreed to participate in an Early Disposition Program (EDP), through which cases are decided in an expedited manner.[35] Although substantial assistance and other departures were separately accounted for in the Commission's prior regression model, it did not separately take into account EDP departures, instead accounting for them within the "other departure" category. However, it may be possible that courts give additional consideration at sentencing to indviduals who have agreed to participate in an EDP program. The Commission tested whether the inclusion of an EDP departure variable improved the regression model. The variable was determined to be statistically significant, and its inclusion in the model improved the overall model fit.

Criminal History and Final Offense Level

The severity of an individual's crime and criminal history are the two key factors used to determine the sentencing range under the federal sentencing guidelines. In the Commission's previous reports, the severity of the instant offense, as quantified by the final offense level, and the individual's Criminal History Category (CHC) were controlled for in its regression model through the "presumptive sentence" variable. The presumptive sentence variable represents the sentence length at the bottom of the guideline range applicable to the final offense level and CHC determined by the court in each case.[36]

In refining its model, the Commission explored whether courts give additional consideration to individuals with especially high, or especially low, final offense levels. If so, then the inclusion of the final offense level as an additional control could improve the regression model. When the Commission included final offense level as a separate control variable in its regression model, the variable was found to be statistically significant. It also was found to improve the overall model fit and so was retained in the final model used.

Similarly, the Commission explored whether the inclusion of the individual's CHC as an additional variable would improve the overall fit of the model. Other researchers also have hypothesized that judges consider an individual's criminal history beyond just its function in determining the guideline range.[37] For example, judges often cite criminal history when giving reasons for a sentence above or below the guideline range.[38] If judges do give additional consideration to criminal history, including the sentenced individual's CHC as a separate variable in the model would account for this additional consideration. When the Commission added a separate control variable for criminal history, the variable was found to be statistically significant and improved the overall fit of the model. Therefore, the CHC variable was retained in the model.

Weapon Involvement

Individuals who use a weapon in connection with their offense may be convicted under section 18 U.S.C. § 924(c)[39] as one of the statutes (or the only statute) of conviction in the federal offense. Alternatively, the court may enhance the guideline range at sentencing for an individual who possessed a weapon during the offense through application of a specific offense characteristic in the *Guidelines Manual*.[40] In the Commission's past regression model, convictions under section 924(c) were accounted for through the variable identifying whether a mandatory minimum penalty applied at sentencing.[41] Additionally, the presumptive sentence variable accounted for cases in which the application of a specific offense characteristic for weapon possession increased the final offense level in the case.

In refining the model, however, the Commission explored whether judges might take into account weapon possession, or the actual use of a weapon, over and above the extent to which it contributes to the presumptive sentence or results in a mandatory minimum penalty in the case. Including a separate weapon variable in its analysis demonstrated that the weapon variable itself was statistically significant and that its inclusion improved the overall fit of the model. Therefore, the new weapon variable was retained in the final model.

Violent Criminal History

The Commission's past reports have noted that judges make sentencing decisions based on many legal factors and other legitimate considerations for which data are not readily available and, therefore, not accounted for in the Commission's model.[42] One specific example concerned information about violence in an individual's criminal history. As the Commission explained in 2010:

> [A] judge sentencing two offenders convicted of similar crimes with the same criminal history score under the federal sentencing guidelines might impose a longer sentence on the offender with a more violent criminal past than on the offender with a less violent, or non-violent, criminal history. Similarly, a judge sentencing two offenders convicted of similar crimes might be influenced by the presence of violence in one case that was not present in the other case and was not reflected in the final offense level for those cases as determined under the sentencing guidelines.[43]

While the Commission has always recorded the criminal history score used by courts in determining the criminal history category, prior to 2016 the Commission did not collect detailed criminal history about individuals sentenced for a federal offense. That year, the Commission began routinely collecting information on individuals' prior offenses of conviction.

In its 2017 Demographics Report, the Commission used the newly collected data to examine whether prior violent offending had an effect on the demographic differences that were observed in sentencing. Because only one year of data on violent offenses was available at that time (for individuals sentenced in fiscal year 2016), the Commission's analysis on this factor was limited. As discussed more fully in that report, the inclusion of the additional data was not statistically significant.[44]

As part of its separate data collection efforts, the Commission has continued to collect extensive data regarding the criminal history of sentenced individuals. Because the Commission now has detailed criminal history information for all individuals sentenced in the five fiscal years discussed in this report, the Commission retested whether an individual's prior violence is associated with the sentence imposed. The inclusion of a variable for prior violence was found to be statistically significant and improved the overall model fit to the data. Therefore, the prior violence variable was included in the final model.

Appendix B.
Analysis of Other Demographic Factors

As discussed in the body of this report, the Commission's analysis continues to demonstrate that some demographic factors are associated with the likelihood of receiving a probation–only sentence as well as the length of incarceration imposed. In this appendix, the Commission will focus on the demographic factors of age, education, and citizenship.

The Commission's analysis indicates that an individual's age is related to the sentence imposed. Specifically, for each additional year of age, an individual's likelihood of receiving a probation-only sentence decreased by 2.3 percent. Further, for individuals sentenced to a term of incarceration, each additional year of age was associated with a sentence length increase of 1.3 percent (Table 5).

The Commission found that individuals' educational attainment also was related to the sentence imposed. Compared to individuals with less than a high school education, those who graduated from high school[45] were approximately 17.4 percent more likely to receive a probation-only sentence. Similarly, individuals with some college education were approximately 19.0 percent more likely to receive a probation-only sentence. For individuals sentenced to incarceration, there was almost no difference in the sentences imposed on those who had graduated from high school compared to those who had not. But

individuals with some college received sentences that were 2.6 percent shorter than those who had not graduated high school, and college graduates received sentences that were 4.6 percent shorter.

