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Judges and Discrimination

Assessing the Theory and Practice of Criminal Sentencing

FINAL REPORT

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CHAPTER 1: INTRODUCTION

> *The sentencing decision is the symbolic keystone of the criminal justice system: in it, the conflicts between the goals of equal justice under the law and individualized justice with punishment tailored to the offender are played out, and society's moral principles and highest values—life and liberty—are interpreted and applied.*
>
> *Research on Sentencing: The Search for Reform (1983)*

The sentencing decision receives considerable attention from both researchers—who look at the determinants of the sentence choice—and policy makers—who look at the necessity and possibility of reform. Yet, despite decades of study, there are large gaps in our understanding of how "punishments are tailored" across the full range of sentencing options. Any effort to explain sentencing outcomes means coming to terms with judicial discretion and how it is put into practice.

Judges are the voice of sentencing, but their freedom of choice is limited by the statutes and sentencing structures existing in a particular state. Since the late 1970s, judicial discretion has been constrained by the creation of sentencing guidelines and other means for structuring the sentencing decision. Some argue these structures unduly restrict a judge's ability to appropriately weigh the factors that play a role in sentencing, while others feel that additional measures, such as mandatory minimum sentencing laws, are needed to constrain judicial discretion further. But regardless of ones personal views on circumscribing judicial discretion, a comprehensive assessment of sentencing outcomes in present day America must integrate understanding of the sentencing proclivities of individual judges with the way discretion is shaped and controlled.

Our interest in sentencing outcomes is focused on disparity. According to the U.S. Congress, sentencing disparity exists "when defendants with similar criminal records found guilty of similar criminal conduct receive dissimilar sentences."[1] In practice, disparity refers to differences in sentencing outcomes that are associated with "extralegal" factors such as race, ethnicity, economic standing, gender, or the exercise of certain procedural rights (e.g., trial). Disparity exists whenever extralegal factors influence the sentence once the legitimate factors related to the offense/offender are taken into account. Not all sentencing variation is unwarranted; sentences properly reflect differences in the seriousness of the offense and/or the criminal history of the offender. Assessing disparity requires distinguishing between differences in sentences that meet the state's legitimate purposes in sentencing and those differences whose consideration is prohibited by the offender's constitutional rights.

Existing data sources make clear why the issue of disparity in sentencing remains center stage. Between 1980 and 2000 the prison population in the United States grew by one million individuals. As can be seen in Figure 1-1, the rate per 100,000 population in 1980 was 139, growing to 460 per 100,000 by 2000 - an increase of 300%. Dramatic increases have been experienced in all states.

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[1] 28 U.S.C. § 991(b)(1)(B).

Figure 1-1: Incarceration rates for prisoners under State or Federal jurisdiction, per 100,000 residents

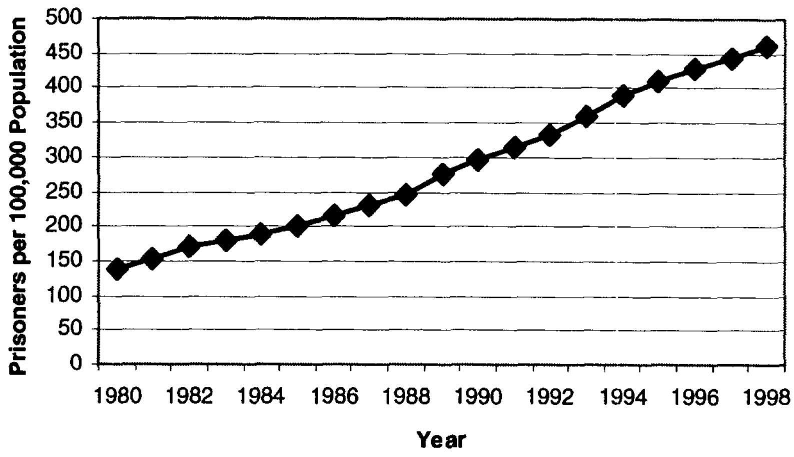
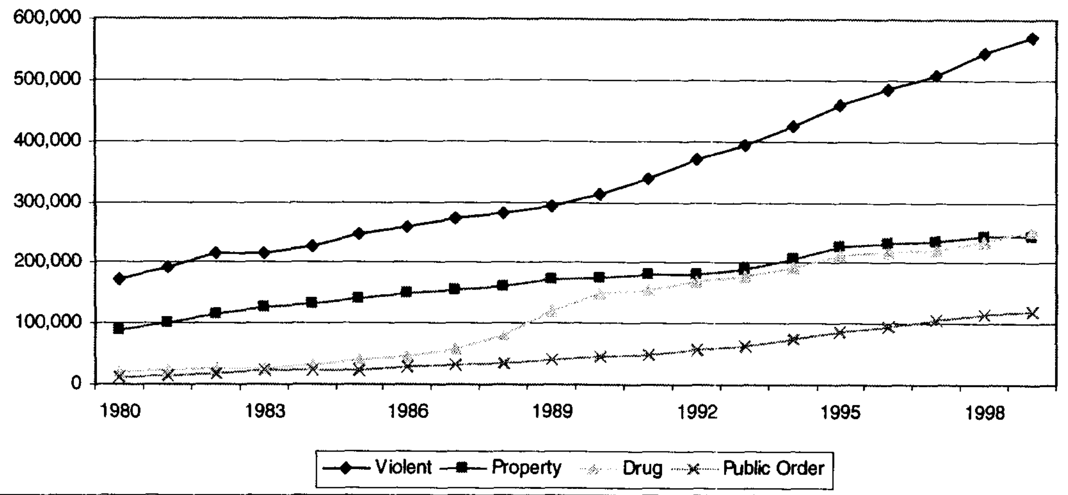


Figure 1-2 shows that the increases in prison population have not occurred across the board. Although violent offenders comprise the largest share of prison population, the greatest increase has been for drug offenders. In 1980, 58% of those coming to prison were convicted of violent offenses and 6% for drug offenses. By 2000, 48% were coming for violent offenses while 21% were coming for drug offenses. Proportionally, there are 10% fewer violent offenders and 15% more drug offenders than in 1980.

Figure 1-2: Number of Prison Sentences by Offense Type, 1980-1999



The racial mix of prison population has remained remarkably stable over the past two decades. While blacks make up 12.5% of the U.S. population, they account for about one half of the prison population: African Americans are still over-represented in state prison population versus the total population in all states.[2] The average incarceration rate for Blacks is 1,547 per 100,000 population while the average for Whites is 188 per 100,000 – the incarceration rate for Blacks is approximately 8 times higher than for Whites. On the surface, these numbers raise the specter of discrimination.

Our empirical approach to assessing disparity is illustrated through a comprehensive analysis of sentencing outcomes in Michigan. Sentencing in Michigan is structured through a set of sentencing guidelines that are described in detail in Chapter 5. While we believe our methods have utility for measuring disparity in all sentencing systems, the choice to develop and refine them within

[2] In a recent Bureau of Justice Statistics (BJS) special report (Bonczar et al. 1997) using 1991 as a base year, it was noted that Blacks have a 28.5% chance of going to prison in their lifetime, Hispanics have a 16% chance, and whites have a 4.4% chance.

a guidelines context offers several advantages (see also Ulmer 1997). To begin with, guidelines are an accepted part of the sentencing landscape and viewed by many as the best means to structure judicial discretion to attain consistency and fairness in sentencing. In addition, the control of disparity is often an explicit rationale for their development. Finally, guidelines require the collection and classification of a great deal of objective data essential for the empirical study of disparity. Therefore, beyond clarification of the statistical methods, our approach allows us to address the larger issue of how the guidelines model of structuring judicial discretion can be designed to better achieve the articulated goals of consistency and elimination of unwarranted disparity—with data sufficient to conduct a full and comprehensive study.

We begin with an overview of the recent history to control judicial discretion through sentencing guidelines. It also serves to place the Michigan system in broader perspective. We then turn to the specific goals of this book.

The Changing Nature of Judicial Discretion

Judicial discretion is increasingly constrained through sentencing guidelines as well as mandatory minimum penalties, three-strikes laws, and other forms of structured sentencing. The sentencing reforms since the 1970s have sought to limit judicial discretion and, at least on paper, have largely succeeded in that objective. Judges in many states find that statutory provisions mandate the factors that must be considered when passing sentence, designate the relative importance of those factors, and specify a presumptive sentence (or range) for a defendant based on offense seriousness and prior criminal involvement.

The attention given to judicial sentencing should be understood as a part of a sea change that occurred in sentencing philosophies. The 1970s brought the transition from a venerable system of "indeterminate sentencing" to a new one organized around the principle of "just desserts." Indeterminate sentencing combined two main features. First, judicial discretion in sentencing was wide and largely unchecked, save for legislatively specified maximums and (less commonly) minimums. Second, judicial decisions regarding sentence length was paired with a system of state parole boards, appointed by the governor, whose release decisions determined the actual length of time offenders spent in custody.

The formal principle underlying indeterminate sentencing was substantive rationality: achieving the sentence that is just for each individual defendant (Ulmer and Kramer 1996). This principle encouraged the use of extralegal factors to establish, for example, the rehabilitative potential of the offender. The heyday of indeterminate sentencing coincided with a period of optimism about the potential for rehabilitation--the 1960s--in which treatment displaced punishment as the official role for penal institutions.

Structured sentencing, including guideline systems, arose in response to what were perceived as undesirable features of indeterminate sentencing. Some critics claimed that disparity was promoted when judges were given no guidance in how to incorporate all sentencing-relevant factors in a consistent fashion (Freed 1992, 1687). In this regard, it was possible for offenders with identical offenses and prior criminal records to receive vastly different sentences. Also, critics noted that indeterminate sentencing did not encourage appellate review of sentencing decisions (Freed 1992, 1688). Moreover, the broad discretionary powers of parole boards ensured that judges could never be certain of the actual time that a convicted offender would serve following imposition of sentence.

With structured sentencing, formal rationality (predictable and uniform application of rules) replaces substantive rationality as the principle underlying sentencing. This principle has been most influentially expressed in the just deserts approach to sentencing (see: Ulmer and Kramer 1996). A just deserts philosophy was used to establish the first state sentencing guideline system, enacted by Minnesota in 1980.

Since the mid-1970s, judicial discretion has been out of fashion and parole boards have been eliminated or have had their discretionary release authority substantially curtailed. Implementing sentencing guidelines is not the only mechanism for structuring discretion. Legislatures enact mandatory minimum sentences in pursuit of uniform and severe punishment of selected types of offenders (e.g., those committing their crimes with firearms in proximity to a public school). Habitual offender and "three-strikes" provisions also direct judicial sentencing to accomplish specific objectives of the legislative branch.

States have pursued various paths to sentencing reform. Many states have adopted a prescriptive approach to guidelines development, whereby a sentencing rationale has been articulated at the onset and guidelines have been formulated consistent with that rationale. Other states have created guidelines in a more descriptive fashion, such that sentence recommendations more closely reflect past sentencing behavior of judges in felony cases. However, no state has gone the route of the U.S. Sentencing Commission, which developed a highly detailed and mechanical set of guidelines without a clear rationale.

Observers disagree on the overall impact of sentencing guidelines on judicial discretion. Some feel that the criminal justice system contains a fixed amount of discretion. Efforts to restrict discretion at any one stage or by any one category of actor in the system fail because of the "hydraulic displacement of discretion" (McCoy 1984). That is, a change or reform that limits discretion in one area leads to an increase of discretion in another area. One view is that sentencing reform in recent decades has diminished the discretion of judges and parole offices, but has enhanced discretion of the prosecutor (Boerner 1995). As the gatekeepers to the system, prosecutors decide which defendants are prosecuted and with what charges.

More recently, observers have stressed the discretion that judges retain in the sentencing process. Despite the embrace of just deserts in Minnesota's sentencing guidelines, "attorneys and trial judges remain firmly attached to offender-based crime control sentencing goals" and the use of judicial discretion has steadily increased. Some of the prime movers in the sentencing guidelines movement now claim that enhancing judicial discretion (by reducing "back end" discretion on the part of parole boards) was one of their original objectives and note the accountability that judges uniquely possess for their sentencing decisions (Knapp 1993; Alschuler 1993).

Sentencing Guidelines Basics

Guideline sentences are typically based on factors such as offense severity, the offender's prior record, the availability of punishment alternatives, and concerns for community safety. Distinctions exist, though, in how stringent different guidelines systems are in "limiting" judicial discretion. The limits are found in the sentencing procedures that direct judges to reference, consider, and adhere to a specific recommendation on a sentencing grid or worksheet. In conjunction with state statutes and authority, these procedures or "mechanics" define the extent to which a system is voluntary or mandatory in nature.

Sentencing guidelines systems developed during the early 1980s were quickly categorized by scholars and practitioners as either presumptive or advisory (mandatory or voluntary) and as either prescriptive or descriptive (Tonry 1987; Frase 1995; Morris and Tonry 1990). As new systems have developed, these distinctions have become blurred, with states using combinations or hybrids of the earlier systems. For this reason, it is difficult to classify the various sentencing guidelines systems into a rigid voluntary/mandatory dichotomy. In general terms, most sentencing guidelines systems make use of a grid or set of worksheets that are completed before sentencing and provided to the sentencing judge. Each guidelines system has policies and procedures addressing issues such as when guideline forms should be completed, when judges must review guidelines, how compliance or departures are to be handled, and what appellate rights are retained by the defense or prosecution.

Figure 1-3: Policies Governing Sentencing Guidelines' Use in Selected States

State	Policies
1. North Carolina	• State law requires completion of guidelines forms • Compliance within presumptive, aggravated, or mitigated ranges is required; no departures are allowed • Sentences within approved aggravated and mitigated ranges must be accompanied by written justification
2a. Florida	• State law requires completion of guidelines forms. Judges must review guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2b. Kansas	• State law requires completion of guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2c. Michigan	• State law requires completion of guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2d. Minnesota	• State law requires completion of guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2e. Ohio	• There are no guidelines forms to be completed • Judges are guided by rebuttable presumptions • Defense or prosecution may appeal sentences against the presumptions
2f. Oregon	• Sentencing commission policy requires completion of guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2g. Pennsylvania	• Sentencing commission policy requires completion of guidelines forms. Judges must review guidelines forms • State law requires departures to be accompanied by written justification • Defense and prosecution may appeal sentences
2h. Washington	• Information used to determine the standard range must be signed by the judge. • Departures (exceptional sentences) must be accompanied by written justification • Defense and prosecution may appeal exceptional sentences
3a. Arkansas	• Judges must review guidelines forms and departures must be accompanied by written justification • Failure to file departure may result in early release (release decision can be based on presumptive range) • No appellate review of guidelines sentences
3b. Delaware	• Judges must review sentencing orders • State law requires departures to be accompanied by written justification • No appellate review of guidelines sentences
3c. Utah	• Sentencing commission policy requires completion of guidelines forms • Sentencing commission policy requires written justification for departures • No appellate review of guidelines sentences

3d. Virginia	• State law requires completion of guidelines forms • State law requires court clerks to forward guidelines worksheets and sentencing order to commission • State law requires departures to be accompanied by written justification, no appellate review of guidelines sentences
4. Missouri	• Guideline forms do not have to be completed • Judges may depart at their discretion

Note: The table shows four basic gradations along the voluntary/mandatory continuum. The lower the number, the greater the extent to which a state's system is considered "mandatory".

As can be seen in Figure 1-3, at one extreme, states may use legislation to specify all of the procedures and requirements of a sentencing guidelines system. The sentencing commission oversees a strict system of worksheet completion and reports departure rates or the use of aggravating and mitigating sentences. Such a system also gives the defense and state counsel appellate rights and uses case law to further refine the appropriate application of the guidelines. North Carolina, for example, enacted a system that requires the completion of a guidelines worksheet for all cases and requires sentences to fall within a specified presumptive range. If aggravating and mitigating circumstances exist, judges still must sentence within specified ranges and may not depart further from the guidelines. It could be argued that North Carolina's system is the most "mandatory" system currently in place at the state level.

Further along the continuum, some states adopt laws that require guidelines completion but allow departures if accompanied by written justification. Legislation often gives the defense and prosecution the right to appeal departures under these systems (e.g., Kansas, Minnesota, and Florida). Virginia law requires guidelines completion and written reasons for departure, but specifically denies appellate relief for any reason related to the guidelines.

Delaware's policies are similar, requiring written reasons for departure but preventing appellate review of those sentences. Utah, rather than using state statutes, requires completion of guidelines forms through authority of the sentencing commission. Utah also denies appellate review for guidelines sentences. Considered more voluntary than most, Missouri's sentencing guidelines system does not require completion of guidelines forms and allows judges to depart at their discretion. Michigan's guidelines are seen to fall midway on the continuum.

Challenges to Assessing Sentencing Disparity

A central problem for the analysis of disparity is disentangling the competing goals of sentencing from the sentencing decisions of judges. Throughout the many characterizations of the goals of sentencing, four goals stand out (Blumstein, Cohen, Martin, Tonry 1983, 48). First, there is a desire to deter the offender and other potential offenders. Second, there is a desire to incapacitate the offender so that he or she cannot commit further crimes. Third, there is a desire for retribution against the individual for his or her social transgressions. Finally, there is a desire to rehabilitate the offender and thereby ensure that he or she will commit no future crimes.

Structured sentencing systems do not specify a single goal for judges to consider when devising their sentences. Because the four goals are only partially complementary, "the main burden of reconciling the competing goals of the criminal justice system falls on the sentencing judge" (Hogarth 1971, 4).

Because no two offenders or offenses are exactly alike, labeling sentencing differences as disparity involves a moral judgment--what appears to be disparity to one individual may simply be justifiable variation to another. Many within the research community, however, have felt comfortable concluding that there is evidence of disparity when similar individuals convicted of committing similar crimes are given different sentences. A conservative approach to assessing "similarity" is to assume that judges pay attention, in a limited fashion, to all four goals.

Each goal requires incorporating different types of information into a study of the sentencing decision. To pursue the goals of deterrence and/or retribution, a judge must examine the characteristics of the offense. If a judge wishes to focus on incapacitation, the offender's prior record becomes important. An interest in rehabilitation prospects leads each judge to examine the personal status characteristics of the offender. Researchers therefore stress the need to include information pertinent to all of the goals in their analyses. Any investigation of sentencing disparity must proceed from a plausible model of sentence decision making that includes four distinct types of information: (1) factors related to the conviction offense, (2) factors describing the offender's prior criminal history, (3) extralegal factors that (potentially) are related to the offender's prospects for rehabilitation, and (4) elements of local court context.

The measurement and interpretation of a sentencing model is difficult. One problem is the sheer number of factors potentially influencing sentencing decisions. A more fundamental issue, though, is correctly interpreting the findings of the model. In a detailed study of racial disparity under Pennsylvania's sentencing guidelines, Kramer and Steffensmeier (1992) find some evidence that incarceration patterns vary by race. They conclude, however, that the findings indicate not that racial disparity exists, but that race is confounded with other factors that are not easily measured by the available data. Further complicating the analysis is that social and economic factors that are generally considered in pursuit of the goal of rehabilitation (e.g., education, employment, and socioeconomic status) are often related to potential sources of disparity (e.g., race or gender).

It is therefore unsurprising that the results found in the research literature are difficult to interpret. Some studies, finding that African-Americans are incarcerated more often and receive longer sentences than whites, interpret this finding as evidence of racial disparity (Spohn and Welch 1981; Thompson and Zingraff 1981; Myers and Talarico 1987; Humphrey and Fogarty 1987; Spohn 1990; Albonetti 1991). Other studies argue that evidence of racial disparity in sentencing primarily reflects inadequate research designs, a failure to rigorously take into consideration the full range of legal variables, or the disproportionate participation in crime among blacks (Kleck 1985; Kramer and Steffensmeier 1993; Steffensmeier, Kramer, and Steifel 1993; Wilbanks 1987).