Finally, the analysis indicates that citizenship also was associated with the sentence imposed, although only slightly so.[46] Non-U.S. citizens received sentences that were 1.1 percent longer than U.S. citizens after controlling for all other factors.

Table 5. Summary of Findings
Analysis of Other Demographic Factors

COMPARISON GROUP	REFERENCE GROUP	ESTIMATE	
		LIKELIHOOD OF RECEIVING PROBATION ONLY SENTENCE	LENGTH OF INCARCERATION
AGE		-2.3 ***	1.3 ***
HIGH SCHOOL GRADUATE		17.4 ***	-0.9 ***
SOME COLLEGE	vs. LESS THAN HIGH SCHOOL	19.0 ***	-2.6 ***
COLLEGE GRADUATE		7.1 (ns)	-4.6 ***
NON-U.S. CITIZEN	vs. U.S. CITIZEN		1.1 **

p-values * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

> **Compared to individuals sentenced federally with less than a high school education, those who graduated from high school were 17.4% more likely to receive a probation-only sentence.**

Appendix C.
Offense–Specific Analyses

Consistent with past practice, the Commission also examined whether and to what extent demographic differences in sentencing were observed within specific crime types.

Consistent with past practice, the Commission also examined whether and to what extent demographic differences in sentencing were observed within specific crime types. While the Commission's main analysis controlled for the type of offense in each case, the analyses described in this appendix examine demographic differences within a single crime type by conducting separate sub-analyses for three of the four largest crime types.[47] The Commission performed these additional analyses for two reasons: first, to determine whether its findings on demographic differences in overall sentencing outcomes are observed in each of the major crime types; and second, to determine the extent to which demographic differences in sentencing within each crime type contribute to the demographic differences observed for all sentences. Consistent with the results of the main analysis, demographic factors were associated with sentencing in drug trafficking, firearms, and fraud offenses.

Drug Trafficking Offenses

The Commission found that demographic factors were associated with the sentences imposed on individuals convicted of a federal drug trafficking offense. As with sentences overall, there were large differences in the likelihood of receiving a probation-only sentence, but smaller differences in sentence length among those who were sentenced to incarceration (Table 6).

Among males sentenced for a drug trafficking offense, the Commission found that each demographic group was less likely to receive a probation-only sentence when compared to White males. Specifically, Black males were 35.2 percent less likely, Hispanic males were 33.8 percent less likely, and Other race males were 26.8 percent less likely to receive a probation-only sentence. However,

demographic differences were much less pronounced among males sentenced to incarceration for a drug trafficking offense. Black males received incarceration lengths that were 1.2 percent longer, and Hispanic males received incarceration lengths 1.2 percent shorter, than White males.

The Commission found that among individuals sentenced for a drug trafficking offense, females were 50.8 percent more likely to receive a probation-only sentence than males. Further, females sentenced to incarceration for a drug trafficking offense received sentences 12.2 percent shorter than males sentenced for such an offense. Even so, demographic differences persisted among females sentenced for drug trafficking. Black females were 22.9 percent less likely, and Hispanic females were 22.8 percent less likely to receive a probation-only sentence compared to White females.

The Commission also found an association between demographic factors and the length of incarceration imposed among females sentenced for drug trafficking. Compared to White females, Black females received incarceration sentences that were 6.3 percent shorter, and Hispanic females received incarceration sentences that were 7.6 percent shorter.

Table 6. Summary of Findings
Drug Trafficking–Specific Analysis

COMPARISON GROUP	REFERENCE GROUP	ESTIMATE	
		LIKELIHOOD OF RECEIVING PROBATION ONLY SENTENCE	LENGTH OF INCARCERATION
FEMALE	vs. MALE	50.8 ***	-12.2 ***
BLACK MALE		-35.2 ***	1.2 *
HISPANIC MALE	vs. WHITE MALE	-33.8 ***	-1.2 *
OTHER MALE		-26.8 *	-1.1 (ns)
BLACK FEMALE		-22.9 *	-6.3 **
HISPANIC FEMALE	vs. WHITE FEMALE	-22.8*	-7.6 ***
OTHER FEMALE		-31.3 (ns)	-1.0 (ns)

p-values * p ≤ .05; ** p ≤ .01; *** p ≤ .001

Firearms Offenses

The Commission found that some demographic factors were associated with the sentences imposed on individuals convicted of a federal firearms offense. Again, as with sentences overall, there were large differences in the likelihood of receiving a probation-only sentence, but smaller differences among those who were sentenced to incarceration (Table 7).

Among males sentenced for a firearms offense, the Commission found that individuals of all other races were less likely to receive a probation-only sentence compared to White males. Specifically, Black males were 40.4 percent less likely, and Hispanic males were 29.8 percent less likely, to receive a probation-only sentence. Among males sentenced to incarceration for a firearms offense, there was some

association between race and the sentence imposed, although relatively small and not consistent among racial groups. Compared to White males, Black males received sentences that were approximately 2.0 percent longer while Other race males received sentences that were 4.0 percent shorter.

The Commission found that females sentenced for a firearms offense were approximately 46.1 percent more likely to receive a probation-only sentence as compared to males sentenced for such an offense. Further, among individuals sentenced to incarceration for a firearms offense, females received sentences that were 13.1 percent shorter than males. However, among females, there was no statistically significant association between race and the likelihood of receiving a probation-only sentence or in the length of incarceration imposed.