Another source of difficulty in measuring disparity at the sentencing stage is that a defendant passes through a number of "evaluation checkpoints" between the detection of a crime and incarceration. These evaluation procedures introduce the possibility of an unacknowledged bias in the pool of individuals who reach the relatively late stage of sentencing. Research results may indicate evidence—or lack of evidence—of disparate sentencing by judges that is actually due to discriminatory practices at the arrest or prosecution stages. Examining whether women receive more lenient sentences than men can illustrate this potential for bias. It may be that systematic bias causes women to be treated more leniently in the earlier stages of the criminal justice process, so only the most nefarious female offenders reach the sentencing stage. Consequently, one might find no evidence of disparity at the sentencing stage because the previous bias has gone undetected (e.g., Steffensmeier 1993; Bickle and Peterson 1991; Daly 1987).

A final noteworthy complication is that consistency and disparity in sentencing can coexist. Disparities can arise if judges use legitimate extralegal factors as calculation aids. As Nagel (1983, 482) has noted, "extralegal . . . is not synonymous with illegal, inappropriate, or socially unjust. It is defined as 'extra' to the law." Certain extralegal factors (e.g., age, employment, and education) could be used by a judge to simplify the task of identifying the types of individuals to receive particular intermediate sanctions. Even though the use of these factors may enhance "consistency" in sentencing, it may do so at the expense of creating unwarranted differences.

The need to systematically address these challenges drives this inquiry. In the following pages, we offer a comprehensive means to determine the extent to which judges are *consistent* in their sentencing behavior; to assess the degree to which there is evidence of *discrimination* in felony sentencing; and to determine the magnitude of the *local variation* in sentencing within a given state. Recognizing the presence of local legal cultures, we seek to measure the degree to which similar offenders receive dissimilar sentences based solely upon where they are sentenced.

The Strategy for Reform

The search for fairness and consistency in sentencing remains of paramount importance. While recent years have seen sentencing commissions pay considerable attention to other sentencing goals such as incapacitation through truth-in-sentencing, the reduction of disparity remains a fundamental goal. State efforts to "reconsider sentencing goals, redistribute discretionary authority, and determine the appropriate level of sanction are strongly affected by the distribution of discretion, [and] the extent and nature of sentencing disparity" (Martin 1983). Eleven sentencing commissions explicitly state that the elimination of disparity is a current goal of their sentencing guidelines (Figure 1-4). Guidelines have the potential to improve the sentencing process, but how does one determine whether the goal has been achieved?

Figure 1-4: Current Goals of Sentencing Commissions Addressing Sentencing Disparity

Arkansas	The standards seek to ensure equitable sanctions which provide that offenders similar with respect to relevant sentencing criteria will receive similar sanctions.
Florida	Sentencing is neutral with respect to race, gender, and social and economic status.
Kansas	Six goals are specified to achieve uniform sentencing in Kansas:. . . (2) to reduce sentencing disparity to ensure the elimination of any racial, geographical, or other bias that may exist.
Louisiana	The purpose of the guidelines is to recommend a sanctioning policy that ensures certainty, uniformity, consistency, and proportionality of punishment.
Michigan	The sentencing guidelines shall reduce sentencing disparities based on factors other than offense and offender characteristics and ensure that offenders with similar offense and offender characteristics receive substantially similar sentences.
Minnesota	The purpose of the sentencing guidelines is to establish rational and consistent sentencing standards that reduce sentencing disparity.
Missouri	The purpose of the sentencing guidelines is to recommend a uniform policy that will ensure certainty, consistency, and proportionality of punishment. Use of the guidelines will result in minimal sentencing disparity.
North Carolina	Sentencing policies should be consistent and certain: similarly situated offenders should receive similar sentences.
Oregon	Guidelines are intended to establish proportional and just punishment, create truth-in-sentencing, and establish sentencing uniformity.
Pennsylvania	The purpose of the sentencing guidelines is to insure that more uniform sentences are imposed in this Commonwealth.
South Carolina (proposed)	Sentencing guidelines should balance judicial and prosecutorial discretion with fairness and consistency in sentencing.
Virginia	The primary goal is to achieve certainty, consistency, and adequacy of punishment. Disparity reduction is also mentioned as an important goal.
Washington	The sentencing of felony offenders should be structured, but should not eliminate discretionary decisions affecting sentences. Sentence structure should ensure that the punishment is commensurate with the punishment imposed on others committing similar offenses.

Michael Tonry (1996, 5), provides a consensus statement on reducing the perceived inequities of the current criminal justice environment through an eight-part "just sentencing system" in Sentencing Matters: (1) repeal all mandatory minimum sentences; (2) invest in intermediate sanctions approaches; (3) create a "sentencing commission"; (4) develop and monitor sentencing guidelines; (5) ensure that all sentences can be funded by existing resources; (6) set maximum sentences for all cases and minimum terms for only the most serious crimes; (7) devise some flexibility in the guidelines for penalties other than jail or prison; and (8) explicitly presume that judges will "impose the least punitive and intrusive appropriate sentence." Again, such extensive suggestions hold the promise of reform, but success requires the ability to evaluate the sentencing process and show the goals such as consistency and fairness have been achieved.

In this book, we argue that reforms on any scale have a greater likelihood of success if they are firmly grounded in both the theory and realities of sentencing in the United States. Our strategy for reducing unwarranted disparity and proving it empirically reform begins with a fuller understanding of judicial discretion and decision-making. In order to understand who goes to prison, and for how long, we must first understand how judges sentence.

How do judges sentence? This deceptively simple question has produced decades of scholarship and controversy. It is our view that a serious inquiry into the sentencing process must address at least three issues. First, assessing how judges sentence requires coming to terms with the full spectrum of sentencing outcomes. How do judges conceptualize, classify, and compare the various sentences that fall along the "continuum" from prison to probation? Second, asking how judges sentence implies the need for a theory of how judges assess an offender's culpability and need for punishment. What characteristics of an offender and his crime are most relevant to the sentencing decision, and how do judges "score" these characteristics? Finally, we must also understand how judges translate the blend of relevant offender attributes to arrive at a particular sanction decision. This raises the issue of "fairness" in sentencing. [3] That is, is there evidence of sentencing disparity, and if so, to what degree? Answering the fairness question requires a careful empirical examination of sentencing outcomes informed by a theory of judicial decision-making (e.g., determining which offenders are similarly situated).

The empirical study of criminal sentencing guides the scope and content of this book. Each chapter will address a distinct issue in the sentencing literature, formulate a theoretical approach, and use a blend of analytic techniques to provide an answer. While the statistical methods are at times quite complex, we have chosen the techniques that we believe are most appropriate to the issue at hand. We also believe that while methods matter,

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[3] Perhaps the most succinct statement of this goal comes from the Introduction to the Virginia Sentencing Guidelines manual: "Unwarranted and dramatic differences in sentencing imposed in similar cases are generally condemned for several reasons. It is unjust for similarly situated offenders convicted of the same offense to receive markedly different sanctions. Further, when sentencing varies dramatically, no reasonable expectation exists of what the actual penalty will be for a crime."

results must be clearly interpreted to be significant. Therefore, we have used an array of interpretive tools to bring out the meaning beneath the numbers.

Understanding the Sentencing Process

The trial judge is responsible for imposing sentence. Sentences typically reflect statutory requirements, as well as information and recommendations from probation departments. Within these basic parameters judges ordinarily have discretion in sentencing. Judges ultimately assess the "facts" of a case, and apply the law, within this discretionary context. We need a theory of judicial decision-making to explain and understand the outcomes of this discretionary process. Such a theory can help us identify the types of factors most likely relevant to sentencing decisions, clarify how those factors are interpreted, and make clear how distinct patterns of offender attributes translate into particular types of sanctions.

The goal of this book is to develop and empirically test a comprehensive model of the sentencing process. While there is a great deal of empirical work on sentencing, there is far less on the development of theories of judicial decision-making. Some researchers have grounded their statistical models in existing bodies of theory (e.g., Wheeler, Weisburd, and Bode, 1982; Albonetti, 1991; Steffensmeier et al, 1998; Ulmer 1997; Myers and Talarico 1987). But some other researchers have simply offered a list of their variables – using the cumulation of prior research to provide substantive foundation—with only passing reference to a theoretical rationale. What we need is a theoretical framework to guide the development of models that can be empirically evaluated.

To address this need, we offer a theory of judicial decision-making building upon and "blending" the work of those that have come before. And because we ultimately want to test our theory, we also offer a clear set of inter-related hypotheses to frame and assess an empirically based model of judicial decision-making. Our analysis of the judicial sentencing process will proceed in three sections:

Sentencing in Theory

- How does theory inform our understanding of the structure and content of judicial decision-making?
- What offender attributes do judges routinely examine, and why?
- How do judges conceptualize, classify, and compare the range of sentences that fall along the continuum from prison to probation?
- How do judges conceptualize sentence severity?
- Is there local variation due to different local legal cultures?

Sentencing in Practice

- How do judges translate the blend of relevant offender attributes into a particular sanction decision?
- How do alternative statistical techniques affect the utility and interpretation of sentencing research?
- How do we best examine judicial sentencing outcomes for the presence of discrimination and disparity?

- Can we measure the extent of local variation in aggregate or state-level models?

Prospects for Reform

- What areas for targeted reform emerge from our analysis of sentencing theory and practice?
- Can sentencing reforms provide both predictability and appropriate judicial discretion?
- What are the parameters of a sentencing guideline system designed to enhance consistency, control discrimination, and accommodate forecasts of demand for prison beds?

We believe a theoretical model of sentencing that includes an explicit set of testable hypotheses will further significantly our understanding of, and ability to evaluate, sentencing in practice.

A Conceptual Framework for Understanding the Sentencing Process

Section 1: Sentencing in Theory

Sentencing is at once a routine and complex decision. Yet, despite the complexity, judges handle full dockets and sentence convicted offenders in an expeditious manner. We hypothesize that judges cope with complexity by finding ways to simplify and structure decision-making so that it can be done swiftly, economically, and consistently. Our theory of offender assessment draws on attribution (e.g., Albonetti 1991; Steffensmeier et al. 1998), cybernetic theory (Simon 1979), and social context/worlds theory (Myers and Talarico 1987; Ulmer 1997), theories common to the sentencing literature. But our framework also incorporates personal construct theory (Kelly 1955). We argue that a synthesis of these four theories provides the means to clarify the cognitive process by which judges evaluate and use particular offender attributes. This theoretical framework provides the rationale for the independent variables we have chosen for our sentencing model.

After reviewing cybernetic/structural organization theory, attribution theory, social context/worlds theory, and personal construct theory, we will identify the fundamental elements shaping the judicial sentencing decision in Chapter 2. To understand sentencing it is imperative that we understand the ways in which judges assess the need for punishment. How do judges evaluate specific offenders? What characteristics of an offender and a crime are most relevant to the sentencing decision? By focusing on discrete aspects of judicial choice we will develop a set of hypotheses that identify the types of characteristics most relevant to the sentencing decision.

Conventional wisdom holds that sentencing is a two-stage process. In the first stage, the judge decides the type of sentence the offender will receive (e.g., prison, jail, community service, restitution). In the second stage, the judge decides the severity of the sentence (e.g., years of prison, months of jail, days of community service, amount of restitution). Before we examine the connection between offenders and punishments, it is imperative that we consider the ways in which punishments are conceptualized and measured at each of the two stages. Judges choose from a broad spectrum of sentencing options, which can range from a verbal warning to a maximum-security prison cell. Likewise, judges specify the severity of the sanction, the term of incarceration, probation, and/or community service, which can also have a broad range. To date there has been little agreement within the research community about how to conceptualize and measure either of these two stages of the sentencing process.

Even the most sophisticated empirical studies of criminal sentencing tend to characterize the first stage as a simple, dichotomous "prison/no prison" decision. This focus on prison means that, with very few exceptions (e.g., Schiff, 1995), researchers have ignored non-prison sentences, and how judges choose among jail, probation, and the full range of alternative punishments. And because offenders sent to prison tend to serve sentences stated in months or years, the uttered sentence has been the obvious choice for researchers looking to measure sentence severity. However, we believe that using months or years as the measure of sentence severity is not as straightforward as it appears.

To model decisions about sentence type and severity we need a theory of how judges make choices in a complex environment. Denison, Hooijberg, and Quinn (1995, 525) offered the term "behavioral complexity" to denote the action, as well as the cognition, required of decision makers. Cognition is the issue in the sentencing context. Specifically, how do judges make sense of the sentencing options available at each stage of the sentencing process? We suspect, in keeping with the tradition of decision theory we develop in Chapter 2, that judicial choice is constrained by certain psychological processes that circumscribe and order the way in which sentencing options are conceived.

In research terms, we want dependent variables for sentence type and sentence severity decisions that mirror actual cognitive processes and sentencing practice. We will characterize the sentence type decision in Chapter 3. Where the sentencing literature traditionally draws a basic prison/no prison distinction, we have developed a sentence type variable with five distinct categories. Our principal innovation is to unpack the "no prison" sanction and break it into four discrete categories that exhaust the range of possible "community" sanctions.

In Chapter 4 we will develop a measure of the sentence severity dependent variable for the prison-type decision. Following a review of the many ways in which sentence severity has been conceptualized and measured to date, we will develop a theoretical justification for a different characterization of severity than is usually offered. In Chapter 5, we will present the data and operationalize the relevant offender characteristics identified in Chapter 2 into a set of independent variables we can use in both the model of sentence type and of sentence severity.

Section 2. Sentencing in Practice

Having developed measures of sentence type and sentence severity in Chapters 3 and 4 (the two dependent variables), and a set of relevant offender characteristics in Chapter 5 (the independent variables), we will evaluate the model of sentencing empirically in Chapters 6, 7, and 8. It is fundamentally important to assess "fairness," that is disparity and discrimination, in the sentencing decision.

The words "disparity" and "discrimination" are used frequently, sometimes interchangeably, in the sentencing literature. In a recent overview of the literature on the subject, Spohn (2000, 432) offered the following definitions:

> Disparity refers to a difference in treatment or outcome, but one that does not necessarily involve discrimination. As the Panel on Sentencing Research noted, "Disparity exists when 'like cases' with respect to case attributes—regardless of their legitimacy—are sentenced differently" (Blumstein et al., 1983, 72). Discrimination, on the other hand, is a difference that results form differential treatment based on illegitimate criteria, such as race, gender, social class, or sexual orientation. With respect to sentencing, discrimination "exists when some case attribute that is objectionable (typically on moral or legal grounds) can be shown to be associated with sentence outcomes after all other relevant variables are adequately controlled" (Blumstein et al, 1983, 72).

For purposes of clarity, we prefer to speak in terms of "consistency" rather than disparity in discussing the sentencing decision. Consistency in sentencing is comprised of three distinct features. First, sentences are consistent to the extent that similar offenders receive similar sentences. Second, they are consistent to the extent that division of offenders into similar groups is based upon a set of "legitimate" factors. Third, sentences are consistent to the extent that they are proportional; that is, dissimilar offenders should receive dissimilar sentences in rough proportion to their degree of dissimilarity.

Judge Martin Frankel, in *Criminal Sentences: Law Without Order* (1972), offered a vitriolic rationale for expecting *inconsistency* in sentencing. Frankel believed that judges do not take sentencing seriously, claiming they "treat as a casual anticlimax the perfunctory process of deciding whether, and for how long, the defendant will be locked away or otherwise treated (vii)." To Frankel the process appeared casual and swift. Casual, because "the . . . judge will read a presentence report, perhaps talk to a probation officer, hear a few minutes of pleas for mercy – invest, in sum, less than an hour in all – before imposing sentence of ten years in prison (15)." Swift, "because the process of reaching it is not reflective or orderly. The court renders no "opinion" because it has not followed the rational steps required to create one." (38). The implication is that sentencing is visceral and idiosyncratic – the very antithesis of the rational ideal.

Over the past fifty years much research has supported the conclusion that judicial decisions are inconsistent. For example, Blumstein, et al. (1983, 10) noted, " despite the number and diversity of factors investigated as determinants of sentences, two-thirds or more of the variance in sentence outcomes remains unexplained." The prospects for consistency in sentencing would seem bleak.

However, based on the theory of judicial decision-making we discuss in Chapter 2, we believe that inconsistency is not the norm. On the contrary, the logical consequence of "a system leaving to individual preferences and value judgments the kind of discretion our judges have over sentencing" (Frankel, 1972, 24) is the *presence* of consistency. The linchpin of our argument is that consistency and swiftness, rather than signs of complacency, are the logical results of making decisions under the twin constraints of uncertainty and complexity. Judges cope with the complexity of the sentencing decision by developing and using stable rules so that sentencing becomes a routine—and consistent--decision-making activity.

But that judges are consistent does not imply that they might not also discriminate in sentencing. Judges might base sentencing decisions on factors related to the age, race, or gender of the offender. The result might be sentences that are simultaneously consistent and discriminatory.

On the most general level, discrimination refers to sentences that are different, with the difference tied to specific characteristics of the defendant. As Rich et al (1980, 109) noted:

> As a general proposition, we may state that differences in offenses and offenders justify differences in relationship to the state's legitimate purposes in punishing criminals, so long as those differences do not involve classifications that are prohibited by our fundamental constitutional law. Those classifications that appear to conflict with constitutional values are race, ethnicity, gender, wealth, and the exercise or waiver of fundamental rights (e.g., trial).

A discrminatory sentence is one in which one of the suspect classifications makes a difference in the sentence once the "legitimate" factors relating to the offender and the offense have been taken into account. Though discrimination is easy to define, it is not easy to prove. Our position is in line with Zatz' (1984, 147-8) observation of nearly twenty years ago: "the sum of our knowledge is that for some offenses, in some jurisdictions, controlling for some legal and extralegal factors, at some historical points, and using some methodologies, some groups are differentially treated." Consequently, on the questions of consistency and discrimination in sentencing, the onus remains on the research community to improve the way statistical models are specified and estimated.

Our methodological discussion has many aims. Chief among them is to make a broader variety of statistical analyses easier to understand and more attractive to use. Some of the econometric tools we have selected are common in recent empirical work on sentencing, but we have also chosen tools that are, in our view, rather underused. We have tried to be cautious with jargon, and have kept equations to a minimum. We show our mathematics when we believe it will facilitate understanding across the broad spectrum of sentencing researchers.

We believe that many readers are less interested in statistical tools for their own sake than they are in whether the alternative tools provide different answers, so the methods we use are always tied to real applications. Therefore, our primary purpose is to clarify the rationale for using specific techniques and to illuminate how the results make a difference in a policy context. Our goal is to make these methods accessible to a range of analysts and a useful guide for those pursuing sentencing-related research.

In Chapter 6 we will empirically evaluate the sentence type model. Following a review of issues related to the estimation of models with categorical dependent variables, we will offer estimates of the model parameters and a substantive interpretation of the results. In Chapter 7 we will explore the methodology of estimating sentence severity models. We will discuss the statistical issues and assumptions underlying such models, present the model parameters, discuss "goodness of fit," and provide an extensive interpretation of sentencing relevant variables. Finally, in Chapter 8, we will turn to a comparative statics analysis of the models presented in Chapters 6 and 7. We will develop a series of scenarios and explore the implications of the model for combinations of race, age, and type of court. Our goal with this analysis is to provide some insights into issues of discrimination that have long vexed students of the sentencing process.

Section 3: Prospect for Reform

In Chapter 9 we will build a sentencing guidelines system consistent with the theory developed in the first eight chapters. While we believe that judges are relatively consistent and impartial in their sentencing decisions, the current system has too much "wiggle room." It is possible for similarly situated offenders to receive vastly different sentences. The sentencing system we offer is based upon the way judges actually sentence, which enhances its plausibility and acceptability. It circumscribes current practice, however, by providing guidance in deciding both sentence type and sentence severity. Furthermore, the sentencing system is built in a way that enables policy makers to forecast accurately the short and long term consequences of any changes in the system.

CHAPTER 2: A BLENDED THEORY OF SENTENCING

Introduction

How do judges decide who to send to prison and for what length of time? What offender attributes or characteristics do judges routinely examine, and why? How do judges "score" each attribute to gauge the impact each will have on the sanction decision? To answer these questions we draw on three extant theories in sentencing research, as well as an additional theory that has not as yet appeared in the sentencing literature. The first is cybernetic theory (i.e., Steinbrunner 1974).[1] Cybernetic theory, a version of structural organization theory applied to the individual, was applied to the sentencing decisions by Albonetti (1991). The second approach, causal attribution theory, formed the foundation for the work of both Albonetti (1991) and Steffensmeier et al (1998). The third approach, social contexts or social worlds, has informed Myers and Talarico (1987) and Ulmer (1997). Our new addition is based on personal construct theory (Kelly 1955). We believe that personal construct theory provides organization and structure to decision-making theory, and supplements the sentencing relevant "content" identified by the other three theories. In the next section, we provide an overview of these theories.

[1] Cybernetic theory, pioneered by Ashby, Simon, and Beer, has been used quite sparingly in the sentencing literature (e.g., Albonetti 1991). Steinbrunner (1974) offers a detailed overview of the approach along with an impressive history of the ideas.

Foundational Theory

Judges as Cybernetic Decision Makers

Cybernetic theory holds that sentencing is a routine, though complex, decision. Despite the apparent complexity of sentencing, judges handle full dockets and sentence convicted offenders in an expeditious manner. We assume that judges, as a way of coping with complexity, seek ways to simplify and structure decision-making so that it can be done swiftly, economically, and consistently. We base our conceptual structure on the cybernetic model developed by Nobel Laureate Herbert Simon and his colleagues.

As Simon (1979, 3) observed, the crux of cybernetic thinking and theorizing is the very human need to simplify:

> Human powers are very modest when compared with the complexities of the environments in which human beings live. If computational powers were unlimited, a person would choose the course of action that would yield maximum utility under the given circumstances . . . But real human beings . . . cannot follow this procedure. Faced with complexity and uncertainty, lacking the wits to optimize, they must be content to satisfice – to find 'good enough' solutions to their problems and good enough courses of action.

People seek and evaluate potential responses prior to making a decision. This search, furthermore, "takes place in a space that is essentially infinite" (Simon, 1979, 3). To simplify the selection process, human beings limit their search to identifying a few "essential" variables and finding alternatives that are "good enough". Decision-makers thus self-impose restrictions on both the variables they monitor and the alternative actions from which they choose. As Simon

(1945, 79) observed, choice activity in almost every sector of decision-making is routinized, and general solutions to recurring problems are expressed as "rules of thumb." Given environmental complexity and the computational limitations of the decision maker, decisions tend to be based on straightforward and stable rules.

From this foundation, Albonetti (1991) introduced the structural organization approach (March and Simon (1958), and Thompson (1967)). This approach assumes that individuals rarely, if ever, possess complete information when making decisions. We reduce the resultant uncertainty by relying on a "rationality that is the product of habit and structure" (249). Albonetti observed that simplification and routinization absorb or control this uncertainty. She noted that Thompson (1967) identified two dimensions around which decision makers – in this theoretical orientation – organize their efforts to control uncertainty: preferences among possible outcomes, and beliefs about cause and effect relationships.

Cybernetic theories often rely on the idea of a "base" in discussing the development of preferences among possible outcomes. The base enables the decision maker to start her search for an appropriate outcome from a starting point that is likely in the vicinity of the final choice. The decision maker "satisfices" by searching for preferred outcomes using the base as a starting point. Kahneman et al (1972, 14) called this process "anchoring." As Kahneman et al noted, choosing a starting point has tremendous consequences for the final selection, in that final choices are often "biased" toward the starting value.

Thompson's second dimension, beliefs about cause and effect relationships, is of critical importance in the context of sentencing, especially as it relates to controlling recidivism. Albonetti suggested that simple decision rules judges employ to connect sentencing relevant factors to the likelihood of recidivism are examples of March and Simon's (1958) concept of "patterned responses." To understand the development of patterned responses, Albonetti directed our attention to attribution theory.

Judicial Attribution of Cause

Hawkins (1981), the primary proponent and interpreter of attribution theory in the sentencing literature, introduced it as follows:

> Attribution theorists have suggested that in an effort to simplify and understand the social world people assign various socially relevant attributes to themselves and to others. Shaver (1975) proposed three identifiable stages of the attribution process: (1) observation of an action by the perceiver; (2) perceiver judgment of actor intention, and (3) attribution by the perceiver of a disposition to the actor. The process of attribution is designed to simplify the perceiver's perceptual world by 'explaining the present and past behavior of others and by predicting with some degree of accuracy what those people are likely to do in the future" (p. 29). The attribution of dispositions may be related to both perceptions of responsibility and of causality for a given act.

To attribute is to assign cause. Following Heider (1958) and Shaver (1975), Hawkins (1981, 208) suggested that judges-as-perceivers gauge actions and make causal inferences based on both environmental conditions and personal disposition. In short, in the context of sentencing, attribution theory deals with the explanations judges use to "make sense" of and forecast an offender's behavior.

Hawkins (1981, 209) noted that attribution theory applies to both the act and the actor. Attribution is intended to get at the perceived cause for the behavior. Hawkins hypothesized that judges will look at the degree to which the offender is to blame for the offense, as well as the likelihood that the offender will repeat such behavior in the future. From this, Hawkins (1981, 207-8), quoting Shaver (1975, 29), suggested that the sentencing judge is concerned with "explaining the present and past behavior of others" and "predicting with some degree of accuracy what those people will do in the future." Judges seek to understand the "causal processes" that led to the offense, and how those processes will unfold in the future. In essence, attribution theory holds that judge ask, why did this offense take place, and will it be repeated in the future?

Both Albonetti (1986, 1991, 1997) and Steffensmeier et al. (1998) based their notions of the sentencing process in attribution theory. Albonetti's theory brought together the structural organization approach we discussed earlier (March and Simon, 1958; Simon, 1959; Thompson, 1967) with the social psychological orientation of attribution theory (e.g., Hawkins, 1980, 1981). From Albonetti's perspective (1991, 249), "The result is decision making made on the 'basis of past experience, stereotypes, prejudices, and highly particularized views of present stimuli' (Clegg and Dunkerley, 1980, 265)." Judges focus on a customary set of offender attributes related to conventional beliefs about cause and effect (patterned responses). Of particular importance are the factors that "relate offender characteristics, case processing outcomes, and punishment to the goal of reducing the likelihood of recidivism" (Albonetti, 1991, 249). The sentencing process is given content as judges integrate time-honored information thought to be germane to assessing an offender's likelihood of committing future crimes.

Steffensmeier, Ulmer, and Kramer (1998) provided a related perspective on attribution theory in positing three focal concerns for judges: offender's blameworthiness, protection of the community, and practical constraints and consequences. The first focuses attention on offender characteristics such as the seriousness of the offense, the offender's culpability, the degree of harm caused to the victim, criminal history, and offender's role. The second refers to the probability of recidivism and/or the dangerousness of the offender. This concern leads judges to form expectations about the offender based on such characteristics as the seriousness of the offense, prior criminal history, and drug dependency. The last point, practical constraints and consequences, focuses attention on the dynamics of justice system operations. It suggests, for example, that judges will be sensitive to maintaining an appropriate alignment between offender seriousness and choice of sanction to insure that the punishment fits the crime.

Moreover, along with Albonetti, Steffensmeier et al. (1998, 768) believed that in addition to the basic facts of the case, judges develop "perceptual shorthand" which links race, gender, and age to dangerousness. Because a wide range of offense and offender characteristics potentially influence sentencing, they stressed the need to examine how various constellations of factors fit into the perceptual shorthand.

To our way of thinking, the most important element of the existing literature is its identification of the type of offender characteristics most likely relevant to the sentencing decision. Steffensmeier et al. (1998, 766-7), drew our attention to the offender's culpability and degrees of injury:

> Sentencing research generally shows that seriousness of the offense – as measured in terms of the culpability of the defendant and the harm caused by the offense – is the most significant factor in sentencing. Moreover, relevant research applying schema theory to criminal punishment finds that crime wrongfulness and harmfulness (defined in various ways) are two global schema by which people in a wide variety of contexts assess the appropriateness of criminal sanctions (see Farrell and Holmes, 1991; Miller, 1994). Besides offense severity, the main factors influencing the judges' and other criminal justice actors' view of the blameworthiness of the offender are biographical factors, such as criminal history (which increases the perceptions of blameworthiness and risk) or prior victimization at the hands of others (which tends to mitigate perceived blameworthiness), and the offender's role in the offense, such as whether the offender was a leader, organizer, or follower.

Albonetti (1991, 249) underscored the importance of assessing the recidivism potential of an offender:

> From an uncertainty avoidance perspective, case information salient to reducing recidivism will affect judicial discretion. The direction of the effect is dependent on whether the information increases or decreases the likelihood that the offender will avoid future criminal activity. In other

words, proponents of this perspective would argue that in the face of uncertainty characterizing the link between sentence severity and likelihood of recidivating, case information thought to predict future criminal behavior is expected to increase the severity of the sanction imposed. Conversely, case information stereotypically thought to decrease the likelihood of recidivating is expected to decrease sanction severity.

These two examples capture the several "blocks" or "types" of sentencing relevant variables we think judges use in gauging offender culpability and the likelihood of recidivism. Broadly speaking, we find evidence that the following six types of variables are used or referenced extensively in empirical sentencing research:

- Statutory Seriousness of the Offense
- Nature of the Offense
- Extensiveness of the Prior Record
- Case Processing Factors
- Personal Characteristics

While studies vary on which factors to include, and their specification and significance, there is broad consensus that this type of information is relevant to explaining judicial decision-making.

The Social Contexts of Judging

Trial courts are legal institutions. Administering the law is their business and the law consists of a set of rules. Despite similar rules, there is considerable variation in the way legal professionals undertake their tasks. As Fleming, Nardulli, and Eisenstein (1992, 3) note: "[t]he fact that courts are varied and that the law does not adequately or sufficiently explain why these differences [between courts] occur has been well established by the past twenty years of empirical research." In response, the related concepts of county legal culture, courthouse community, courtroom work group, and court work orientation have been advanced to describe differences in how courts are organized and conduct their work. According to Eisenstein, Fleming, and Nardulli (1988, 28), county legal culture "consists of the values and perceptions of the principle members of the court community about how they ought to behave and their beliefs about how they actually do behave in performing their duties." Finding this definition unwieldy, they go on to develop more fully the idea of the courthouse community. Nardulli, Eisenstein, and Fleming (1988, 123-4) contend:

> The notion of a courthouse community is a useful conceptual device in the study of criminal courts because it captures some very fundamental aspects of the social milieu: criminal courts are operated by a group of actors who are tied together by a variety of interdependencies and who share a common workplace.

They also observe that: "[t]he core of the local court community's culture outlines general values and details specific norms and expectations—many of which override and conflict with those associated with formal organizational dictates (1988, 127)." Yet, until recently, there has been very little evidence on exactly what combination of interrelated beliefs and attitudes make up varying court cultures.

Within the context of criminal sentencing, Ulmer (1997), building upon the work of Eisenstein et al, introduces the idea of "social worlds" to define the key environmental factors that affect sentencing outcomes in a given court community. Based upon an in-depth analysis of three Pennsylvania counties, Ulmer (1997, 28-9) identifies the following important contextual features of the social world approach: (1) "the availability and attractiveness of various case processing strategies"; (2)" the familiarity and stability of court community membership"; (3) "the attitudes and ideologies of the various members"; (4) "the scope of plea agendas"; (5) "distribution of resources and power"; (6) "strength and type of commitments of court community members"; (7) "visibility of case processing activities"; and (8) "case processing technologies and caseload characteristics." His central conclusion is that sentencing outcomes are "influenced by the organizational and political features of particular court communities" (Ulmer 1977, 29). He goes on to suggest that these contextual features of individual jurisdictions have significant influence on sentencing outcomes—particularly with respect to extralegal disparity.

Myers and Talarico (1987), in their pioneering study, combine measures internal and external to the court in assessing the role of social context on sentencing. Their study directs attention toward attributes of the community such as urbanization and economic inequality, judicial background, and court characteristics such as overall caseload. They find that "the county, the court, and time shape the magnitude and direction of differential treatment during sentencing."

Integrating social context into the analysis of sentencing outcomes makes clear that judges do not reach decisions in a vacuum. Factors related to the severity of offense and offender as well as extralegal defendant characteristics are gauged and interpreted through the filter of local court culture. Therefore, an analysis of judicial decision-making must draw on both individual defendant characteristics and factors relevant to defining the external work environment.

Cybernetic/structural organization, attribution, and social context theories clearly inform the types of factors relevant to sentencing decisions. However, these theories are less helpful for clarifying the cognitive processes underlying how and why judges evaluate particular attributes in crafting a specific sanction. That is, we lack an explicit organizing structure that shows how these theories weave together into a complementary whole. For example, while there is general agreement that judges exhibit patterned responses, what accounts for the patterns? George Kelly's personal construct psychology can help us develop a set of theoretical principles that "organize" the decision making process.

Personal Construct Psychology

Kelly began his treatise with a discussion of the processes people use to develop a set of "personal constructs." The constructs provide a way of construing, translating, and interpreting the world. As Kelly (1955, 9) noted:

> Man looks at the world through transparent patterns or templates which he creates and he attempts to fit over the realities of which the world is composed. The fit is not always very good. Yet without such patterns the world appears to be such an undifferentiated homogeneity that man is unable to make any sense out of it. Even a poor fit is more helpful to him than nothing at all.

Constructs are the means by which individuals "make sense" of their world. This is achieved by finding "patterns" or regularities.

Kelly (1955, 49) further noted, "a person's processes, psychologically speaking, slip into grooves which are cut out by the mechanisms he adopts for realizing his objectives." These psychological grooves provide mechanisms for coping with decision-making. These grooves, or templates, provide the wherewithal for making sense. We contend that as judges form their assessment of a particular offender's need for punishment, the prospects of rehabilitation, or the likelihood of obtaining restitution, they draw on offender attributes such as offense severity, prior criminal record, and socio-economic factors. With reference to such factors a judge can quickly form an "offender profile" and choose a particular, appropriate sanction.

Kelly offered as his "fundamental postulate" the theoretical assumption that "a person's processes are psychologically channelized by the ways in which he anticipates events." In other words, a judge seeks ways to readily assess offender blameworthiness while simultaneously appraising the likelihood of recidivism. Kelly viewed all people as "personal scientists" whose goal is to analyze events as they unfold to assess the consequences of particualar behaviors. People move thorough successive approximations to test their constructions in an effort to establish predictive efficiency (Kenny 1984). The rational individual, in Kelly's eyes, is the one who places emphasis on "sense making," where sense making involves a frequently rapid search for relevant patterns and regularities.

We achieve predictive efficiency by developing personal theories, or constructs, that are our way of understanding the world. In Kelly's view, individual decision makers develop personal theories "as a way of binding together a multitude of facts so that one may comprehend them all at once." While one could develop an infinite number of possible theories, only some of them are useful. People behave in a rational manner by testing their constructs and expectations against actual experience, replacing those that do not work, and refining those that do. In this sense there are alternative constructs available to all decision makers. The ones that work best for the task at hand are the ones most likely to be adopted and used.

Kelly's theory about the nature of constructs and their role in decision-making has several relevant corollaries. The first, the "construction corollary", holds that a person anticipates events by construing their replications.
Kelly believed that a goal of each person is to develop a series of valid constructs that enable him to focus on the incoming data that is central to the task at hand and connect it to important and relevant future outcomes.

In keeping with the spirit of the cybernetic tradition, Kelly placed considerable emphasis on the fact that decision makers think in terms of dichotomies. To this end, he offered the "dichotomy corollary", which holds that a person's construction system is composed of a finite number of dichotomous constructs.

People tend to make rather blunt either/or distinctions. In answer to the question of why people think in dichotomies, Kelly (1955, 61-62) argued that "rules of thumb" are meaningful only to the extent that they enable the individual to form the basis for similarity and contrast. Not only does this "come nearer to representing the way people actually think," it is also consistent with the way computers store information. Kelly (1955, 64) concluded: "personal-construct theory, with its emphasis upon the dichotomous nature of the personal constructs which channelize psychological processes, is in full accord with this modern trend in scientific thinking."

There are two other corollaries of Kelly's theory relevant to judicial decision-making. The "commonality corollary" holds that to the extent that one person employs a construction that is similar to that of another, the psychological processes of each are similar. And the "sociality corollary" holds that to the extent that one person construes the construction process of another, he may play a role in a social process involving the other. These corollaries offer insight into the development of common "rules of thumb" within groups of individuals who engage in similar tasks and/or interact on a regular basis. It also provides the foundation for examining the impact of different social worlds of sentencing.

The primary implication for our theory of judicial decision-making that follows from the commonality corollary is the expectation that judges will share the basic context of the offender assessment process. This does not suggest that all judges sentence the same way in every situation. But it does suggest that people who share a similar work environment and similar cultural norms also likely share similarities in how they "make sense" of their experience.

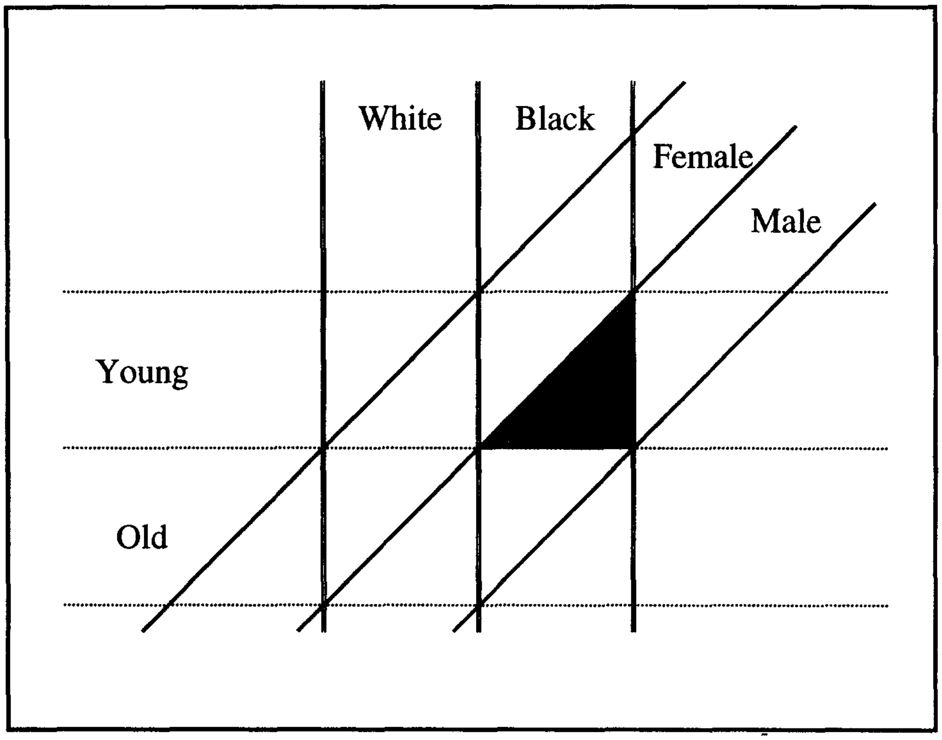
The sociality corollary suggests that individuals who work together on a regular basis will naturally begin to anticipate the behavior of the others. In doing so, individuals develop and adopt practices based on group expectations and established ways of understanding the world. Unwritten rules and practices within the group tend to be reinforced by the give and take of everyday observation and interaction. Therefore, we should not be surprised that as judges anticipate, and sometimes emulate, the conventional sentencing practices of their colleagues, patterned responses in sentencing outcomes emerge.

Combining these basic ideas, Kelly (1955, 121) concluded, "what one predicts is not a fully fleshed-out event, but simply the common intersect of properties." In the context of sentencing, judges assess the seriousness of the offender and potential for recidivism by paying attention to a wide range of specific offender attributes. Based on Kelly's theory, it is our view that judges interpret information by simultaneously making basic distinctions among multiple factors, using a personal shorthand or established rules of thumb. One can conceive the simultaneous appraisal of multiple attributes as the search for specific patterns or subsets of attributes that imply a certain level of blame or likelihood of future criminal behavior.

For example, suppose the issue is the likelihood of recidivism, and a judge predicts this outcome for a specific offender through reference to an internally held "profile of the recidivist offender." The sentencing literature suggests that the array of factors underlying this decision includes offender race, gender, and age. Specifically, young, black males are traditionally deemed to fit the profile because of they are alleged to have a greater likelihood of recidivism. Following from dichotomy corollary, we assume judges make blunt distinctions among relevant attributes: black/white, male/female, and old/young.