Table 7. Summary of Findings
Firearms–Specific Analysis

COMPARISON GROUP	REFERENCE GROUP	ESTIMATE	
		LIKELIHOOD OF RECEIVING PROBATION ONLY SENTENCE	LENGTH OF INCARCERATION
FEMALE	vs. MALE	46.1 ***	-13.1 ***
BLACK MALE		-40.4 ***	2.0 ***
HISPANIC MALE	vs. WHITE MALE	-29.8 **	1.4 (ns)
OTHER MALE		-3.5 (ns)	-4.0 *
BLACK FEMALE		-31.6 (ns)	0.5 (ns)
HISPANIC FEMALE	vs. WHITE FEMALE	8.7 (ns)	-1.0 (ns)
OTHER FEMALE		-14.4 (ns)	-3.0 (ns)

p-values * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Fraud Offenses

The Commission found that some demographic factors were associated with the sentences imposed on individuals convicted of a federal fraud offense (Table 8).

Among males sentenced for a fraud offense, the Commission found that the likelihood of receiving a probation-only sentence was associated with some demographic factors. Specifically, Hispanic males were 16.1 percent less likely to receive a probation-only sentence than White males. The Commission did find an association between race and the length of incarceration imposed for males sentenced for a fraud offense. Compared to White males, Black males received incarceration lengths that were 9.2 percent longer, and Hispanic males received incarceration lengths that were 12.8 percent longer. However, Other race males received incarceration lengths that were 6.1 percent shorter.

The Commission found that females sentenced for a fraud offense were 28.0 percent more likely to receive a probation-only sentence than males sentenced for such an offense. Also, females sentenced to incarceration for a fraud offense received sentences that were 5.4 percent shorter than males. Among females, Hispanic females were 33.5 percent less likely to receive a probation-only sentence than White females. The Commission found no statistically significant association between race and the length of the incarceration sentence.

Table 8. Summary of Findings
Fraud−Specific Analysis

COMPARISON GROUP	REFERENCE GROUP	ESTIMATE	
		LIKELIHOOD OF RECEIVING PROBATION ONLY SENTENCE	LENGTH OF INCARCERATION
FEMALE	vs. MALE	28.0 ***	-5.4***
BLACK MALE		-6.1 (ns)	9.2 ***
HISPANIC MALE	vs. WHITE MALE	-16.1 *	12.8 ***
OTHER MALE		-0.7 (ns)	-6.1 **
BLACK FEMALE		-12.9 (ns)	-0.1 (ns)
HISPANIC FEMALE	vs. WHITE FEMALE	-33.5 ***	5.2 (ns)
OTHER FEMALE		-2.0 (ns)	-5.2 (ns)

p-values * p ≤ .05; ** p ≤ .01; *** p ≤ .001

Appendix D.
Differences by Length of Incarceration

The Commission analyzed whether demographic differences in the length of incarceration imposed varied across incarceration lengths. The Commission found that demographic differences in sentences were concentrated primarily in sentences of 18 months or less incarceration.

For individuals sentenced to 18 months or less incarceration, females received 10.5 percent shorter sentences than men. Among males, Black males received lengths of incarceration that were 6.8 percent longer than White males. Among females, no statistically significant differences were found in the length of incarceration imposed.

For individuals sentenced to greater than 18 months to 60 months, far smaller sentence differences were observed. Females received 3.2 percent shorter sentences than males. Among males, Black males received lengths of incarceration that were 1.3 percent longer than White males. Among females, Black females received sentences that were 1.4 percent longer than White females, while Hispanic females received sentences that were 3.1 percent shorter.

Similar results were found among individuals sentenced to greater than 60 to 120 months. Females received 1.6 percent shorter sentences than males. Black males received sentences that were 0.9 percent shorter than White males, while the sentences for Hispanic males were 1.3 percent shorter. Small differences also were observed among females. Only the difference in sentences for Hispanic females, 3.8 percent shorter than White females, were statistically significant.

Among individuals sentenced to more than 120 months incarceration, there was no statistically significant difference among the sentences imposed on most individuals. Only the differences in sentences for Black males, 0.9 percent shorter, and Hispanic males, 1.2 percent shorter, were statistically significant.

Table 9. Summary of Findings
Analysis of Differences by Length of Incarceration

COMPARISON GROUP	REFERENCE GROUP	ESTIMATE			
		18 MONTHS OR LESS	**>18 TO 60 MONTHS**	**>60 TO 120 MONTHS**	**>120 MONTHS**
FEMALE	**vs. MALE**	-10.5 ***	-3.2 ***	-1.6 ***	-0.9 (ns)
BLACK MALE		6.8 ***	1.3 ***	-0.9 ***	-0.9 **
HISPANIC MALE	**vs. WHITE MALE**	2.1 (ns)	-0.5 (ns)	-1.3 ***	-1.2 ***
OTHER MALE		-1.5 (ns)	-0.4 (ns)	-0.5 (ns)	-0.9 (ns)
BLACK FEMALE		4.7 (ns)	1.4 *	-1.1 (ns)	-1.5 (ns)
HISPANIC FEMALE	**vs. WHITE FEMALE**	-1.9 (ns)	-3.1 ***	-3.8 ***	0.2 (ns)
OTHER FEMALE		6.2 (ns)	-0.7 (ns)	-2.1 (ns)	0.9 (ns)
ADJUSTED R²		0.46	0.58	0.46	0.75

p-values * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

> **"**
> **The Commission found that demographic differences in sentences were concentrated primarily in sentences of 18 months or less incarceration.**

Appendix E.
Variables Used in the Models

Table 10 provides a list of the variables included in the multiple regression models. The variables listed in the Generalized Linear Model (GLM) column were used in the first stage of the analysis examining the odds of receiving a probation only sentence. The variables listed in the Linear Model (LM) column were used in the second stage of the analysis focusing on demographic differences in the length of incarceration imposed. Variables not found to be statistically significant for any individual analysis were removed for parsimony.

Table 10. Regression Model Variables

ATTRIBUTE	DESCRIPTION	GLM[48]	LM[49]
Log Length of Incarceration	Natural log of length of incarceration (capped at 470).		X
Probation-Only Sentencing	Indicator of receiving a probation-only sentence.	X	
Race and Gender	Pairings of race and gender (*e.g.*, White male, Black male, *etc.*).	X	X
Age-at-Sentence	Age of the defendant at the time of the sentencing.	X	X
Presumptive Sentence (Log)	Natural log of guideline minimum.		X
Presumptive Sentence	Guideline minimum.	X	
Upward Departure	Upward departure.		X
Substantial Assistance	Received substantial assistance.	X	X
Mandatory Minimum Penalty	Mandatory minimum penalty indicator.		X
In Custody	Custody status at sentencing.	X	X
Education	Education level of the defendant.	X	X
Citizenship	U.S. Citizen indicator.	X	X
Early Disposition Program	Received Early Disposition Program (EDP).	X	X
Gov't Downward Dep or Var	Government sponsored downward departure or variance.	X	X
Non-Gov't Downward Dep or Var	Non-government sponsored downward departure or variance.	X	X
Offense Type	Offense type (*Guidelines Manual* parts - A, B, C, *etc.*).	X	X
Criminal History Category	Criminal history category.	X	X
Weapon	Indicator for weapon SOC enhancement or 18 U.S.C. § 924(c) conviction.		X
Final Offense Level	Final offense level.	X	X
Prior Violent	Indicator for prior violent offense.		X
Instant Violent	Indicator for violent instant offense.	X	
Conviction Type	Conviction via plea agreement or trial.	X	X

Appendix F.
Regression Analyses Output

Table 11. Length of Incarceration[50]

Term	Estimate (SE)[51]	p-value	95% CI Lower	95% CI Upper
Intercept	0.618 (0.015)	<0.001 ***	0.59	0.65
Race and Gender				
Black Male vs. White Male	0.046 (0.003)	<0.001 ***	0.04	0.05
Hispanic Male vs. White Male	0.019 (0.004)	<0.001 ***	0.01	0.03
Other Male vs. White Male	-0.020 (0.007)	0.005 **	-0.03	-0.01
White Female vs. White Male	-0.073 (0.008)	<0.001 ***	-0.09	-0.06
Black Female vs. White Male	-0.083 (0.013)	<0.001 ***	-0.11	-0.06
Hispanic Female vs. White Male	-0.135 (0.008)	<0.001 ***	-0.15	-0.12
Other Female vs. White Male	-0.092 (0.018)	<0.001 ***	-0.13	-0.06
Age at Sentencing				
Age	0.013 (0.001)	<0.001 ***	0.01	0.01
Age Squared	0.000 (0.000)	<0.001 ***	-0.00	-0.00
Presumptive Sentence (Log)				
Log Guideline Minimum	0.177 (0.001)	<0.001 ***	0.18	0.18
Upward Departure				
Yes vs. No	0.701 (0.006)	<0.001 ***	0.69	0.71
Mandatory Minimum Penalty				
Yes vs. No	0.226 (0.004)	<0.001 ***	0.22	0.23
In Custody				
Yes vs. No	0.316 (0.005)	<0.001 ***	0.31	0.33
Citizenship				
Non-U.S. Citizen vs. U.S. Citizen	0.011 (0.004)	0.004 **	0.00	0.02
Substantial Assistance				
Yes vs. No	-0.597 (0.005)	<0.001 ***	-0.61	-0.59
Early Disposition Program				
Yes vs. No	-0.692 (0.004)	<0.001 ***	-0.70	-0.68
Government Downward Dep or Var				
Yes vs. No	-0.572 (0.005)	<0.001 ***	-0.58	-0.56
Non-government Downward Dep or Var				
Yes vs. No	-0.488 (0.003)	<0.001 ***	-0.49	-0.48
Education				
H.S. Graduate vs. Less than H.S. Graduate	-0.009 (0.003)	0.001 **	-0.01	-0.00
Some College vs. Less than H.S. Graduate	-0.026 (0.004)	<0.001 ***	-0.03	-0.02
College Graduate vs. Less than H.S. Graduate	-0.047 (0.006)	<0.001 ***	-0.06	-0.03