The shaded area in Figure 2-1 shows the intersection of these three dichotomies, and highlights the group of individuals that is commonly predicted most likely to commit additional felonies. As we can see, and as Kelly anticipated (Kelly, 1955, 129), "the construction system sets the limits beyond which it is impossible for him to perceive. His constructs are controls on his outlook".

Figure 2-1: Simultaneous Appraisal of Multiple Attributes (Young, Black, Males)



From Theory to Model

Blending cybernetic/structural organization theory, attribution theory, social context/worlds theory, and personal construct theory provides the means to identify a set of fundamental elements shaping the judicial sentencing decision. Moreover, taken together, these theories provide a comprehensive framework for organizing the empirical analysis of judicial decision-making. By focusing on discrete aspects of the sentencing decision process, our goal is to craft a model and a set of assumptions that identify the types of factors most likely relevant to the sentencing decision, clarify how those factors are interpreted, and make clear how distinct patterns of offender attributes translate into a particular type of sanction. In our view there are at least six basic components to the sentencing decision: (1) the decision maker, (2) an observed response or choice set, (3) a base or reference point, (4) a set of essential variables and critical values, (5) a social context, and (6) a rule or patterned response that maps essential variables onto the elements of the choice set.

Decision Maker

We assume the decision maker is an individual judge. While we recognize that many others are involved in the criminal justice process (e.g., prosecutor, defense attorney, probation officer), we focus our attention on the individual who metes out the sentence. Wonders (1996, 623) noted "judges today depend upon the cumulative perceptions of others who make decisions at earlier points in time." She buttressed her argument with reference to the work of Eisenstein, Nardulli, and Fleming, and their discussion of the courtroom workgroup, or elite. Still, we believe that the judge, as the final arbiter, is the appropriate focus of our analysis. Consequently, we assume that the central decision maker is the individual judge.

Sentencing Choice Set

To analyze sentencing, it is imperative that we make a clear assumption about the sentencing options that judges consider. The first thing to note about the sentencing choice set is that it is broken into subsets that don't overlap.

Specifically, we conceptualize sentencing as a two-stage process, which first involves a decision concerning the type of sentence (e.g., prison, jail, probation), and second the severity of the resulting sentence. Our first assumption concerning the sentencing choice set is that sentencing involves two related but separate decisions – sentence type and sentence severity. It is worth noting that, in principle, there is a separate sentence severity decision for each possible sentence type (e.g., length of prison sentence, length of jail term, length and number of conditions on probation, amount of fine, type of community service).

Our second assumption concerns the number of options considered by the sentencing judge. On the basis of our review of attribution theory (Albonetti 1991; Steffensmeier etal 1998) and the cybernetic literature (e.g., Newell and Simon, 1969; Simon, 1979), we argue that the number of sentencing options in each of the two judicial choice sets will be limited, if for no other reason than to ease the burdens of calculation. In other words, the restricted choice sets reflect the tendency of decision makers (including judges) to simplify situations by reducing the number of possible alternatives. In the sentencing context, we suspect that judges consider and use only a relatively small number of sentencing options for both the sentence type and sentence severity decisions.

Sentencing Base

We contend that sentencing proceeds from a base. The base provides an "anchor" that serves as a reference or starting point for the search process that leads to the selection of a sentence from the choice set. For our purposes, the base is related to the severity of the conviction offense, and therefore to the offender's exposure to a particular range of possible sentences. Kahneman et al. (1972, 14) refered to this process as "anchoring." As they noted, the choice of a starting point has tremendous consequences for the final choice, in that final choices are often "biased" toward the starting value. Our purpose in developing our model is not to tell judges how to sentence, but rather to model the sentencing process. Therefore, in the sentencing context, we assume that judges initiate sentencing decisions with reference to the legislatively determined seriousness of the offense, and that this serves as the "base" or "reference point" for the resulting decision. The base enables the judge to locate an area within which a satisficing-type search can commence.

Sentencing Relevant Variables

In the existing sentencing literature, there is widespread agreement concerning the type of information that will fit into the marginal calculations around the sentencing base. Factors such as offense seriousness, prior record, conviction at trial, private attorney, race, gender, and age are all included in empirical models. We further assume that judges are interested in understanding the "causal processes" that led to the offense, and how those processes may unfold in the future. The literature repeatedly turns to the role of stereotypes as a sort of perceptual shorthand (Steffensmeier, et al., 1998) that assist judges in assessing cause. To our way of thinking, a more productive route to understanding attribution of cause comes from the work George Kelly has done in personal construct psychology.

We believe that a number of implications follow from Kelly's work, especially when it is considered in conjunction with existing sentencing research. One of the first tasks in applying Kelly's theory is to locate the dimensions of the "cognitive space" judges use in the sentencing process. From the existing literature (e.g., Thompson 1967), and following upon Kelly's fundamental postulate and construction corollary, we believe that judges attempt to anticipate the likelihood of future criminal behavior, as well as the offender's role in the cause/effect process that ends in the conviction offense. We believe that judges rely upon recurrent patterns or themes to predict things to come. Thus, we assume that they will come to associate certain constellations of information with specific inferences about offender seriousness.

Following Kelly, we also assume that a judge's construction system is composed of a finite number of dichotomies. In the context of sentencing, this corollary suggests that judges will make a number of dichotomous discriminations about factors deemed relevant to anticipating the future criminal behavior of the offender, or ascertaining an offender's responsibility in the instant criminal event.

We further assume that judges are likely to adopt rules that include common ways of predicting recidivism and assigning blame. This leads us to expect two things. First, we anticipate that judges are essentially homogenous with respect to how they approach the sentencing task. Second, we expect that there is general agreement on the types of dichotomies relevant to estimating relevant subjective probabilities; these include: *prior record*, *offense factors*, *case process*, and *defendant characteristics*.[2]

Social Contexts

Judges do not make decisions in splendid isolation. Sentences are shaped by statute and sentencing structure (the "sentencing base"), individual defendant characteristics (the "sentencing relevant variables"), and local legal and political culture. Acknowledging and incorporating the affect of social context help achieve a more complete and nuanced understanding of sentencing outcomes. How contextual features are conceived and integrated depends greatly on the focus of analysis. A detailed rendering of the local environment is best accomplished through court-specific case study. An alternative approach, akin to

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[2] Notice that our classification of the types of sentencing relevant variables does not include the modifiers "legally-relevant" or "extra-legal." While this distinction has been critiqued (Hagan and Bumiller, 1983), it is still in wide usage. In a thought-provoking discussion, Wonders (1996, 627-632) deconstructs the distinction between legal and extra legal factors. When discussing prior record and offense severity, Wonders notes:

> These variables are widely regarded as "legally relevant" because they are considered in all jurisdictions to be legitimate criteria in sentencing decisions. The belief in their legitimacy is so pervasive that sentencing researchers consistently eliminate all the effects of prior record and seriousness before exploring other variables (Chiricos and Crawford, 1995). Failure to do so results in claims of shoddy scholarship (see Blumstein et al. 1983). Unfortunately, very little attention has been given to the possibility that both prior record and offense severity may actually conceal discrimination and thus may reproduce systematic bias.

For example, the legislatively mandated seriousness of some offenses may result from the kinds of people who commit or are victimized by them. Prior record can represent prior discrimination in the criminal justice system. Rather than take a position on these value-laden issues, it is our desire to construct a model that focuses on the factors that judges actually use in determining sentences.

Ulmer's (1997) "statewide sentencing outcomes" model, pares the analysis of social context to its more essential and comparable ingredients. The goal is to control for significant features of the local environment that can be accurately and consistently measured across multiple jurisdiction. Following in the tradition of Myers and Talarico (1987) we will look at key demographic variables for each of the counties included in our sample. Like Ulmer (1997), we anticipate that the size of the court is correlated with key elements of a court's culture. Hence, as a proxy for court culture, we anticipate that court size will play a role in the decision making process.

Decision Rules

We believe that personal construct psychology has a number of things to tell us about the decision rules judges use. In general, we expect that judges develop decision rules to anticipate what will happen based upon a small set of significant dichotomies. In doing so, judges develop a "personal theory" that gives them "a way of binding together a multitude of facts so that one may comprehend them all at once." It is the presence of a personal theory that leads to the patterned responses anticipated by Albonetti (1991). When we combine this with Kelly's sociality corollary, we anticipate that judges working in the same court will often share a similar personal theory of sentencing.

We also assume that judges anticipate the future by monitoring a relatively small number of sentencing relevant variables. All other information, even if it is contained in the pre-sentence investigation report, is screened out or minimized. In this way, judges process subjective probability estimates about the blameworthiness of the offender and the likelihood of recidivism. Our basic assumption is that judges pay attention to a relatively small number of factors – measured in a dichotomous fashion – in assessing the subjective probabilities concerning blameworthiness and recidivism. It is the intersection of the dichotomies that drives the final decision.

We also assume that decision rules are routinized, and, in addition, are linear, additive, and relatively stable. As such, they represent "patterned responses" to decision making even in situations characterized by high levels of discretion (Albonetti, 1991, 249). Furthermore, we assume that judges use the same sets of factors in both the sentence type and severity decisions. However, we must allow for the possibility that the sentencing relevant factors might have a different effect on the two decisions. Taken together, these assumptions lead to the following two-equation model of the sentence decision-making process:

$$z_i = \gamma_0 + \sum_{j=1}^{J} \gamma_j B_{ij} + \sum_{k=1}^{K} \gamma_k O_{ik} + \sum_{l=1}^{L} \gamma_l P_{il} + \sum_{m=1}^{M} \gamma_m D_{im} + \sum_{n=1}^{N} \gamma_n C_{in} + \sum_{p=1}^{P} \gamma_p W_{ip} + e_i$$

$$y_i = \beta_0 + \sum_{j=1}^{J} \beta_j B_{ij} + \sum_{k=1}^{K} \beta_k O_{ik} + \sum_{l=1}^{L} \beta_l P_{il} + \sum_{m=1}^{M} \beta_m D_{im} + \sum_{n=1}^{N} \beta_n C_{in} + \sum_{p=1}^{P} \beta_p W_{ip} + u_i$$

where

z_i	=	sentence type
y_i	=	sentence severity
B_{ij}	=	sentencing base
O_{ik}	=	offense factors
P_{il}	=	prior criminal history
D_{im}	=	defendant characteristics
C_{in}	=	case processing factors
W_{ip}	=	court community and size characteristics

As a final caveat to our specification of the decision rules, we anticipate that the "errors" of the sentence type equation will be related to the "errors" of the sentence severity equation. When an individual with low offense severity is given a prison sentence, it is likely that the selection equation predicts no prison, while the judge gives a prison sentence. This will show up as an error in the type equation. Given that the prison/no prison and sentence severity decisions are made by the same person, in the same location, at the same time, it is likely that the severity of the sentence will be greater than the model predicts. For some reason – outside the purview of our model – a judge gives a harsher sentence to an individual than the model predicts he will. The harshness will be reflected in both equations – first, the offender will go to prison, and second, the prison sentence will be above some minimum threshold.

Summary

The model we have developed in this section, which is based upon cybernetic/structural organization theory, attribution theory, social context theory, and personal construct theory, consists of six theoretical assumptions:

1. Decision Maker – The sentencing judge is the central decision maker.
2. Sentencing Choice Set(s) –
   a. Sentencing decision-making involves two related though separate decisions – sentence type and sentence severity. There is a separate sentence severity decision for each sentence type.
   b. Judges consider and use only a relatively small number of sentencing options for both the sentence type and sentence severity decisions

3. Sentencing Base – Judges initiate their sentencing decisions by reference to the legislatively established severity of the offense, which serves as a "base" or "reference point" for the resulting decision.

4. Sentencing Relevant Variables
    a. Number of Factors – Judges will pay attention to a relatively small number of factors

    c. Attribution Theory for Content – Sentencing relevant variables will include such factors as the legislatively established severity, offense factors, prior record factors, court processing, defendant characteristics, and court culture.

    d. Dichotomies – Judges make blunt distinctions in gauging the significance of each sentencing relevant variable. The offender assessment process involves a finite number of dichotomous decisions.

    e. Court work environment – Sentencing judges share a similar work environment and tend to develop and adopt decision making practices based on group expectations and established ways of determining offender punishment. Therefore, we anticipate that most judges employ sentencing decision rules similar to their colleagues.

        i. Judges are essentially homogeneous with respect to how they approach the sentencing task.

        ii. There is general agreement on the types of dichotomies that figure in the estimation of the relevant subjective probabilities (e.g., offense, prior record, case processing, personal characteristics).

5. Social Context – as a proxy for the variations in local legal culture, we expect that the size of the court matters.

6. Decision Rules – Rules are developed that anticipate what will happen based upon a small set of significant dichotomies.

    a. Judges as decision makers develop a personal theory "as a way of binding together a multitude of facts so that one may comprehend them all at once." This leads to "patterned responses."

b. Choices are routinized and expressible as rules of thumb --rules are linear and additive.

c. Two decisions are connected to one another ("seemingly unrelated")

We believe that these six assumptions provide a strong foundation upon which to build and test a model of sentencing. These assumptions synthesize existing theories found in Albonetti (1991), Steffensmeier et al (1998), Myers and Talarico (1987), and Ulmer (1997) with personal construct psychology, which attends to the psychological processes underlying judicial decision-making. We will introduce and operationalize the model in the model in the next three chapters.

CHAPTER 3: THE SENTENCE TYPE DECISION

Introduction

This chapter takes up the challenge of developing a model of the sentence type decision that integrates the full range of sentencing options. We will begin by examining the theoretical dilemma of melding the alternative goals of sentencing with the choice of specific sanctions. This process will clarify the inherent difficulties of designing effective sentencing policies, which must respond to goals that may be complement one another or compete with one another. We will then develop a spatial model of the sentence type choice set that specifically distinguishes among the full range of sentencing options. We will also introduce an appropriate methodology for estimating the parameters of our spatial model. Our results raise little hope that one can attain the longstanding goal of discovering a single dimension, like severity, along which all sanctions can be arrayed. Instead, the evidence suggests that judges conceptualize the sentence type decision in multiple dimensions. Consequently, we need to reconfigure and expand how we think about the "in/out" decision. Specifically, rather than calling all non-prison sentences "out", our spatial model provides a way to define and differentiate four categories of non-prison sanctions (also referred to as "community sanctions") that reflect the way judges actually view the sentence type decision. We will close the chapter with a discussion of our strategy for measuring the sentence type decision in practice. We will put the model to the test, using data from the state of Michigan, in a later chapter.

Intermediate Sanctions and Sentencing Goals

Intermediate sanctions are the greatest challenge to the empirical study of sentencing. One benefit of the study of prison sentences is that a single dimension of severity exists. Prison sentences are measured in a uniform metric, and it makes sense to assume that longer sentences are more severe than shorter sentences. This is not the case for intermediate sanctions. For example, is three years of probation more or less severe than two months of in-patient treatment, or four months in jail? The difficulty in comparing non-prison sentences is that there is no single continuum along which all such sentences can be arrayed. This is hardly surprising, given the multiple goals the multitude of existing sanctions has been designed to meet. Moreover, intermediate sanctions are often packaged together to meet different combinations of offender risk and need.

The research community has yet to address the essential complexity a judge faces in deciding to impose one or more non-prison sanctions. Judges are asked to balance and integrate the competing goals of sentencing (e.g., retribution, restitution) through a wide range of alternative sanctions (e.g., fines, community sanctions, treatment), with no clear framework of how they interrelate. The problem is greater than simply laying out a list of goals and values and attempting to match them with another list of sanctions (e.g., restoration is a goal of sentencing, and imposing a fine meets that goal). We need conceptual clarity to better understand the *interrelationship* between the goals of sentencing and potential sanctions, and to develop a process for judges and policymakers to better gauge the *effectiveness* of alternative sanctioning strategies. We believe these are critical steps in coming to terms with the complex and often conflicting decisions judges must make in handing down community-based sanctions.

Certainly we are not the first to see the need for a theoretical framework to disentangle the complex relationship between sentencing goals and intermediate sanctions. Morris and Tonry (1990, 8), for example, were clear on the complexity of the choice situation.

> It will be appreciated that the just and efficient application of such a wide-ranging armamentarium of punishments raises issues of complexity at the sentencing stage if the sentence is to be tailored to the threat that the offender presents to the community and his social and psychological needs, if recidivism is to be reduced and unjust disparity in sentencing is to be avoided. Hence, the centrality of sentencing theory in our consideration of intermediate punishment.

A theoretical framework is important because, as McGarry (1990, 11) noted, it can provide "a vision or articulated mission for the entire sentencing enterprise." What would such a theory look like?

According to McGarry (1993, 12), a theory "requires the development of both a range of sanctioning options and a coherent policy to guide their use." Harland (1993, 35) captured the consequences of not having these "tools":

> Attention is increasingly being drawn to the danger that, without clear guidance to structure discretion as to how and for whom the variety of sanctions might best be applied, such expansion may make the decision maker's task even more difficult and confusing, leaving greater chance for idiosyncratic and otherwise inappropriate results.

We agree that a meaningful theory of intermediate sanction options is prerequisite to the effective design and application of community-based sentences.

A primary purpose of the community-based sentence is to provide effective alternatives to prison. But assessing the effectiveness of these sanctions depends on the particular goal(s) one hopes to achieve. To illustrate the possibilities, Harland (1993, 40) recounted the range of goals confronting a judge: retribution, deterrence, specific deterrence, incapacitation, rehabilitation, reparation, economic cost, and public satisfaction. The complexity of the situation is exacerbated by the fact that a judge does not typically choose one type of community sanction. As Morris and Tonry (1990, 7) noted:

> These intermediate punishments do not function in isolation from one another. The fine is often combined with other punishments. So too are house arrest and the community service order. Electronic monitoring is really a technique or technology; it is seldom intended to serve as punishment itself. All are sometimes allied to brief periods of prison or jail.

They go on to say (Morris and Tonry 1990, 8):

> We do not shrink from urging serious consideration of complex intermediate punishments. For some offenders, a substantial fine may well be combined with an order that the offender make restitution to the victim, pay court costs, and be subject to a protracted period of house arrest, monitored electronically, for which too the offender pays the costs. For others, intensive probation involving regular and close supervision by a supervising officer playing a police role and also by a case worker may be combined with a definite period of residence in a drug treatment facility, followed by regular urinalyses to ensure the offender remains drug free, and also an obligation to fulfill a set number of hours of community service—all strictly enforced. Too complex? Too expensive? Not at all—such sentences in appropriate cases serve the community, the victim, the

> offender better and more economically than the prison term they supplant.

Not only is assessing the needs of the community, victim, and offender a complicated endeavor, but formulating a "package" of sentencing options is itself quite complex. How do we imagine that judges deal with such complexity?

We contend that judges face a menu of community-based sentencing alternatives that do not fall nicely onto a single dimension of severity. Instead, the judge's sentencing menu is both broad and deep. By choosing a sentence that includes both punishment and rehabilitation, or public protection and restitution, a judge may be forced to accommodate underlying goals that are at odds with one another. Thus, we suspect that a judge's cognitive map contains, at least implicitly, more than a single dimension. As Morris and Tonry (1990, 180 emphasis added) observed: "The overarching question we address concerning all these community-based punishments is the extent to which it is possible to *combine control purposes, aiming at minimizing the threat the criminal presents to society, with treatment purposes, aiming to train the criminal for conformity.*" At minimum, Morris and Tonry seemed to suggest that both "control" and "treatment" motivate the choice of intermediate sanctions.

The fundamental problem is how to identify and measure these dimensions. Von Hirsch (1992, 223, emphasis added) asked a similar question: "The question raised by Morris and Tonry's book, but not satisfactorily answered, is whether it is possible to provide meaningful guidance for the choice of noncustodial penalties, *while adopting a hybrid set of sentencing aims.*" To develop of a hybrid set of aims we must first clarify the nature of those aims.

One aim that has received considerable attention in the sentencing literature is Morris and Tonry's (1990) "continuum of sanctions." Crafting such a continuum requires that we determine how all sanctions relate to imprisonment, and to each other. This leads us to search for measures of equivalence or interchangeability. Though highly critical of Morris and Tonry, von Hirsch (1992, 211) agreed that a continuum of sanctions is of primary importance. As he noted, "A variety of sanctions are being tried—day fines, community service, intensive supervision, home detention, and the like. However, not much thought has been give to the scaling of these penalties. They are fashioned largely ad hoc, and applied to whatever heterogeneous group of offenders seem most convenient . . ."