Table 11 (cont). Length of Incarceration

Term	Estimate (SE)	p-value	95% CI Lower	Upper
Conviction Type				
Trial vs. Plea	0.054 (0.006)	<0.001 ***	0.04	0.07
Offense Type				
2B vs. 2A	0.256 (0.007)	<0.001 ***	0.24	0.27
2C vs. 2A	0.103 (0.025)	<0.001 ***	0.05	0.15
2D vs. 2A	0.049 (0.007)	<0.001 ***	0.04	0.06
2E vs. 2A	0.113 (0.025)	<0.001 ***	0.06	0.16
2G vs. 2A	0.270 (0.008)	<0.001 ***	0.25	0.29
2K vs. 2A	0.125 (0.007)	<0.001 ***	0.11	0.14
2L vs. 2A	-0.050 (0.008)	<0.001 ***	-0.06	-0.04
2N vs. 2A	0.286 (0.128)	0.025 *	0.04	0.54
2P vs. 2A	-0.174 (0.013)	<0.001 ***	-0.20	-0.15
2Q vs. 2A	-0.362 (0.071)	<0.001 ***	-0.50	-0.22
2R vs. 2A	-0.341 (0.118)	0.004 **	-0.57	-0.11
2S vs. 2A	0.063 (0.012)	<0.001 ***	0.04	0.09
2T vs. 2A	0.126 (0.018)	<0.001 ***	0.09	0.16
Other vs. 2A	-0.006 (0.016)	0.726	-0.04	0.03
Criminal History Category				
CHC II vs. CHC I	-0.010 (0.004)	0.011 *	-0.02	-0.00
CHC III vs. CHC I	0.150 (0.004)	<0.001 ***	0.14	0.16
CHC IV vs. CHC I	0.355 (0.004)	<0.001 ***	0.35	0.36
CHC V vs. CHC I	0.497 (0.005)	<0.001 ***	0.49	0.51
CHC VI vs. CHC I	0.489 (0.004)	<0.001 ***	0.48	0.50
Weapon				
Yes vs. No	0.226 (0.004)	<0.001 ***	0.22	0.23
Final Offense Level				
Final Offense Level	0.081 (0.000)	<0.001 ***	0.08	0.08
Prior Violence				
Yes vs. No	0.033 (0.002)	<0.001 ***	0.03	0.04
Adjusted R^2	0.85			
N	261,171			

Dependent Variable: log length of incarceration capped

p-values * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Table 12. Likelihood of Probation–Only Sentence

Term	Estimate (SE)	Exp(B)	p-value	95% CI Lower	95% CI Upper
Intercept	2.023 (0.164)	7.56	<0.001 ***	5.48	10.43
Race and Gender					
Black Male vs. White Male	-0.266 (0.037)	0.77	<0.001 ***	0.71	0.82
Hispanic Male vs. White Male	-0.310 (0.038)	0.73	<0.001 ***	0.68	0.79
Other Male vs. White Male	-0.085 (0.054)	0.92	0.117	0.83	1.02
White Female vs. White Male	0.299 (0.040)	1.35	<0.001 ***	1.25	1.46
Black Female vs. White Male	0.181 (0.044)	1.20	<0.001 ***	1.10	1.31
Hispanic Female vs. White Male	-0.053 (0.044)	0.95	0.234	0.87	1.03
Other Female vs. White Male	0.352 (0.071)	1.42	<0.001 ***	1.24	1.64
Age at Sentencing					
Age	-0.023 (0.005)	0.98	<0.001 ***	0.97	0.99
Age Squared	0.000 (0.000)	1.00	<0.001 ***	1.00	1.00
Presumptive Sentence					
Guideline Minimum	0.023 (0.001)	1.02	<0.001 ***	1.02	1.03
Conviction Type					
Trial vs Plea	-0.767 (0.101)	0.46	<0.001 ***	0.38	0.57
In Custody					
Yes vs. No	-2.931 (0.040)	0.05	<0.001 ***	0.05	0.06
Citizenship					
Non-U.S. Citizen vs. U.S. Citizen	-0.463 (0.040)	0.63	<0.001 ***	0.58	0.68
Substantial Assistance					
Yes vs. No	2.064 (0.043)	7.88	<0.001 ***	7.24	8.57
Early Disposition Program					
Yes vs. No	2.002 (0.049)	7.40	<0.001 ***	6.73	8.14
Government Downward Dep or Var					
Yes vs. No	2.052 (0.041)	7.78	<0.001 ***	7.19	8.43
Non-government Downward Dep or Var					
Yes vs. No	1.549 (0.033)	4.71	<0.001 ***	4.42	5.02
Education					
H.S. Graduate vs. Less than H.S. Graduate	0.161 (0.031)	1.17	<0.001 ***	1.11	1.25
Some College vs. Less than H.S. Graduate	0.174 (0.033)	1.19	<0.001 ***	1.12	1.27
College Graduate vs. Less than H.S. Graduate	0.068 (0.041)	1.07	0.092	0.99	1.16

Table 12 (cont). Likelihood of Probation–Only Sentence

Term	Estimate (SE)	Exp(B)	p-value	95% CI Lower	Upper
Offense Type					
2B vs. 2A	0.560 (0.124)	1.75	<0.001 ***	1.37	2.23
2D vs. 2A	0.680 (0.128)	1.97	<0.001 ***	1.53	2.54
2E vs. 2A	0.485 (0.159)	1.62	0.002 **	1.19	2.22
2H vs. 2A	0.642 (0.212)	1.90	0.002 **	1.25	2.88
2K vs. 2A	0.210 (0.072)	1.23	0.004 **	1.07	1.42
2M vs. 2A	1.165 (0.206)	3.21	<0.001 ***	2.14	4.80
2N vs. 2A	1.233 (0.240)	3.43	<0.001 ***	2.14	5.49
2P vs. 2A	-0.528 (0.221)	0.59	0.017 *	0.38	0.91
2Q vs. 2A	1.180 (0.155)	3.26	<0.001 ***	2.40	4.41
2R vs. 2A	-0.767 (0.272)	0.46	0.005 **	0.27	0.79
2S vs. 2A	0.460 (0.139)	1.58	<0.001 ***	1.21	2.08
2T vs. 2A	0.288 (0.137)	1.33	0.035 *	1.02	1.74
2X vs. 2A	0.952 (0.139)	2.59	<0.001 ***	1.97	3.41
Other vs. 2A	0.118 (0.129)	1.13	0.359	0.87	1.45
Criminal History Category					
CHC II vs. CHC I	-0.813 (0.037)	0.44	<0.001 ***	0.41	0.48
CHC III vs. CHC I	-1.180 (0.042)	0.31	<0.001 ***	0.28	0.33
CHC IV vs. CHC I	-1.730 (0.070)	0.18	<0.001 ***	0.15	0.20
CHC V vs. CHC I	-2.103 (0.097)	0.12	<0.001 ***	0.10	0.15
CHC VI vs. CHC I	-2.086 (0.093)	0.12	<0.001 ***	0.10	0.15
Final Offense Level					
Yes vs. No	-0.321 (0.004)	0.73	<0.001 ***	0.72	0.73
Instant Violence					
Yes vs. No	0.385 (0.113)	1.47	<0.001 ***	1.18	1.83
McFadden Pseudo R^2	0.47				
N	214,873				

Dependent Variable: Probation-Only vs. Incarceration Sentence (binary)

p-values * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

Endnotes

1   28 U.S.C. § 991(b)(1).

2   28 U.S.C. § 995(a)(12).

3   U.S. Sent'g Comm'n, Final Report on the Impact of United States v. Booker on Federal Sentencing (2006) [hereinafter Booker Report]; U.S. Sent'g Comm'n, Demographic Differences in Federal Sentencing Practices: An Update of the Booker Report's Multivariate Regression Analysis (2010) [hereinafter 2010 Booker Multivariate Analysis]; U.S. Sent'g Comm'n, Report on the Continuing Impact of United States v. Booker on Federal Sentencing, at pt. E (2012) [hereinafter 2012 Booker Report]; U.S. Sent'g Comm'n, Demographic Differences in Sentencing: An Update to the 2012 Booker Report (2017) [hereinafter 2017 Demographics Report]. Commission materials cited herein are available on the Commission's website at https://www.ussc.gov.

4   See 2017 Demographics Report, supra note 3.

5   Id. at 8.

6   One of the purposes of the Commission is to "establish sentencing policies and practices for the Federal criminal justice system that . . . reflect, to the extent practicable, advancement in knowledge of human behavior as it relates to the criminal justice process." 28 U.S.C. § 991(b)(1)(C).

7   For a more detailed explanation of multiple regression analysis, the methodology behind it, and its uses and limitations, see 2010 Booker Multivariate Analysis, supra note 3, at 4–10. See also also Daniel L. Rubinfeld, Reference Guide on Multiple Regression, in Federal Judicial Center, Reference Manual on Scientific Evidence 303 (3d ed. 2011) [hereinafter Rubinfeld]; Neil J. Salkind, Statistics for People Who (Think They) Hate Statistics 324 (2d ed. 2007).

8   A control variable is a variable that is hypothesized to influence the outcome variable. Control variables (e.g., offense type) are not central to the study's objectives but are included in the analysis because their absence could affect the measurement of the outcome being studied (i.e., sentencing).

9   U.S. Sent'g Comm'n, Guidelines Manual (Nov. 2021) [hereinafter USSG].

10   For example, the Commission does not have ready access to data related to law enforcement or prosecutorial decision making, which some commentators contend may contribute to demographic differences in sentencing. See generally Besiki Kutateladze, Vanessa Lynn & Edward Liang, Vera Inst. of Just., Do Race and Ethnicity Matter in Prosecution?: A Review of Empirical Studies (2012) (reviewing 34 studies analyzing the role of race and ethnicity in prosecutorial decision making).

11   As the Commission first stated in 2006, "The presence of violent criminal history may lead the court to sentence higher in the prescribed range. The Commission's datafile does not have information on the type of criminal history behavior. In 2002, the Commission created a datafile which took a 25 percent random sample of cases sentenced in Fiscal Year 2000. This datafile looked more closely at [an] individual's criminal conduct, including detailed information on the type of criminal history the individual had. Using this data (the Intensive Study Sample 2000, or ISS2000), it was found that 24.4% of white is had violent criminal history events, as did 43.7 percent of Black individuals, 18.9 percent of Hispanic individuals, and 23.7 percent of 'other' individuals." 2006 Booker Report, supra note 3, at 105 n.317. See also 2010 Booker Multivariate Analysis, supra note 3, at pt. E, at 9–10; 2012 Booker Report, supra note 3, at pt. E, 8. Beginning with fiscal year 2016 data, however, the Commission developed a process to record all prior criminal history of individuals sentenced for a federal offense, including the date of the prior sentence and type of the prior offense.

12   In the Commission's prior analyses, an attempt was made to create a model that described all aspects of the sentence imposed. Concerns over multicollinearity dictated that multiple variables that might help explain a single aspect of sentencing would not both be included in the model. For this report, however, the Commission has focused specifically on demographic differences in sentencing. In that examination, the Commission explored whether adding additional variables might have an impact on that issue.

13   To make this determination, the Commission used the Bayesian Information Criterion (BIC) as the primary measure to assess model fit. *See* Ken Aho, DeWayen Derryberry & Teri Peterson, *Model Selection for Ecologists: The Worldviews of AIC and BIC*, 95 Ecology 631 (2014) (providing further information about the BIC).

14   *See, e.g.*, U.S. Sent'g Comm'n, 2021 Sourcebook of Federal Sentencing Statistics 62 tbl.13 (2022) [hereinafter 2021 Sourcebook] (6.2% of all individuals sentenced in fiscal year 2021 were sentenced to probation).