Harland (1993, 40) defined a continuum of sanctions as "a variety of coercive measures taken to enforce societal standards, ordered on the basis of a fundamental common feature . . ." Following Harland, it is our view that understanding the continuum concept requires that we clarify at least three issues. First, what is the precise nature and scope of the coercive measures embraced by the term sanctions? Second, by which essential common features (dimensions) might judges and other key decision makers find it most helpful to order the various sanctions on the list? Finally, what techniques or methods might best be used to scale and grade sanctions according to each of the dimensions?

Addressing these three questions is fundamental to constructing a continuum of sanctions. Moreover, they call for us to consider explicitly whether the continuum of sanctions is best viewed in terms of a single dimension or multiple dimensions. As Harland observed:

> . . . selection and interchangeability decisions must further be guided by policies and rules determining the relative weight and priority to be given to each dimension when conflicts (e.g., between punishment and treatment) arise. Assuming adequate specification and description of the options, the next question that arises is: given such a range of choices, is there a consistent, principled order or sequence in which the various measures should be factored into the construction of an appropriate sanctioning response? In any given case or class of cases, how does the sanctioning decision maker know where to start the selection process, where to stop, and how to resolve conflicts that may arise between competing possibilities on the list?

Harland is clear on the behavioral complexity facing judges as they conceptualize community-based sentencing options. In the next section, we suggest how judges interpret and view the various goals and options at their disposal when they impose a community-based sentence.

Modeling the Sentence Type Choice Set

The goal of this section is to develop and test a model of the sentence type choice set that distinguishes among the full range of sentencing options. To this end, we employ a three-pronged research strategy designed to address Harland's three challenges. First, we assemble a comprehensive list of twenty ideal sentence types. Second, we develop a spatial analysis of the ideal types to reveal the common dimensions in which judges view these options. Third, we use the results from the first two steps to conceptualize a "continuum of sanctions" and construct the dependent variable of the sentencing type decision.

The Spectrum of Sanctions

The first step in modeling the judicial sentencing process in relation to intermediate sanctions is to determine the possible sentencing alternatives from which judges choose. A thorough search of the literature on intermediate sanctions (e.g., Byrne, Lurigo, Petersilia 1992; Harland 1996; Klein 1997; Morris and Tonry 1990; Tonry 1997) produced in excess of fifty sentencing alternatives. By eliminating overlap and by grouping similar sanctions we reduced these to a set of 19 ideal types. For the sake of comparison we have also included prison in our list of sentencing options. We offer definitions and examples for each of the 20 distinct types of sanctions in Table 3-1.

Table 3-1: Twenty Sentencing Ideal Types

1. **Warning Measures –** sentences that include judicial notice (e.g., verbal or written warning) of consequences of subsequent wrongdoing. Examples include*: (a) admonishment, (b) suspended sentence, (c) oral warning, and (d) confrontation programs (e.g., "Scared Straight").*

2. **Shame Tactics –** sentences that include the element of shame and humiliation. Examples of shame tactics include: *(a) offender registries, (b) giving community lectures, (c) public apologies, (d) transcribe victim obituaries, and (e) post sign of offense (e.g., bumper sticker, sign at residence).*

3. **Restitution**—sentences that require the offender to be proactive in relation the victim (e.g., do something positive rather than have something done to

him/her) in response to the offense. Examples of restitution measures include: *(a) child support order, (b) direct victim service, (c) pay funeral expenses, and (d) charitable donations (e.g., services, material items, money).*

4. **Fines** – sentences that require offenders to pay money, often specified by statute. Examples of fines include: *(a) flat fines (i.e., offender pays a flat fee), (b) garnish wages, (c) post bond (e.g., against probation violations, and (d) day fines (fine proportional to offender's wealth and seriousness of crime, paid for a certain number of days.*

5. **Forfeiture**—sentences that require offenders to forfeit personal assets, and/or assets acquired from the crime. For example: *offender may be ordered to give up illegally obtained property and/or money as a part of a plea agreement or in exchange for sentence reduction.*

6. **Court Costs** – sentences that include civil assessments levied against the defendant to reimburse state and locality for actual expenses of litigation, punishment and/or rehabilitation.

7. **Victim/Offender Mediation**— sentences requiring offender to interact with victim and/or community to become aware of the consequences of the criminal activity. Examples include: *(a) meetings between offender and victim to encourage victims and offenders to be directly involved in resolving the conflict and (b) community mediation (i.e., panel of community members determine sentence).*
8. **Behavioral Restrictions** – sentences that restrict offender's behavior in regards to movement, association, and/or substance use. Also, behavioral restriction may include monitoring behaviors (e.g., searches/chemical tests without warrants and probable cause). Examples of behavioral restriction measures include: *(a) drug and alcohol use restriction, (b) disbarment from professional association, (c) association restrictions, (d) travel restrictions, (e) no contact with minors, (f) driving restrictions, (g) scheduled and random urinalysis, and (h) weapon possession restriction.*

9. **Community Work/Service**—sentences that require offenders to engage in unpaid work, usually confined to nonprofit or public agencies. The offender is deprived of leisure time and forced to help others rather than being the recipient of help/services.

10. **Mandatory Training/Self-Improvement** – sentence orders offenders to complete academic, vocational, and/or life skills courses. Examples of training/self-improvement measures include: *(a) academic training (e.g., GED, literacy), (b) life skills training, (c) vocational training, (d) anger management training, and (e) physical challenge/self-esteem course (e.g., Outward Bound).*

11. **Out-patient Treatment** – sentences ordering offenders to participate in medical, psychiatric, and/or self-help treatment on an out-patient basis. Treatment may take place in an individual or group setting on a periodic or scheduled basis. Examples of out-patient treatment measure include*: (a) attend AA, NA meetings, (b) day treatment center, (c) chemical castration, (d) counseling, (e) take behavior modifying drugs (e.g, methadone, lithium).*

12. **In-patient Treatment** – sentences ordering offenders to participate in medical, psychiatric, and/or self-help treatment on an in-patient basis. Treatment may take place in an individual or group setting on a short or long-term basis. Examples of in-patient treatment measure include: *(a) hospital-based program, (b) residential treatment program, and (c) diagnostic facility.*

13. **Home Confinement/Electronic Monitoring**—sentences that confine the offenders to their residential setting. Sentences may allow offender to leave the home for employment purposes. Examples of home confinement/electronic monitoring measures include: *(a) home curfew, electronic ankle bracelet, and (c) house arrest.*

14. **Residential Community Corrections** – sentences where offenders are ordered to a correctional facility from which residents are regularly permitted to depart, unaccompanied by an official, for the purposes of using community resources, such as schools or treatment programs, and/or seeking or holding employment. Examples of residential community correction measures include: *(a) community residential program and (b) halfway house.*

15. **Boot Camp** – sentences where offenders are ordered to participate in disciplinary programs patterned after military basic training. Typically, offenders serve a short period of time in a military-style boot camp prison where they are separated from other prison inmates and are required to participate in military drills, physical training, and hard labor.

16. **Probation** – sentences where offenders are ordered to a defined period of court controlled monitoring and to report to an official on a regular basis (e.g., less regularly than weekly). The period of probation is to allow the offender to demonstrate his/her ability to abide by the laws and engage in good behavior. Withdrawal of autonomy varies with the terms of the probation order, and if the conditions of probation are breached, there is often some threat of jail/prison. Examples include: *(a) traditional probation, (b) mail reporting, and (c) shock probation.*

17. **Intensive Supervision** – sentences where offenders are ordered to participate in daily or weekly face-to-face contact with a court official (e.g., probation officer) or day reporting center personnel, and which may include urine testing or other restrictions.

18. **Periodic/Intermittent Detention** – sentences where offenders are ordered to spend varying amounts of time in jail. The detention is typically on scheduled intervals and often these sentences will be weekend incarceration. Also, shock incarceration sentences are included in this category. Shock incarceration sentences involve imposing a lengthy jail/prison sentence and suspending it after a small portion has been served.

19. **Jail** – sentences where offenders are ordered to spend a fixed amount of time (with maximum stay of 365 days) incarcerated in a local facility.

20. **Prison** – sentences where offenders are ordered to spend a fixed amount of time (minimum stay of 365 days) incarcerated in a state-run facility.

Spatial Model Of Sentencing

We use spatial analysis to develop our model of the sentence type decision and to characterize how judges distinguish between different types of sentencing options. We draw on this flexible methodology because it accommodates a large number of possible sanction types, addresses the "dimensionality" issue by evaluating solutions involving one or more dimensions, and provides an empirical means for representing the relationship between sanctions and a number of dimensions. We discuss the specifics of the model design and estimation strategy below.

In the spatial model, alternative sentences are represented as points within a Euclidean space of low dimensionality. The coordinate axes correspond to the dimensions judges use to evaluate the alternative sanctions. We assume that all judges use the same dimensions, although the relative importance of the dimensions will vary from judge to judge. The full set of judicial perceptions of alternative sentencing attributes is represented by matrix X. The matrix X has j rows reflecting the j (j= 1, 2, . . . , J) available sentencing alternatives (e.g., fines, community service, jail), and r columns reflecting the r (r=1, 2, . . ., R) dimensions that judges use to conceptualize alternative sanctions (e.g., treatment, punishment,

$$X = \begin{Bmatrix} x_{11} & x_{12} & \ldots x_{1R} \\ x_{21} & x_{22} & \ldots x_{2R} \\ x_{J1} & x_{J2} & \ldots x_{JR} \end{Bmatrix} \tag{3-1}$$

where x_{jr} represents the value of the j-th sentencing alternative on the r-th evaluative dimension (e.g., how well does community service serve the ends of treatment).

Underlying the group (or attribute) space are representations of individual judges. Individual representations can vary from judge to judge to the extent that some judges favor one of the evaluative dimensions over others. As a particular evaluative criterion becomes more (or less) central to a judge's assessment of the alternative sanctions, the weight attached to the appropriate dimension increases (or decreases) accordingly.[1]

For each judge k, the dimension weights are a set of r numerical values collected into the r-dimensional diagonal matrix, W_k. The r-th diagonal element in the matrix, w_{rk} , shows the weight that is applied to evaluative dimension r for judge k. The fixed sanction positions and the judge-specific weights are combined to form the perceptual spatial model for each judge:

[1] As Jacoby (1998) notes, the weights – from a geometric perspective -- have the effect of stretching or shrinking a coordinate axis. By changing the relative lengths of the axes, the weights can also change the relative positions of the sanction points within the individual judge's perceptual space.

$$X_k = X\,W_k \qquad (3\text{-}2)$$

Each entry in the matrix $x_{jr}w_{rk}$ gives judge k's perception of sanction j on evaluative dimension r, weighted according to the "importance" of that particular evaluative dimension for judge k. The net effect is that the relative positions of the alternative sanction points can change from judge to judge. A spatial model with a diagonal weight matrix, like that in Equation (3-2), is usually referred to as the "weighted Euclidean model." This model allows the relative importance of the dimensions to change while the identity of the dimensions themselves remains stable across all our judges.

The spatial model we have developed provides a useful platform from which to examine how judges conceptualize alternative sanctions. First, the spatial locations of the alternative sanctions and the individual dimension weights are determined empirically, so they should accurately represent the perceptual map that judges bring to the sentence type decision. Second, the spatial model easily incorporates any number of possible sanctions, rather than limiting the discussion to a small number of options, such as jail and probation. Third, the model places judges into the same geometric configuration as the sanctions. Finally, the model provides a parsimonious representation of the difference in sentencing philosophies among judges through the different values of the dimension weights.

Our next task is to devise a strategy to estimate the parameters of the spatial model. The goal is to identify the dimensions along which judges evaluate the various alternative sanctions, to place the alternative sanctions into specific positions in the multidimensional space, and to determine the extent of agreement (or disagreement) among judges on how sanctions and dimensions relate. The individual judge is our unit of analysis, so the results incorporate and variations in judicial philosophy. We will use Weighted Multidimensional Scaling (WMDS) for this analysis.[2]

The WMDS procedure begins with a proximity matrix, Δ, which represents subjective values of how alternative sanctions relate to one another. That is, we ask judges assess the degree of similarity or dissimilarity among all sanctions. Each entry in Δ, $\delta_{ij,k}$ is the proximity between sanctions i and j according to the k-th judge (Arabie et al. 1987). For each data input value $\delta_{ij,k}$ there is a corresponding estimated distance $d_{ij,k}$ in the matrix $D = \{ d_{ij,k} \}$, which indicates the distance between sanctions i and j in an alternative sanction space that has been altered by applying dimension weights for judge k to stretch or shrink the axes differentially.

$$F_k (\delta_{ij,k}) = d_{ij,k}$$

Linear functions F_k are fitted between input proximity data values $\delta_{ij,k}$ and corresponding output distances $d_{ij,k}$ for each $k = 1, 2, \ldots, K$ sources of proximity matrices. For each judge k, a weighted Euclidean distance model

[2] The weighted Euclidean model is often called the INDSCAL model. As Jacoby (1998) notes, both of these terms come from the first computer program that was developed for estimating the weighted Euclidean model (Carroll and Chang 1970). Following Young (1984, 1987), Jacoby prefers to use the more generic terms "weighted Euclidean model" and weighted multidimensional scaling. This latter usage emphasizes the distinction between the spatial model and the general analytic strategy on one hand, and the specific software employed to calculate the parameter estimates on the other.

represents the squared distance between any two alternative sanctions; say j and p, as follows:

$$\text{Distance}^2 = \{x_j , x_p\} = \sum_{r=1}^{R} w_{kr}^2 (x_{jr} - x_{pr})^2 \qquad (3\text{-}3)$$

Substantively, the distance between sanctions obtained with the above equation should correspond to the similarity that judges perceive between sentencing alternatives j and p (i.e., the perceived similarity between, for example, fines and community service). The weighted distance model provides a parsimonious representation of how judges' view the relationship among sanctions. It also offers a way of relating the views of the individual judges to the overall alternative sanction space. If judges tell us, in a structured way, their perceptions of the degree of similarity between all pairs of alternative sanctions (perceptual proximities), then the elements of X and the various W_k matrices can be estimated through weighted multidimensional scaling or WMDS (Davison 1983; Young and Hamer 1987).

One important benefit of WMDS is that the resulting dimensional space has a unique orientation, since the coordinate axes are not arbitrary (Arabie et al. 1987). With WMDS the axes are determined uniquely because stretching and shrinking is permitted only along the coordinate axes.[3] Thus the coordinate axes

[3] WMDS uses several matrices of proximities (one for each subject) to determine the configuration of points called the attribute stimulus space and a subject space. The program does not use the distances among the points in our attribute space. Instead, a new configuration is created for each subject k, and the distances in these configurations are used. A configuration for individual k is made by altering the group configuration space according to the weights in the

play a special role. This does not mean that the unrotated axes have unambiguous meaning, but the empirical fact is that they are interpretable in most instances. So, while there are certainly differences among judicial viewpoints, the dimensions from WMDS should correspond to "fundamental" perceptual or judgmental processes common to judicial choice. While interpretating the dimensions should be straightforward, there are no conventional criteria for selecting the number of dimensions. Therefore, dimensionality is often based on substantive interpretability. We normalized the attribute weights such that the sum of the weights along each dimension is 0.0, so that the mean for each dimension of the attribute space is 0.0 (Arabie et al. 1987). We adjusted the subject weights accordingly, and consequently they cannot be readily interpreted as percentages relative to some baseline. Subject weights do however gauge the relative perceptual effect of a given dimension.

We surveyed a group of Michigan judges from six counties to determine the relative proximity of the twenty sanctioning alternatives in Table 3-1, and used this data to populate the "X-matrix" (equation 3-1). The survey consisted of a series of paired comparisons between each of the sentencing alternatives. The top part of the data collection form is displayed in Table 3-2. As one can see, each respondent was asked to circle the number that corresponds to the degree of similarity (i.e., 1= very dissimilar and 7= very similar) between the sanction listed in bold at the top of the column and the alternative sanctions

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weight vector w_k–Specifically, one stretches (or shrink) the first axis of the group configuration by $\sqrt{w_{kr}}$ and so on to obtain the kth configuration.

listed directly below. The instructions that accompanied the data collection instrument offered the following suggestions for assessing similarity and dissimilarity.

> Are the two sanctions *similar* in that they are almost interchangeable in furthering the same goal of sentencing? That is, do some sanctions appear to be substitutes for each other? Are the two sanctions *dissimilar* in that they are used to achieve different goals of sentencing? That is, do some sanctions appear to conflict in terms of factors, such as degree of control over the offender or attention to treatment options? In other words, if the sanctions reinforce the same goal of sentencing (e.g., mandatory attendance at Alcoholics Anonymous in conjunction with the requirement of frequent drug testing as a means to rehabilitate an offender) then the sanctions are likely more similar than dissimilar. Similarly, if the sanctions are more "carrot and stick" (e.g., spending nights in a detention center in conjunction with a fine as a means to both punish the offender and provide restitution to the victim) then the sanctions are likely more dissimilar than similar.

Table 3-2: The Sentence Type Data Collection Instrument

Warning Measures compared to:		Very Dissimilar	←				→	Very Similar
1	Periodic/ Intermittent Detention	1	2	3	4	5	6	7
2	Behavioral Restrictions	1	2	3	4	5	6	7
3	Shame Tactics	1	2	3	4	5	6	7
4	Boot Camp	1	2	3	4	5	6	7
5	Jail	1	2	3	4	5	6	7
6	Forfeiture	1	2	3	4	5	6	7
7	Intensive Supervision	1	2	3	4	5	6	7
8	Residential Community Corrections	1	2	3	4	5	6	7
9	Victim/Offender Mediation	1	2	3	4	5	6	7
10	Prison	1	2	3	4	5	6	7
11	Court Costs	1	2	3	4	5	6	7
12	Restitution	1	2	3	4	5	6	7
13	Home Confinement/ Electric Monitoring	1	2	3	4	5	6	7
14	Fines	1	2	3	4	5	6	7
15	In-patient Treatment	1	2	3	4	5	6	7
16	Community Work/ Service	1	2	3	4	5	6	7
17	Probation	1	2	3	4	5	6	7
18	Mandatory Training/ Self-Improvement	1	2	3	4	5	6	7
19	Out-patient treatment	1	2	3	4	5	6	7

The full questionnaire extended Table 3-2 to 190-paired comparisons,[4] with all 20 sanctions presented in a randomized order. We targeted six Michigan trial courts for participation—Genesee (Flint), Kalamazoo, Kent (Grand Rapids), Muskegon, Oakland (Pontiac), and Washtenaw (Ann Arbor). The presiding judge in each court agreed to distribute the questionnaire to all judges with a criminal docket, and hence familiar with alternative sanctions. Seventeen judges in the six courts completed the questionnaire, and we used these results to construct the proximity matrices that serve as the primary data source for our analysis. Each element of the proximity matrix is an ordinal measure of how similar/dissimilar two specific sanctions are perceived to be by a particular judge.

We computed two, three, and four-dimensional solutions. The two-dimensional solution emerged as the best fit.[5] Not only is the fit for the two-dimensional solution quite good[6], but none of the individual judge weights on the three and four-dimension solutions are greater than the corresponding weights for the first two dimensions. Couple this with the ease of interpreting the two

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[4] Once we asked a judge to compare alternative j to m, we did not ask them to compare alternative m to j. As a consequence, the matrix of paired comparisons is lower triangular.
[5] To analyze the paired comparison data, we used the SPSS ALSCAL multidimensional scaling algorithm. We chose a square asymmetric matrix (since the upper half of the matrix is missing). We used the Individual Differences Euclidean Distance with an ordinal level of measure with instructions to untie tied observations, with matrix conditionality.
[6] The squared correlation coefficient between the scaled distances and the input dissimilarities is .89 and the Kruskal $Stress_1$ measure is .16. To interpret the square correlation measure, we offer the following from Jacoby (1998): " . . . the R^2 between the distances and the data values is actually a conservative measure of model fit. Since the input data are assumed to be ordinal-level, the appropriate comparison is between the rank-orders of the data values and the scaled-distances. An alternative measure, Kruskal's $Stress_1$, does measure the degree of monotonic fit. . . However this coefficient is a badness of fit statistic (increasing values correspond to worse scaling solutions), so it is difficult to interpret."

dimensional solution, and we are satisfied that the full range of alternative sanctions can be arrayed and represented quite accurately in two dimensions.[7]

Table 3-3 presents configuration coefficients for the twenty sentencing alternatives for each of the two dimensions. Dimension one is anchored by *prison, jail,* and *boot camp* at one end, and *mediation* and *warning* at the other. Close inspection of the values in the first dimension leads us to interpret it as a *control* dimension. At one end of the dimension, judges seek sentences that place the offender under tight control of the state. At the other end, the sanctions seek to facilitate and encourage self-control by the offender within a looser and more limited structure.