15   The Commission uses the term "probation-only" to refer to sentences that involve probation and no other punishment (such as community confinement, intermittent confinement, or home detention). *Id*. at app. A, at 212.

16   Logistic regression is a technique used to analyze the relationship between attributes (*e.g.*, age, gender, etc.) and a binary response variable (*e.g.*, incarceration or no incarceration). *See* Rubinfeld, *supra* note 7, at 303 (providing an overview of regression modeling).

17   The p-value is the probability that the observed relationship between a particular variable and the outcome could have occurred only by random chance. Each variable has an associated p-value. Researchers set a p-value threshold for statistical significance at the beginning of the analysis based on several factors, including the amount of data available. Results that meet the threshold are reported as "statistically significant;" that is, the researcher concludes that the variable did have an effect on the observed outcome. The lower the p-value threshold, the stronger is statistical significance of the observed relationship. Some researchers report statistical significance at multiple threshold levels. *See generally id*. at 320-21.

18   *See* 2017 Demographics Report, *supra* note 3.

19   The Commission receives information from the courts on cases in which the defendant was convicted of a felony or a Class A misdemeanor. *See* USSG §1B1.9 ("The sentencing guidelines do not apply to any count of conviction that is a Class B or C misdemeanor or an infraction."). The fiscal year for the federal government begins on October 1 and ends on September 30. The fiscal year is designated by the calendar year in which it ends.

20   Complete sentencing information was not available for 25,277 individuals; therefore, these individuals were excluded from the analysis.

21   *See* 18 U.S.C. § 3561(a) (prohibiting probation for individuals convicted of a Class A or B felony, or convicted under a statute for which probation is precluded).

22   *See, e.g.*, 18 U.S.C. § 924(c)(1)(D) (penalties for various firearms statutes); 18 U.S.C. § 929(b) (use of restricted ammunition); 18 U.S.C. § 1028A(b) (aggravated identity theft); 18 U.S.C. § 2332b(c)(2) (acts of terrorism transcending national boundaries); 21 U.S.C. § 841(b)(1)(A)(viii), (b)(1)(B)(viii), (b)(1)(C) (certain acts involving controlled substances); 21 U.S.C. § 848(d) (continuing criminal enterprise); 21 U.S.C. § 861(e) (employment or use of persons under 18 years of age in drug operations); 21 U.S.C. § 960(b)(1)(H), (b)(2)(H), (b)(3) (certain acts involving controlled substances).

23   Individuals were subject to a mandatory minimum penalty if they were convicted under a statute that provided for a mandatory minimum penalty and did not receive relief from that penalty at the time of sentencing by providing substantial assistance to the government (18 U.S.C. § 3553(e)) or through the statutory safety valve (18 U.S.C. § 3553(f)).

24　　Individuals receiving a probation-only, or fine only, sentence were excluded. Also, cases in which an individual received a *time served* sentence but where the length of the time served could not be determined also were excluded.

25　　*See, e.g.*, 2021 Sᴏᴜʀᴄᴇʙᴏᴏᴋ, *supra* note 14, at 64 tbl.15 (providing data on average sentence length and average length of imprisonment for 30 crime types).

26　　*See* USSG Ch.2, intro. comment. ("Chapter Two pertains to offense conduct. The Chapter is organized by offenses and divided into parts and related sections that may cover one statute or many.").

27　　The 18 parts of Chapter Two in the *Guidelines Manual* are: Part A (Offenses Against the Person); Part B (Basic Economic Offenses); Part C (Offenses Involving Public Officials and Violation of Federal Election Campaign Laws); Part D (Offenses Involving Drugs and Narco-Terrorism); Part E (Offenses Involving Criminal Enterprises and Racketeering); Part G (Offenses Involving Commercial Sex Acts, Sexual Exploitation of Minors, and Obscenity); Part H (Offenses Involving Individual Rights); Part J (Offenses Involving the Administration of Justice); Part K (Offenses Involving Public Safety); Part L (Offenses Involving Immigration, Naturalization, and Passports); Part M (Offenses Involving National Defense and Weapons of Mass Destruction); Part N (Offenses Involving Food, Drugs, Agricultural Products, and Odometer Laws); Part P (Offenses Involving Prisons and Correctional Facilities); Part Q (Offenses Involving the Environment); Part R (Antirust Offenses); Part S (Money Laundering and Monetary Transaction Reporting); Part T (Offenses Involving Taxation); and Part X (Other Offenses). *See* USSG Ch.2.

28　　*See, e.g.*, Mᴏɴɪᴄᴀ Rᴏʙʙᴇʀs & Jᴀsᴏɴ Gʀᴀɢᴏ, U.S. Sᴇɴᴛ'ɢ Cᴏᴍᴍ'ɴ, Yᴏᴜᴛʜꜰᴜʟ Oꜰꜰᴇɴᴅᴇʀs ɪɴ ᴛʜᴇ Fᴇᴅᴇʀᴀʟ Sʏsᴛᴇᴍ (2017).

29　　*See* Rʏᴀɴ Cᴏᴛᴛᴇʀ, Cᴏᴜʀᴛɴᴇʏ Sᴇᴍɪsᴄʜ & Dᴀᴠɪᴅ Rᴜᴛᴛᴇʀ , U.S. Sᴇɴᴛ'ɢ Cᴏᴍᴍ'ɴ, Rᴇᴄɪᴅɪᴠɪsᴍ ᴏꜰ Oꜰꜰᴇɴᴅᴇʀs Rᴇʟᴇᴀsᴇᴅ ɪɴ 2010 (2021); Kɪᴍ Sᴛᴇᴠᴇɴ Hᴜɴᴛ & Bɪʟʟʏ Eᴀsʟᴇʏ, II, U.S. Sᴇɴᴛ'ɢ Cᴏᴍᴍ'ɴ, Tʜᴇ Eꜰꜰᴇᴄᴛs ᴏꜰ Aɢɪɴɢ ᴏɴ Rᴇᴄɪᴅɪᴠɪsᴍ Aᴍᴏɴɢ Fᴇᴅᴇʀᴀʟ Oꜰꜰᴇɴᴅᴇʀs (2017).

30　　*See, e.g.*, BOP Program Statement 5350.28, Literacy Program (GED Standard) § 1 (Dec. 1, 2003) ("[Any Offender] confined in a federal institution who does not have a verified General Educational Development (GED) credential or high school diploma is required to attend an adult literacy program for a minimum of 240 instructional hours or until a GED is achieved, whichever occurs first.").

31　　*See, e.g.*, 2021 Sᴏᴜʀᴄᴇʙᴏᴏᴋ, *supra* note 14, at 54 tbl.10.

32　　For example, in fiscal years 2017 to 2021, when the government sought a departure (other than for substantial assistance of EDP participation) or variance below the applicable guideline range for an incarceration sentence, the average extent of the reduction was 41.3%. When the court departed or varied without a government motion, the average extent of reduction was 33.3%. *See also generally*, 2012 Bᴏᴏᴋᴇʀ Rᴇᴘᴏʀᴛ, *supra* note 3, at pt.A 96 (showing the average extent of reduction for government sponsored below range sentences and for non-government sponsored below range sentences in all cases over four time periods, and also by each of six offense types over those four time periods).

33　　2021 Sᴏᴜʀᴄᴇʙᴏᴏᴋ, *supra* note 14, at 84 tbl.29.

34　　*Id*. at app.A (describing the terms used in Commission data).

35　　USSG §5K3.1 ("Upon motion of the Government, the court may depart downward not more than 4 levels pursuant to an early disposition program authorized by the Attorney General of the United States and the United States Attorney for the district in which the court resides.").

36　　Courts are required to properly calculate this guideline range in every felony and Class A misdemeanor case. *See* Rita v. United States, 551 U.S. 338, 347 (2007) (holding that the courts of appeal "may apply a presumption of reasonableness to a district court sentence that reflects a proper application of the

[s]entencing [g]uidelines"); Gall v. United States, 552 U.S. 38, 49 (2007) ("As we explained in Rita, a district court should begin all sentencing proceedings by correctly calculating the applicable [g]uideline range.") (citation omitted)).

37   *See*, *e.g.*, Bryan Holmes & Ben Feldmeyer, *Reassessing the Influence of Criminal History in Federal Criminal Courts*, 36 Just. Q. 1206 (2019); Travis W. Franklin & Tri Keah S. Henry, *Racial Disparities in Federal Sentencing Outcomes: Clarifying the Role of Criminal History*, 66 Crime & Delinq. 3 (2020).

38   Sourcebook, *supra* note 14, at 102-03 tbls.41 & 42 (reasons given for upward departures and variances from the guideline range); *id*. at 104-05 tbls.43 & 44 (reasons given for downward departures or variances from the guideline range).

39   18 U.S.C. § 924(c)(1)(A) (requiring a mandatory minimum penalty be imposed on "any person who, during and in relation to any crime of violence or drug trafficking crime (including a crime of violence or drug trafficking crime that provides for an enhanced punishment if committed by the use of a deadly or dangerous weapon or device) for which the person may be prosecuted in a court of the United States, uses or carries a firearm, or who, in furtherance of any such crime, possesses a firearm . . . .").

40   *See*, *e.g.*, USSG §2D1.1(b)(1) (dangerous weapon present in connection with a drug trafficking offense adds an increase of 2-levels).

41   Convictions under section 924(c) generally require the imposition of a mandatory minimum sentence of five, seven, or ten years, depending on the conduct involved. *See* 18 U.S.C. § 924(c)(1)(A).

42   *See supra* notes 11 to 12 and accompanying text.

43   2010 Booker Multivariate Analysis, *supra* note 3, at 9–10 (citations omitted).

44   *See* 2017 Demographics Report, *supra* note 3, at 16–18.

45   This category included individuals with education equivalent to graduating from high school, such as having passed the GED test.

46   An analysis of the likelihood of receiving a probation sentence is not included in this report for non-citizens. Many non-citizens are subject to a detainer filed by immigration officials prior to release from law enforcement custody. Therefore, as a practical matter, sentences of probation are much less likely for non-citizens.

47   2021 Sourcebook, *supra* note 14, at 45 fig.2. The Commission did not conduct a subanalysis for immigration offenses because the vast majority of individuals sentenced for an immigration offense were in one demographic group. *See*, *e.g.*, *id*. at 129 tbl.I-1.

48   Generalized Linear Model (GLM): A multiple logistic regression model was used to analyze the odds of receiving a probation-only sentence as compared to receiving a sentence of incarceration.

49   Linear Model (LM): An Ordinary Least Squares (OLS) multiple linear regression model was used to analyze disparity in the length of incarceration imposed.

50   Appendix F presents the regression tables with White males as a reference category for the race-gender pairing.

51   Heteroskedasticity-Consistent Robust Standard Errors were used. HC1 Standard Errors were calculated using the following formula: HC1: $\frac{n}{n-k}\hat{u}_i^2$ where $\hat{u}_i^2$ refers to the squared residuals, n refers to the number of observations, and k refers to the number of coefficients.