Table 3-3: The Configuration Coefficients

Sentencing Alternative	Dimension 1	Dimension 2
Behavioral Restrictions	-0.38	0.48
Boot Camp	1.32	0.84
Community Service	-0.79	-0.29
Costs	0.15	-1.60
Electronic Monitoring	0.67	0.59
Fine	0.11	-1.90
Forfeit	0.52	-1.56
In Patient Treatment	-0.42	1.39
Intensive Supervised Probation	0.27	1.02
Jail	1.62	0.70
Mandatory Training/Education	-0.98	0.64
Mediation	-1.28	-0.87
Out Patient Treatment	-1.11	0.97
Periodic Detention	0.88	0.01
Prison	2.32	0.49
Probation	-0.70	0.30
Residential Community	0.41	1.25
Resitution	0.10	-1.30
Shame	-1.03	-0.50
Warning	-1.60	-0.60

[7] We also compared our WMDS solution to the straightforward MDS solution (i.e., not allowing individual judge weights). The WMDS solution is preferable on both statistical and substantive grounds.

Fines, costs, forfeiture, and restitution anchor dimension two at one end, and in-patient treatment anchors it at the other. We interpret the way sanctions are arrayed along this dimension as tapping into a treatment dimension. At one end of this dimension, the sanctions respond to perceptions of an offender's needs. For example, they call for the offender to commit to fundamental changes in behavior, perhaps through participation in substance abuse counseling, education, and/or intensive supervision. At the other end, the punishments are not primarily rehabilitative, but tend to be more pragmatic and chiefly financial in nature.

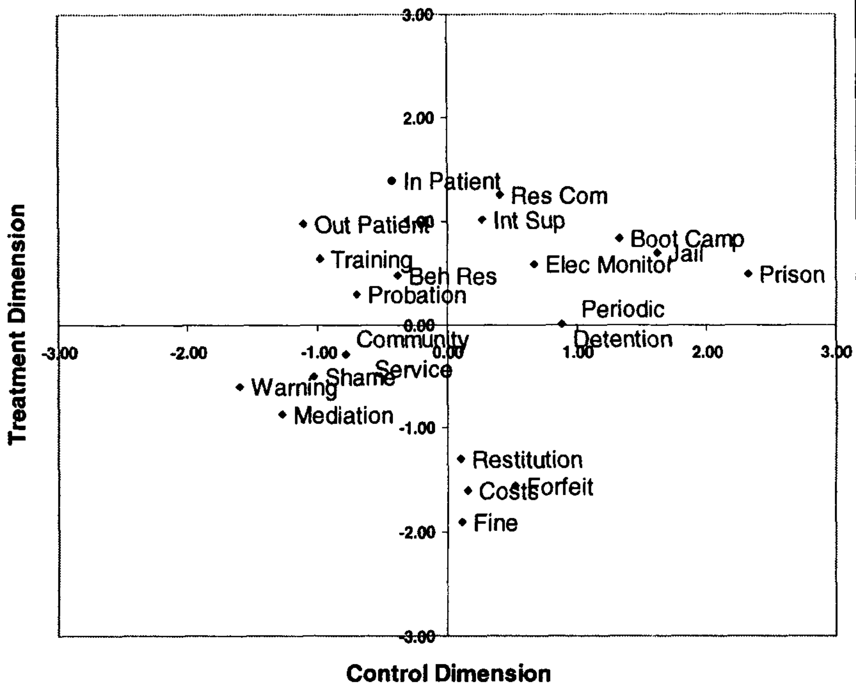
Our interpretation of the dimensions is consonant with the following observation of Morris and Tonry (180):

> The overarching question we address concerning all these community-based punishments is the extent to which it is possible to combine control purposes, aiming at minimizing the threat the criminal presents to society, with treatment purposes, aiming to train the criminal for conformity. . . . It is the central question of this book and merits restatement: To what extent can community-based punishments be combined with conditions of treatment to create punishments that both control and treat. . . .

We contend that judges, in comparing and contrasting the twenty distinct types of sanctions, implicitly consider the *degree of control* to be exercised over the offender as well as the *degree of treatment* to be offered. While these two aspects of sentencing have been discussed in the literature, the WMDS analysis provides a clear picture of how judges view alternatives in terms of these traditional dimensions.

As Young (1987) noted, the WMDS approach is based on the premise that "a picture is worth a thousand numbers." Figure 3-1 presents our "picture." It indicates that *prison* is cognitively close to *jail* and *boot camp* and is quite distant from *warning* and *shame tactics*. Figure 3-1 also enables us to determine which sanction types are logical opposites. For example, *boot camp* has a relatively high degree of control and treatment, while *mediation* offers little in the way of either control or treatment.

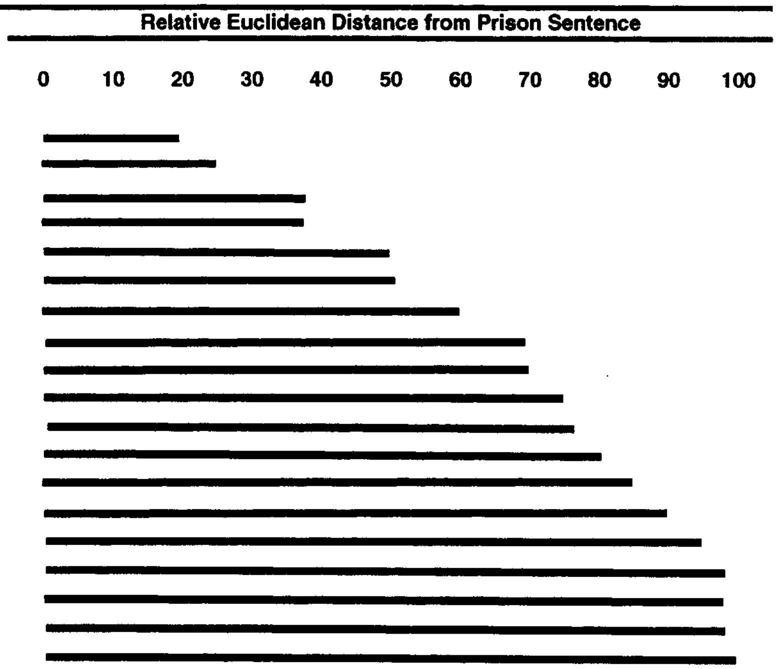
Figure 3-1: Two Dimensional Configuration



One of the advantages of the WMDS model is that it can illustrate "cognitive distance." To illustrate this cognitive distance, we computed the Euclidean distance between prison and the remaining 19 alternative sanctions, with the maximum distance normalized to 100 units (Figure 3-2). The most divergent sanctions are prison and fine (a distance of 100). All of the remaining values are percentages of the maximum distance: *jail* and *boot camp* are cognitively close to *prison*, while *outpatient treatment* is further away than *educational training*, *community service*, and *probation*. Monetary punishments are farthest from prison in the judges' cognitive space. The results in Figure 3-2 provide a picture of the "cognitive distance" a judge must move in considering imposing any sanction other than prison.

Figure 3-2: Relative Euclidean Distance from Prison Sentence

Sentencing Alternative	Relative Distance
Prison	0.0
Jail	17.9
Boot	26.5
Periodic Detentino	37.8
Electronic Monitoring	38.0
Residential Community	49.1
Intensive Supervision	51.2
Behavioral Restrictionis	61.9
Probation	69.2
In Patient Treatment	71.6
Educational Training	75.9
Community Service	77.3
Outpatient Treatment	80.7
Shame Tactics	84.0
Forfeiture	88.4
Warning Measures	94.4
Costs	97.2
Mediation	97.5
Restitution	97.7
Fine	100.0



The Sentence Type Dependent Variable

We can readily intepret the cognitive map displayed in Figure 3-1. First, prison – the quintessential control sentence – is isolated from all other sanctions. It represents a relatively extreme sanction. The sanctions closest to *prison* (e.g., *jail, boot camp*) involve a lesser degree of incarceration and/or control, but are seen by judges as essentially similar. Likewise, analysis shows that judges view other groups of sanctions as related to each other. Sanctions related to monetary penalties (e.g., *fines, costs, restitution*), rehabilitation (e.g., *in-* and *out-patient treatment*), and censure (e.g., *warning measures* and *shame tactics*) form other clusters of related sanction types. Our spatial model provides a means to differentiate and define four categories of non-prison (or intermediate) sanctions based on the way judges actually view the sentence type decision.

The result is a sentence type decision comprised of five categories (four groups of intermediate sanctions plus prison) to replace the basic in/out dichotomy.

To confirm our interpretation of Figure 3-1, we conducted a hierarchical scaling analysis of the two-dimensional coordinates from Table 3-3. This analysis shows that sanction types in each of the four quadrants of Figure 3-1 cluster together to form four distinct sets of alternative sanctions, with prison being our fifth sanction type.

1. **Prison**
2. **Restraint** -- Jail, Boot Camp, Periodic Detention, Electronic Monitoring, Residential Community, and Intensive Supervised Probation
3. **Rehabilitation** -- In-patient treatment, Out-patient Treatment, Education/Training, Probation, and Behavioral Restrictions
4. **Rebuke** -- Warning Measures, Shame Tactics, Mediation, and Community Service
5. **Restitution** -- Fines, Costs, Restitution, Forfeiture

These groupings suggest that judges perceive the alternative sentencing landscape in terms of five basic types of sentences. Furthermore, since each of the four non-prison sentence types occupies one of the four quadrants, we are confident that the two orthogonal dimensions meaningfully partition the alternative sentencing options into four types. However, it is particularly noteworthy that there is no single dimension along which the twenty ideal sentence types can be arrayed.

Constructing the Sentence Type Dependent Variable

Actual Sentencing Outcomes

We hypothesize that judges perceive available sanctions in terms of two distinct dimensions, which yield, in turn, four types of non-prison sanctions. To test this notion we assembled a data set of 1,509 cases disposed in 1995 in twelve large Michigan counties.[8] Local probation offices in the twelve counties provided us the *Judgment of Sentence* for each of these 1,509 cases, which detailed the terms and conditions of the community-based sentences/punishments of these non-prison bound offenders.[9]

We examined the data and sorted it to distinguish sanctions that were 'pro forma' from those that required specific utterances from the judge. Sanctions deemed to be pro forma were those "hard wired" into the county's particular *Judgment of Sentence* form, and hence given in almost every instance. Examples of such pro forma sanctions include: payment of court costs or supervision fees, and certain standard behavioral restrictions (e.g., periodic urinalysis, unsupervised probation, denial of out-of-state travel, and approved residence). Given that nearly 100 percent of offenders in our sample received *behavioral restrictions*, we removed this category of sanction from the analysis.

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[8] See Chapter 1 for a complete description of the data set.

[9] Because the *Judgment of Sentence* is a non-standard form with wide variation in appearance and composition among the counties, we conducted a pilot test on a random sample of cases from each county to ensure the tractability of the coding instrument. The final intermediate sanctions' coding sheet identified numerous sanction types within eight general categories: continuous confinement; partial confinement; monitoring/compliance; banning of legal conduct; economic measures; work-related measures; instruction; and treatment. These eight categories served as an initial framework with which to classify similar sanction types.

We focused instead on sanctions imposed by the judge following some deliberation.

After removing the pro forma sentences we identified 33 distinct community sanctions in our sample. Using the results from our multidimensional scaling as a guide, we matched the 33 sanctions to the 18 remaining ideal types of non-prison sanctions (behavioral restrictions were removed) and sorted by quadrant (Figure 3-3).[10] For example, the requirement that offenders obtain a GED or seek vocational training was classified as educational training within the Rehabilitation quadrant. Likewise, we considered day reporting, home curfew, house arrest, or weekend detention variations of periodic detention, and classified them as Restraints.

---

[10] Offenders in Michigan received a wide variety of sanctions falling within each of the four quadrants. It is noteworthy, however, that offenders in our sample did not receive sanctions that corresponded to intensive supervision, residential community center, mediation, shame, warning, or forfeiture. Whether this indicates that these sanctions are not used in Michigan or whether they did not occur during 1995 is impossible to determine.

Figure 3-3: Connecting Community Sanctions to the Ideal Types

Rehabilitation

Behavioral Restrictions
- Breath Testing
- Physical Testing (AIDS)
- Urinalysis

Educational Training
- GED
- Life Skills
- Vocational

Inpatient Treatment
- Inpatient Treatment

Outpatient
- AA or NA
- Aggressive Behavior Therapy
- Alcohol Treatment
- Drug/Substance Abuse
- Outpatient Treatment
- Parent Counseling
- Participate in Assessment
- Psychological
- Victim's Impact Panel

Probation
- Probation *(Face-to-Face; Monthly)*

Restraint

Jail

Boot Camp
- Boot Camp

Electronic Monitoring
- Electronic Tether

Intensive Supervision

Periodic Detention
- Day Reporting
- Home Curfew
- House Arrest
- Weekend Detention

Residential Community Center

Rebuke

Community Service
- Community Service
- Community Service if not Working
- Work Crew

Mediation

Shame

Warning

Restitution

Costs
- Costs
- Child Support Fees
- Fees (Forensic, Attorney)

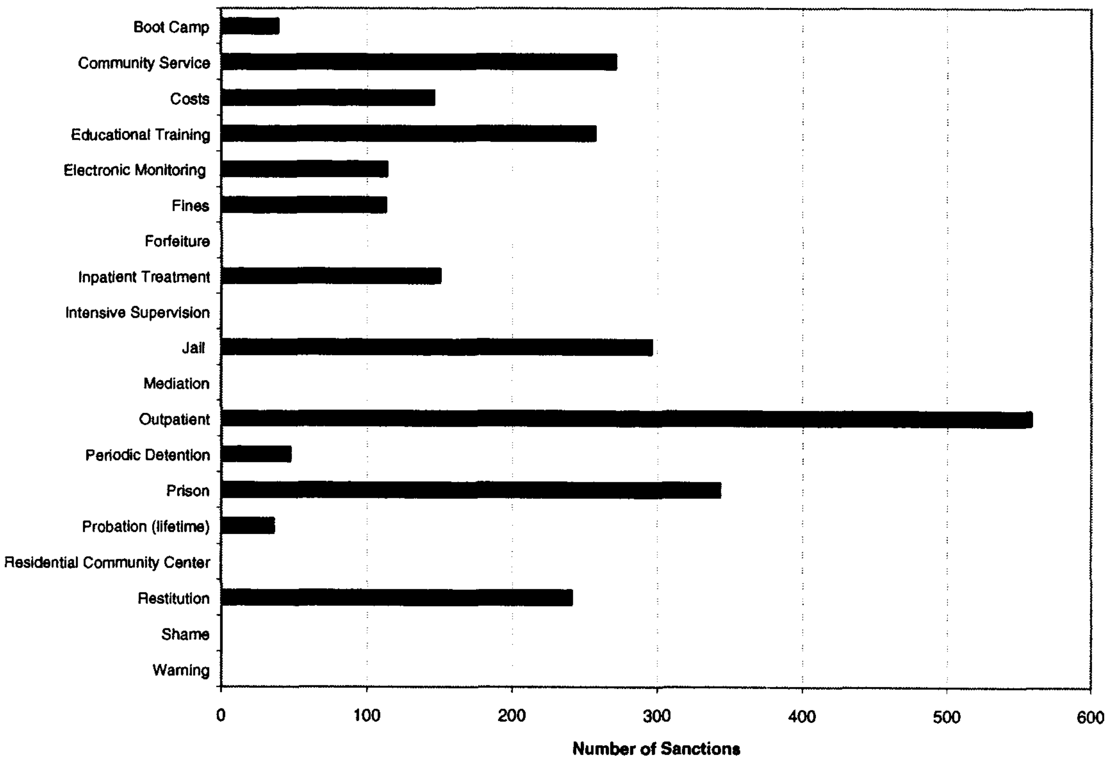
Fines
- Fines

Forfeiture

Restitution
- Restitution

Figure 3-4 presents the frequency with which each of the 19 ideal sentence types (18 non-prison sanctions and prison) occurred in the 1995 sample. The most frequently given sanction type for the 1,509 offenders was *outpatient treatment* (558 offenders), followed by *prison* (343), *jail* (296), and *community service* (271). The figure illustrates that offenders received a variety of sanctions that incorporated sentence types from each of our four quadrants (Restraint, Rehabilitation, Rebuke, and Restitution).

Figure 3-4: The Frequency of Occurrence of 19 Intermediate Sanctions



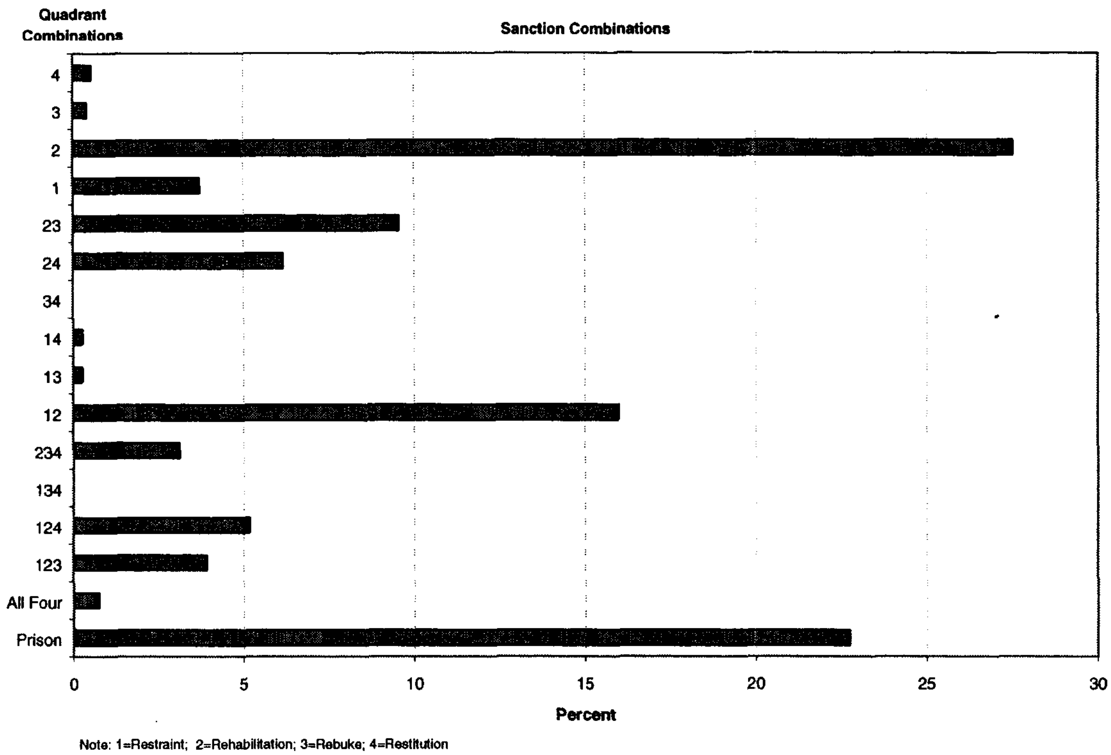
Overall, the 1,509 offenders received 2,611 sanctions, an average of 1.73 sanctions per offender. Clearly, offenders typically received a "package" or combination of non-standard sanctions at sentencing. That multiple sanctions are often imposed has traditionally been the principal challenge to modeling the intermediate sanction process, because it raises the question of whether it is possible to scale multiple sanctions that may be partially complementary and partially competing. For example, an offender might receive some form of outpatient treatment (Rehabilitation) and also a fine (Restitution). Clearly, a single dimension of severity doesn't work. The strength of the current model is that it conceptualizes sentencing as multi-dimensional, and therefore accommodates the full spectrum of sanctions.

Organizing the Sanction Types

Figure 3-5 provides an overview of the sixteen sentence combinations possible under this conception of the sentence type decision.[11] The most prevalent pure sanction was Rehabilitation, followed closely by Prison, those offenders who received both Restraint and Rehabilitation (quadrants 1 & 2), and those who received Rehabilitation and Rebuke (2 & 3). Although we found no evidence of the 1/3/4 or 3/4 combinations, it is clear that offenders received a diverse range of sanction packages that encompassed different types of sentencing goals.

[11] The four types of sanctions yield 15 potential combinations of the various quadrants—four things taken four at a time plus four things taken three at a time plus four things taken two at a time plus four things taken one at a time. In addition to the fifteen possible combinations we add Prison.

Figure 3-5: Quadrant Locations of Sample Community Sanctions



To make estimation feasible, we condense the sixteen possible sanctions into their primary categories: Prison, Restraint, Rehabilitation, Rebuke, and Restitution. This approach gives us five categories that are mutually exclusive and exhaustive. We placed each offender into one of the five categories based upon the 'dominant sanction type' the offender received. In terms of the quadrant combinations we used the following coding rules to construct our dependent variable:

Prison: all offenders who receive a prison sentence

Restraint: quadrant combinations 1, 12 (245 offenders), 13, 14, 123, 124, 134, 1234

Rehabilitation: quadrant 2

Rebuke: quadrant combinations 3 (6 offenders), 23 (132 offenders), *34 (0 offenders)*, 234 (49 offenders)

Restitution: quadrant combinations 4 (7 offenders), 24 (91 offenders)

As we can see, the Prison and Rehabilitation categories capture offenders who received a sanction solely within a single relevant category (i.e., prison or rehabilitation). The other three categories capture the "combination" sentences. An offender is classified in the Restraint set if their sanction included some real jail time. Empirically, the largest group in this category represents a combination of Restraint and some form of Rehabilitation. Offenders in the Rebuke category are primarily those who received community service along with some type of Rehabilitation. The Restitution category consists primarily of those who received both a form of restitution and some type of Rehabilitation.

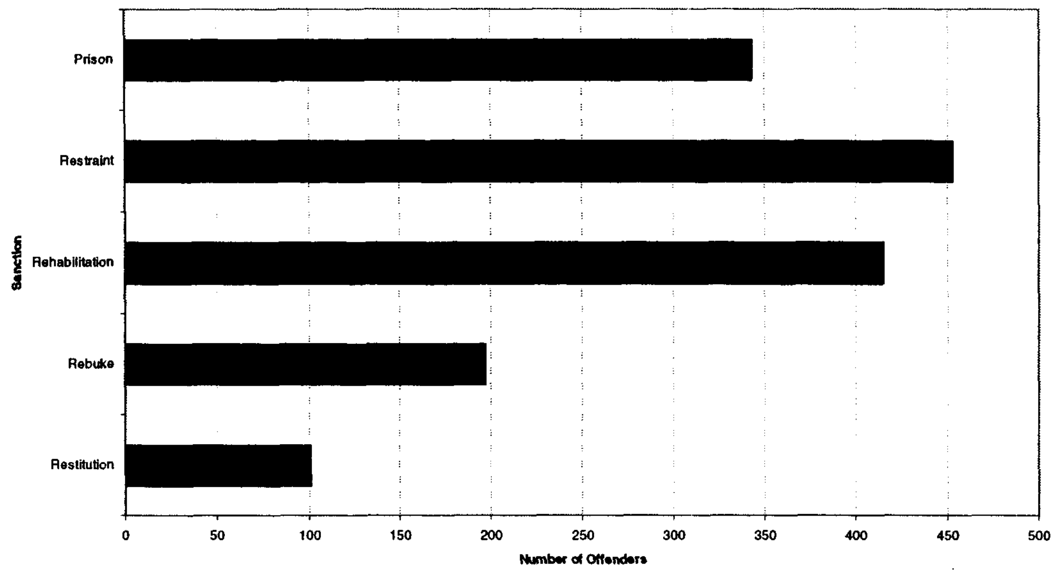
Table 3-4 displays the relationship between the five-category sentence type dependent variables and the sixteen possible quadrant combinations of sentencing outcomes we discussed earlier. In sum, the 343 offenders sentenced to prison are placed in the Prison outcome. Restraint consists of all offenders whose sentence included a sanction from quadrant 1 (e.g., *jail*, *boot camp*, *electronic monitoring*). It is noteworthy that of the 453 offenders in this category, only 56 received just a Restraint. Of those who received multiple sanctions, all but 8 individuals in the Restraint outcome received some form of the Rehabilitation component (quadrant 2). The Rebuke quadrant contains 6 individuals who received a Rebuke-only sentence (quadrant 3); the vast majority also had a Rehabilitative sanction imposed. In the Restitution quadrant, 8 people received a Restitution-only sentence (quadrant 4), while the remaining offenders received a Restitution/Rehabilitation combination. Finally, the Rehabilitation category consists of those offenders whose sentence involved elements solely from the Rehabilitation quadrant.

Table 3-4: Composition of Sentence Type by Quadrant Combination

Sentencing Outcome	Categories of Dependent Variable: Prison	Restraint	Rehabilitation	Rebuke	Restitution	Total
Prison	343					343
1234		11				11
123		59				59
124		78				78
234				47		47
12		241				241
13		4				4
14		4				4
24					93	93
23				144		144
1		56				56
2			415			415
3				6		6
4					8	8
Total	343	453	415	197	101	1509

These five categories will serve as our dependent variable for the subsequent analysis of sentence type. Approximately 25% of the offenders fall into the Prison category, 30% into the Restraint category, 25% into the Rehabilitation category, and 13.5% into the Rebuke category. The remaining 7% fall into the Restitution category (Figure 3-6).

Figure 3-6: Distribution of Offenders in 5 Categories of the Dependent Variable

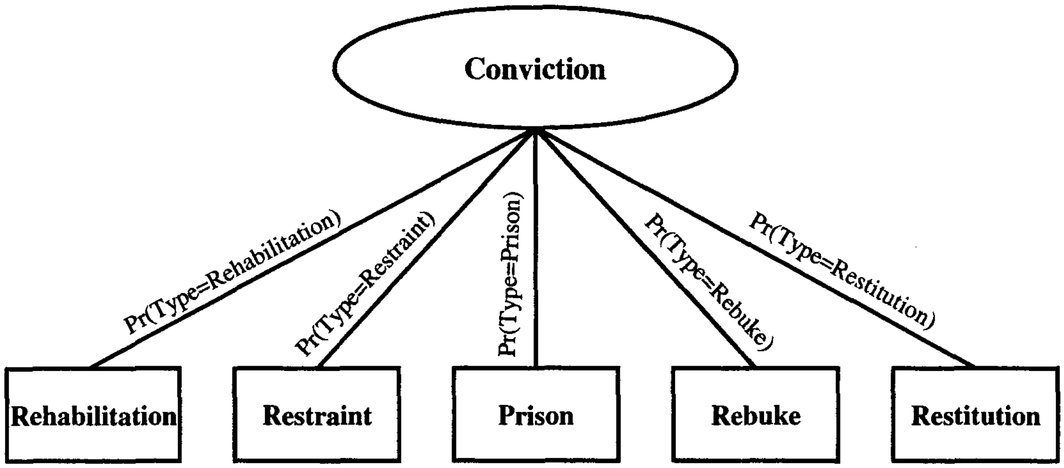


Conclusions

Many have called for a continuum of sanctions that encompasses all sentencing options. Harland (1993, 40), a major proponent of this concept, defined a continuum of sanctions as "...a variety of coercive measures taken to enforce societal standards, ordered on the basis of a fundamental common feature . . ." Our analysis suggests that judges do not arrange sentences on a single dimension, but on two dimensions, control and treatment. In this chapter we have provided a characterization of the sentence type decision. Figure 3-7 provides a visual representation of the type of decision scheme we have described. As one can see, judges choose between five types of decisions following conviction. Our characterization of the sentence type decision moves beyond the simple, and often used, "in/out" decision by incorporating four non-prison outcomes, what we call Restraint, Rehabilitation, Rebuke, and Restitution.

This conceptualization encompasses the complementary, and sometimes competing, sentencing goals judges confront, and the complexity inherent in imposing non-prison sanctions at the time of sentencing. In our subsequent empirical work, we will develop a set of procedures to estimate the probability of each of these outcomes.

Figure 3-7: First Stage of the Sentencing Decision



CHAPTER 4 – THE SENTENCE SEVERITY DECISION

Introduction

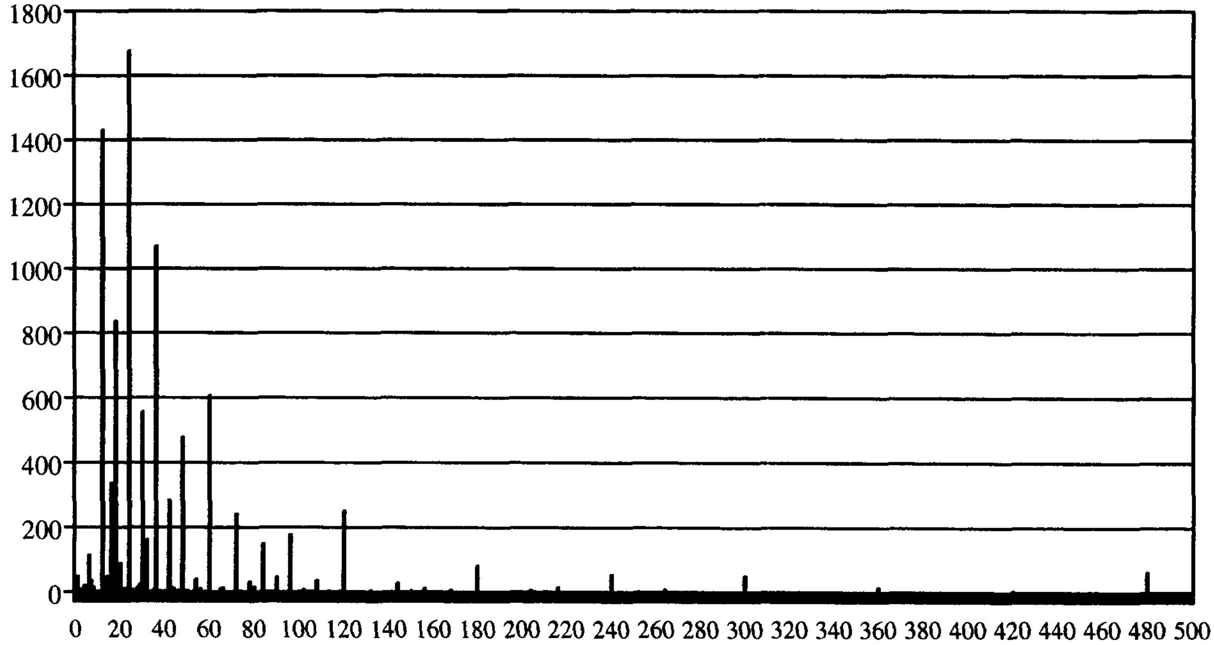
Measurement matters. Measuring the severity of prison sentences is fundamental to analyzing and interpreting sentencing practices in U.S. courts. To understand the sentencing behavior of judges, it is necessary to find a measure of sentence severity that is covered by a consistent theory of judicial decision-making. Since convicted offenders serve a period of incarceration usually stated in months or years, the uttered sentence offers the obvious choice. Indeed, many see the uttered sentence as the natural dependent variable for describing the severity of prison sentences. In this chapter, however, we argue that using months or years as a measure of sentence severity is not as straightforward as it might first appear.

Actual sentence length may not be consistent with a continuous "scale of severity." Consider the distribution of prison sentences among 9,586 offenders convicted in the State of Michigan in 1995. As one can see in Figure 4-1, prison sentences ranged from 1 month to 480 months.[1] Michigan judges are free to assign any term of days, months, or years they wish. But it is clear that a small number of sentences predominate: 12, 18, 24, 30, 36, 48, 60, 72, 84, 96, 120 and 180 months. These ten sentence lengths account for over 78% of sentences issued in 1995. In addition, there are prominent "spikes" at 240, 300,

[1] The data for Figure 1 include all 1995 Michigan felony convictions in which the offender was sentenced to state prison as opposed to county jail/probation. The statutory maxima for felonies range from two years to Life (or term of years).

360, and 480 months. The interval between the prominent sentences varies over the range of sentences, increasing in intervals of six months from 12 to 36 months, of twelve from 36 to 96 months, of twenty-four from 96 to 120 months, of sixty from 120 to 360 months, and by an interval of one hundred and twenty months thereafter. Recognizing these patterns—the small number of selected sentences as well as their irregular spacing—is of more than theoretical interest. It is fundamental to designing and evaluating sentencing policy.

Figure 4-1: Distribution of Prison Sentences in Michigan in 1995



Conclusions reached by the research and policy community concerning consistency, disparity, and proportionality in sentencing are clearly affected by how the dependent variable—sentence severity—is measured. The lack of consensus about what the data say is a reminder that there continues to be considerable debate and experimentation in the literature about how to best measure the basic incarceration outcome. We contend that an important foundation of credible statistically based inferences of sentencing outcomes is explicit recognition of the *sentence* decision-making process. Efforts to model felony sentencing should be based on how judges actually perceive and enact their choices.

Our argument is presented in four sections. First, we examine earlier efforts to explain and develop a rationale for the observed pattern of judges selecting from among a limited or "preferred" set of sentencing options. In the second section we review the two major research strategies employed to measure sentence severity. In section three we offer a measure of sentence severity based on theoretical responses to three fundamental questions posed by observed patterns of judicial sentencing as shown in Figure 4-1:

- Why do judges choose from among a limited number of sentencing options?
- What explains the prevalence of certain prominent sentences?
- What accounts for irregular spacing between prominent sentences?

In section four, we develop a measurement model for sentence severity.

Sentencing by the Numbers

The notion that there are "irregularities" in sentencing is not new. Writing in the June 20, 1895 issue of *Nature*, Francis Galton (174) remarked: "it would have been expected that the various terms of imprisonment awarded by judges should fall into a continuous series. This is not the case . . ." Galton's observation in the 1890s regarding the "extreme irregularity of terms of imprisonment" (175) applies with equal force to sentencing practice today, a full century later.

Assessing a diagram similar to Figure 4-1, Galton (1895, 175) went on to say:

> It is impossible to believe that a judicial system acts fairly, which, when it allots only 20 sentences to 6 years imprisonment, allots as many as 240 to 5 years, as few as 60 to 4 years, and as many as 360 to 3 years. Or that, while there are 20 sentences to 19 months, there should be 300 to 18 months, none to 17, 30 to 16, and 150 to 15. . . . *Runs of figures like these testify to some powerful cause of disturbance which interferes with the orderly distribution of punishment in conformity with penal deserts.* (emphasis added)

Galton contended that these gaps (e.g., many sentences are given for 15 and 20 years but none for 16, 17, 18, and 19) do not occur by chance, and he believed an effort must be made to understand the "disturbing cause or causes that stand in the way of appropriate sentences" (Galton 1895, 175).

Galton (1895, 176) summed his discussion of sentence "irregularity" this way:

> I will conclude by moralizing on the large effects upon the durance of a prisoner, that flow from such irrelevant influences as the association connected with . . . *the unconscious favour or disfavour felt for particular*

> *numbers.* These trifles have been now shown on fairly trustworthy evidence to determine the choice of such widely different sentences as imprisonment for 3 or 5 years, of 5 or 7 years, and of 7 or 10, for crimes whose penal deserts would otherwise be rated at 4, 6 and 8 or 9 years respectively. (Emphasis added)

Profound policy consequences follow from observed judicial preferences for only a limited number of sentence options. The goal of individualized sentencing, fine-tuned to the circumstances of each offender, may be compromised. Questions of public safety arise if offenders receive less than their just deserts. At the same time, if "favor for particular numbers" leads to sentences that exceed penal deserts, then prisoners suffer unduly, and scarce, expensive prison space is squandered because of a "quirk" of judicial decision-making.

Fitzmaurice and Pease (1986) explored two theoretical rationales for observed irregularities in felony sentences. First, they looked at the possibility that the pattern is a matter of "just noticeable differences." Using the Weber-Fechner Law, which holds that just noticeable differences in the intensity of various responses are proportional to the intensity of the stimulus, they investigated the proposition that the differences between observed sentences are proportional. However, as an examination of the differences between prominent sentences in Figure 4-1 reveals, such proportional increases are <u>not</u> the case: the jump from 12 to 18 months represents an increase of 50%, that from 18 to 24 a 33% increase, from 24 to 30 a 25% increase, from 30 to 36 a 20% increase, from 36 to 48 is 33% again, from 48 to 60 months is 25%, from 60 to 72 a 20% increase, from 72 to 84 is 16%, from 84 to 96 represents a 14%

increase, from 96 to 120 months is 25%, and from 120 to 180 months we're back to a 50% increase.

Fitzmaurice and Pease (1986, p. 106-7) also investigated the idea of "preferred numbers."

> An alternative way of looking at the choice of length of sentence would be to take the idea of preferred numbers and assume that the choice of sentence length, expressed in numbers, had to do with some property of the numbers themselves. Indeed, if there were not a marked preference for certain sentence lengths, one would expect that all sentence lengths would be imposed and the gaps in [Figure 1] would not have appeared.

They then asked whether the scale of preferred numbers can be generated by some mathematical formula, echoing the work of Baird and Norma (1975). They did not successfully obtain a formulaic generator for the preferred numbers, except to note that judges appear to "operate with multiples of 3 with short sentences, with multiples of 6 in the middle range sentences, and on a scale based on 12 for long sentences." (1986, p. 108). The changing nature of the scale of preferred numbers led Fitzmaurice and Pease to hypothesize that judges employ a sentencing scale where "no sentences are more than 25 percent or less than 10 percent higher than the sentence below . . ." (p. 112). By extension, they seemed to suggest that judges use an approximate and underlying severity scale that is different from an interval/ratio scale measured in terms of months of incarceration.

While Fitzmaurice and Pease failed to uncover a mathematically derived severity scale that fully and accurately describes observed sentencing practice, they contended their analysis does have heuristic value for policy development:

> What the pattern of preferred numbers and jnds (just noticeable differences) shows is rough justice, not injustice. Judges increase sentence length apace with what they regard as culpability. They are approximate in their sentence lengths because they are approximate in the assessment of culpability: in this sense the crudity of assignation of sentence length does not seriously distort the proportionality between culpability and sentence length. Nonetheless there are important policy implications of the work for penal policy. First, the number preferences in sentencing should be taken into account in sentencing legislation. Second, the use of conventional number preferences in sentencing choice probably protects sentencers from thinking about what a sentence means in practice, and the implications of this need to be explored. (p. 113)

The policy implications of "conventional number preferences" are at least three-fold. First, the potential for inconsistency—or at least the appearance of inconsistency—is rampant. If, for example, the "just" sentence for an offender is 180 months, but the judge goes down one preferred sentence level for one offender and up one preferred sentence for another offender, the difference between the two sentences could be as much as ten years, and a difference of ten years for similarly-situated offenders looks like inconsistency. Second, inconsistency can easily become disparity if judges enhance the sentences of racial minorities relative to the sentences of racial majorities. In such instances, actual disparities could be quite substantial. Third, public support for state and federal initiatives to increase sentence length for violent offenders puts considerable pressure on available prison space. If judges increase the average sentence for all violent offenders by *one sentencing unit*,[2] the actual period of

[2] The suggestion is that sentences are meted out in units that differ in metric from actual months. In the subsequent sections, we will discuss the many ways in which sentencing units have been calibrated.

incarceration for violent offenders entering prison increases substantially more than *one year* on average.

Existing Approaches to Measuring Sentence Severity

For the research community, conceptualizing sentence severity is critical to choosing a dependent variable. Most empirical sentencing research uses statistical techniques that require an interval measure of severity. However, as we noted, it does not appear that uttered sentences constitute an interval scale.[3] As a consequence, the field of sentencing research is marked by wide ranging efforts to find a dependent variable that "works." These efforts led Hagan and Bumiller (1982, p. 10) to note:

> One problem in the cumulation of the results from sentencing studies is that they operationalize the dependent variable—sentence—in a variety of different ways. The only clear areas of agreement on this issue seems to be an implicit consensus that sentences can be ordered in terms of severity; the type of ordering applied, however, varies considerably from study to study.

That the extent of agreement within the research community about sentence severity is limited solely to *ordering* underscores the ongoing difficulty of finding a measure of severity that captures what judges are actually doing. If the metric of the dependent variable is not consistent with judicial sentencing practices, statistical models will be mis-specified, and will produce coefficient estimates that

[3] Kerlinger (1992, p. 437-8) noted: "Interval scales possess the characteristics of nominal and ordinal scales, especially the rank-order characteristic. In addition, numerically equal distances on interval scales represent equal distances in the property being measured." He also observed: "the highest level of measurement is ratio measurement, and the measurement ideal of the scientist. . ." A ratio scale, in addition to possessing the characteristics of nominal, ordinal, and interval scales, has an absolute or natural zero that has empirical meaning. Insofar as sentencing is concerned, it is common to say that a sentence of 12 months is one-half the severity of a sentence of 24 months.

cannot be reliably interpreted. This, in turn, affects the validity of conclusions about such perennial policy issues as consistency, disparity, and proportionality in sentencing.

What have we learned from the last 30 years of experimentation in measuring and scaling sentence severity? Hagan and Bumiller (1983, 11) suggested that "[i]n order to cumulate findings [from the sentencing literature], it is necessary to adopt a common standard, or a variety of standards, to be used in some meaningful way across studies." We agree, and distinguish past sentencing research according to which of two primary methods of measuring sentencing severity is used: actual sentence length, or subjectively-derived indexes.

Actual Months of Incarceration

The most widely used method measures severity in terms of the number of months (or years) of the offender's sentence (e.g., Chiricos and Waldo 1975; Kelly 1976; Clarke and Koch 1977; Lizzotte 1978; Zalman et al. 1979; Thomson and Zingraff 1981; Miethe and Moore 1986; Crew 1991; Steffensmeier et al. 1998; Engen and Gainey 2000). The advantage of this measure is that it appears on the individual's record, and it is (holding aside the issues of pretrial time served, good time, and parole) the length of time the individual must serve.[4] The problem, however, is that it may not be an interval scale.

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[4] A problem that frequently arises in the context of the indeterminate sentence is whether to count the minimum, maximum, or some combination (e.g., mean of the two).

Many argue that there is more to a sentence than merely the elapsed time of incarceration. At the very least, one need also consider the length of supervised probation, fines, and/or intermediate sanctions. The split sentence (i.e., one in which the offender receives both incarceration and probation) is an important focus for criticism. It is possible to simply add the term of incarceration to the term of probation. Myers and Talarico (1987), for example, proposed a transformation that weights the two and yields an overall measure of severity. It is important to note, however, that they analyzed this new dependent variable separately from pure incarceration; it is not directly comparable to their measure of pure incarceration.

Observers have also questioned whether the actual months of incarceration constitute an interval or ratio scale. That is, is a sentence of 60 months five times more serious—in the mind of the judge[5]—than a sentence of 12 months? Is a sentence of 120 months—in the mind of the judge—twice as serious as a sentence of 60 months? The answer, for those raising the question, is generally no. Furthermore, the lack of empirical support of regression models of sentencing severity that use months of incarceration may be a consequence of the lack of interval-ness of actual months (e.g., Blumstein et al. 1983).[6]

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[5] We wish to make a distinction between the judge's view of the sentence and the offender's experience of serving the sentence. At issue at this point in the argument is what the judge thinks about sentence severity. As such, the paper complements those that look at the offender's view of sentence severity (e.g., Polinsky and Shavell, 1999).

[6] See also: Engen and Gainey, 2000.

Those using actual sentence length as the dependent variable also employ variations seeking to create interval-ness via a mathematical transformation. Several analysts use a logarithmic transformation. For example, Wheeler, Weisburd, and Bode (1982, 653) used the natural log, because it "serves to pull the longest sentences closer to those of six or twelve months, better approximating the actual intervals of the decision that judges make." But at least one analyst (Brantingham, 1985, 300) took the opposite perspective and squared the actual sentence "to accentuate the difference between short and long jail sentences." The lack of consensus over how to measure months of incarceration (e.g., actual, log, squared) has spurred development of alternative scales of sentence severity.

Indexes of Sentence Severity

In response to criticisms levied against using actual sentence as the dependent variable (i.e., it ignores non-incarceration penalties and it is not an interval scale), a number of analysts argue that judges possess a *latent severity scale* along which all sentencing options are compared. All information relevant to the sentencing decision is summarized in placing the offender on this underlying scale. Because the scale is unobservable, this method assumes judges make decisions *as if* each offender were placed on such a scale. After placing the offender on the latent scale, the judge translates the scale position into actual months of incarceration.

To operationalize this latent severity scale, numerous indices of sentence severity have been developed that seek to, (a) include all sentencing outcomes (e.g., suspended sentences, fines, probation, and incarceration) on the same scale, and (b) weight each of these options to introduce interval-ness to the scale. There are two widely used approaches to this type of scaling.

The first scaling technique, the Administrative Office model, draws on the subjective experience of the researcher, and was initially developed by the Administrative Office of the U.S. District Court (1967). Tiffany, Avichai, and Peters (1975) (hereafter TAP) used "a slightly modified version of a scale created by the Administrative Office" to express sentence severity "quantitatively."[7] The TAP index, which consists of 12 levels weighted to reflect overall severity, is presented in Table 4-1.

[7] They report that McCafferty developed the scale in a paper entitled "Weighting," presented at the 96th Congress of Corrections, 8/30/66, Baltimore, Maryland.

Table 4-1: The TAP Scale

Sentence	Scale Value
Suspended Sentence Probation w/o supervision	0
Fine only; Probation with supervision, 1-12 months	1
Probation with supervision, 13-36 months	2
Probation with supervision, over 36 months	3
Split sentences, Delayed probation	4
Imprisonment, 7-12 months	5
Imprisonment, 13-24 months	7
Imprisonment, 24-36 months	10
Imprisonment, 37-48 months	12
Imprisonment, 49-60 months	14
Imprisonment, 61-120 months	25
Imprisonment, over 120 months	50

Cook (1973) modified the TAP scale by multiplying the weights by four and developing combinations of punishments weighted from 0 to 100. The scale was further modified by Uhlman (1977, 1978, 1979). His measure of sanctioning severity "de-emphasizes the breaking point between prison and non-imprisonment, and instead taps subtler differences along a broader sanctioning continuum." Since Uhlman's measure consists of over 90 categories, we rely on his overview (Uhlman 1977, 22):

> Joining past theory and practice to the data at hand results in a detailed 93-point sentence severity scale that makes meaningful distinctions between and among degrees of deprivation of individual freedom and the varying severity of non-prison sanctions. The scale breaks down into the following general categories (in increasing order of severity): (1) suspended sentences only (scale value 1); (2) fines only (scale values 2-6); (3) suspended sentences and fines (scale values 7-11); (4) probated sentences and probated sentences with fines (scale values 12-31); and (5) active jail sentences (scale values 32-93). Since all but two of the 93 categories are used, it is evident that judges both perceive and respond to a wide variety of sentencing possibilities available to them.

Uhlman interpreted the resulting scale as an interval measure of sentence severity.[8]

The second major scaling strategy, consensual scaling, uses opinion surveys to assess how citizens and/or judges perceive potential penalties, which are then used to construct a severity or seriousness scale based on public perception (e.g., Alpert and Apospori 1993; Buchner 1979; Crouch 1993;

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[8] Uhlman (1977, p. 45) noted that even though "there is an inevitable degree of arbitrariness in the ranking scheme, it is appropriate to think of this scale in interval terms." He went on:

Sentence severity as measured here is most precisely an ordinal scale. The index is, however, open to interval interpretations. With the expectation that the results will be roughly linear to the scale, we may take advantage of stronger interval statistical techniques. While some valid ordinal transformation of the scale might be possible, it is unlikely to change the results significantly.

Erickson and Gibbs 1979; Petersilia and Deschenes 1995; Sebba 1978; Sebba and Nathan 1984; Spelman 1995; Tremblay 1988). Tremblay (1988) noted, "Penal severity scales provide . . . a reasonable, if only tentative, basis for calculating current exchange rates between qualitatively incommensurable penalties (probation, community work, fine, prison, etc.)."

A perceptual study of penal metrics by Buchner (1979) illustrates the strategy. Beginning with a statement of purpose, "to create an interval scale measuring the comparative severity of types of criminal sentences," she noted:

> No successful attempt to place sentences on an interval scale has been made thus far. This situation is remarkable in view of the fact that no sophisticated or reliable comparisons based on severity of sentence can be made without such a tool (182)

Looking for such a scale, she offered the following rationale:

> To have any validity, the ordering of severity should be rooted in either a consensus of community feeling, in the perceptions of those who sentence or in the perceptions of those who are sentenced; otherwise it is an arbitrary and therefore suspect order (182).

Drawing on opinions of 58 judges from a Common Pleas Court in a large metropolitan city, Buchner compared sixteen sentences (divided into three groups) using Thurstone's Case % Scale Score Program. The survey results provided estimates of a scale measuring the severity that judges attribute to different types and lengths of sentences.

Scales purporting to unveil latent severity, whether based on the Administrative Office approach or consensual scaling, raise three fundamental issues. First, they differ on how many sentencing options a judge considers.

The TAP scale focuses on 12 sentencing options, the Uhlman scale identifies over 90 options, and the Buchner scale 16 options. Second, each scale offers a different view of the relative severity of punishments. If one accepts these indices as interval (or ratio) scales, the relative magnitude of various sentences is quite different among the alternative scales. For example, the TAP scale assigns weights of 5 and 14 to 12 and 60 months respectively, the Uhlman scale assigns weights of 44 and 78 to these outcomes, and the Buchner scale 5.5 and 26.9. Finally, these scales remain subjective, and don't offer a compelling line of theoretical argument to defend the assigned weights.

This review of techniques pursued by the research community to measure sentence severity shows basic conceptual challenges for measures based on actual months, as well as for subjective indices. Table 4-2 illustrates the differences by comparing months of incarceration with five existing scales of sentence length.

Table 4-2: A Sample of Existing Sentencing Severity Measures

Months of Incarceration	Tiffany	LaFree	Hagan, Nagel Albonnetti	Uhlman	Buchner
0	0	0	0	0	0
1-3	3	4	4	32	.56
4-6	3	4	4	33	2.20
7-9	3	4	6	33	3.85
10-12	5	6	6	44	5.50
13-18	7	8	8	44	7.15
19-24	7	8	8	54	10.45
24-30	10	10	10	54	13.74
31-36	10	10	10	64	17.03
37-48	12	11	12	72	20.35
49-60	14	12	14	78	26.93
61-72	25	14	17	83	33.52
73-84	25	14	17	86	40.10
84-96	25	17	21	88	46.69
97-108	25	17	21	88	53.28
109-120	25	17	21	91	59.86
121-144	50	21	30	93	66.49
144-180	50	30	30	93	79.71
181-240	50	30	30	93	99.56
241-360	50	30	30	93	132.71
361-480	50	30	30	93	198.57
481-600	50	30	30	93	264.43
120:12	**5.00:1**	**2.83:1**	**4.20:1**	**2.07:1**	**10.88:1**
120:60	**1.79:1**	**1.42:1**	**1.50:1**	**1.17:1**	**2.22:1**

Despite some similarities, these scales each tell a different story about the comparative harshness of various sentences. Presented at the bottom of the table is the ratio between the scale score for 120 and 12 months, and 120 and 60 months, respectively. Clearly, there is substantial variation in the ratios, especially when we look at the relationship between 10 year and 1 year sentences. This disagreement underscores the need for a means to assess and choose between the possibilities.

Conceptualizing Sentence Severity

In this section, we seek a theoretically grounded concept of sentencing severity that reflects the sentencing options actually considered by judges. Specifically, the rationale for the construct must explain why sentencing options are restricted; why, given restricted choices, certain prominent sentences tend to dominate; and why intervals between successive prominent sentences tend to increase.

We find three compelling explanations for the observed pattern of judicial sentencing outcomes shown in Figure 4-1. On the basis of a review of the cybernetic literature (e.g., Newell and Simon 1969; Simon 1979), we argue that the number of sentencing options in the judicial choice set will be drastically limited if for no other reason than to ease the burdens of calculation. In other words, the restricted choice set reflects the tendency of decision makers (including judges) to simplify choice situations by reducing the number of alternatives considered. In the sentencing context, we hypothesize that *judges consider and use only a relatively small number of sentencing options.*

To assess this proposition, Table 4-3 (drawn from Figure 4-1) presents the frequency distribution for the most prominent sentences.

Table 4-3: Twenty Prominent Sentences from 1995

Rank	Prison Sentence	Frequency	Percent	Cumulative Percent
1	24	807	19.30	19.30
2	36	509	12.17	31.47
3	18	350	8.37	39.84
4	60	338	8.08	47.92
5	12	336	8.03	55.95
6	30	248	5.93	61.88
7	48	236	5.64	67.53
8	120	138	3.30	70.83
9	72	120	2.87	73.70
10	96	107	2.56	76.26
11	16	81	1.94	78.19
12	180	80	1.91	80.11
13	32	77	1.84	81.95
14	84	76	1.82	83.76
15	40	70	1.67	85.44
16	480	62	1.48	86.92
17	240	53	1.27	88.19
18	300	49	1.17	89.36
19	42	46	1.10	90.46
20	6	45	1.08	91.54

As one can seen in Table 4-3, twenty sentences (in months) dominate judicial choices: 6, 12, 16, 18, 24, 30, 32, 36, 40, 42, 48, 60, 72, 84, 96, 120, 180, 240, 300, and 480. These twenty sentences account for over 90% of all sentences issued by Michigan judges. Either by convention, or to ease the drain on decision-making resources, Michigan judges—even in those cases where they have maximum discretion—appear to make use of a very small number of sentences.

Second, when reducing their choice set, judges do not include just any sentences; instead, they rely on a small set of prominent sentences. The process of identifying elements of the reduced choice set may be an example of what Kahneman, Slovic, and Tversky (1982) refered to as the availability heuristic.[9] The availability heuristic leads to several predictable decision-making biases. In the context of sentencing decisions, judges select options that are most easily retrievable. Therefore, even though judges can sentence a convicted felon to any period of incarceration up to the legislatively mandated maximum, they will recall some sentences more readily than others. *We hypothesize that those sentences that come to mind most easily will be the ones judges most frequently choose.*

Easily remembered sentences, such as those divisible by 6 or 12 (hence measured in either half or whole years[10]), account for the relative prominence of sentences of 6, 12, 18, 24, 36, 48, 60, 120, 180, 240, 300, and 480 months, and the relative absence of such sentences as 17, 23, 37, 52, and 93 months.

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[9] Kahneman, Slovic, and Tversky (1982, 11) defined the availability heuristic as follows: "There are situations in which people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind."

[10] There are four anomalous sentences in the list in Table 3-3: 16, 20, 32, and 40. Each of these sentences arises from a peculiarity of Michigan sentencing. Michigan uses an indeterminate sentencing scheme in which the minimum sentence is the effective sentence. People v. Tanner restricts the sentencing judge to minimum sentences that are less than or equal to two-thirds of the legislatively mandated statutory maximum (see Palmer and Zalman, 1978). The anomalous sentences 16, 32, 40, and 42 are two-thirds of the following statutory maxima: 24, 30, 48, and 60 months. Offenders receiving these sentences were given the maximum sentence allowed. If People v. Tanner were not in effect, it is our contention that the offenders would have been bumped to the next prominent sentence (i.e., 16->24, 20-> 30, 32->48, 40-> 60).

Third, when the fact that judges focus on a small number of alternatives is coupled with the fact that they focus on prominent sentences, we are led to the hypothesis *that the interval between the elements of the choice set (i.e., prominent sentences) is non-constant.* In other words, the elements in the reduced sentencing choice set are not equally spaced along some conventional interval scale. Instead, they represent "just noticeable differences (jnd)."[11] The jnd tells us the point at which the difference in the additional sentence becomes noticeable to the judge. The question arises as to what accounts for this increasing interval in the just noticeable difference.

Judges tend to abide by these uneven intervals, we argue, because they engage in a form of "psychological discounting" (Abelson and Levi 1985, 276). We assume that offenders experience disutility for each year they are incarcerated, and that a primary goal of sentencing is to achieve a particular level of *total* disutility for each offender. And we contend that judges discount the future when evaluating possible punishments. That is, they act as if the offender's disutility declines with successive years of imprisonment. Polinsky and Shavell (1999) suggested that this form of disutility is the case from the offender's perspective:

> because an offender becomes accustomed to prison life or because he ceases to care as much about those he knew from the outside. Also, the disutility associated with the first year of prison might be particularly great

[11] The difference between two stimuli that is, under properly controlled experimental conditions, 'just noticeable.' Given the variability of our sensory systems, a stable value cannot be found for the difference. Rather, the jnd is determined to be that difference between two stimuli that is detected as often as it is undetected. Thus, it is viewed as a statistical estimate of the resolving power of a sensory system.

> compared to that of later years . . . [because the] stigmatization of the prisoner (which lowers earning capacity an status) may be primarily due to being in prison at all, and it may not increase much with the number of years spent there.

Likewise, it is not too much to assume that judges, who do not, of course, serve the sentence themselves, might fail to view the distant future as vividly and forcefully as the immediate future. According to one interpretation, judges act as if the disutility per year falls with each additional year of incarceration, so that total disutility does not rise in proportion to sentence length.[12]

A Measurement Model

On the basis of our theoretical discussion, and the actual observed sentencing practices of judges, three principles guide the development of our measure of sentence severity:

- Judges simplify decision-making by reducing the size of choice sets to a relatively small number of available sentences.
- Judges focus on a set of preferred or prominent sentences.
- When sentencing, judges employ a form of psychological discounting, hence the actual interval between successive elements in the choice set increases as severity increases.

First, based upon our review of empirical sentencing data in Michigan, it appears that judges use approximately 14 to 20 different sentences on a regular basis— the most common being 12, 18, 24, 30, 36, 48, 60, 72, 84, 96, 120, 180, 240, 300, 360, or 480 months. We are not claiming that no other sentences are

[12] This view also meshes with that of many criminologists. See, for example, James Q. Wilson and Richard Herrnstein, *Crime and Human Nature*, 416-21 (1985).

ever chosen. Instead, we suggest that these sentences will make up a substantial portion of all sentences that are given.

Second, the 14 to 20 sentences do not appear to be random; instead, they are "prominent" in the sense that they are in half, whole year, or five year chunks. Notice, however, they are not <u>all</u> half and whole years. Instead, they are the sentences that come most easily to mind.

Third, we hypothesize that the uneven interval between successive elements of the judicial choice arises from a process of discounting to present value. Judges choose sentences that are similar (psychological) intervals apart from one another. The psychological character of the intervals is based on the just noticeable differences discussed earlier. The intervals between successive elements of the choice set can be explained by the psychological discounting assumption.

Through the discounting process, the total disutility of a particular prison sentence can be calculated by discounting it to the present at some positive rate. If the immediate disutility of each year in prison is c and the rate of discount is r, then the present disutility of a sentence of length s is given by the discounted total:

$$d(s) = c_1 + \frac{c_2}{(1+r)} + \frac{c_3}{(1+r)^2} + \ldots + \frac{c_s}{(1+r)^{s-1}}$$

This means that the true subjective valuation of the disutility of the prison sentence to the judge is not the total number of months or years imposed, but rather the present value of the sentence.

Although selecting the appropriate discount rate is not without uncertainty, we use a rate of 10 percent as an example. The results of discounting are displayed along side the hypothesized elements of the judicial choice set in Table 4-4.

Table 4-4: Present Value of Prominent Sentences (Assuming 10% Discount Rate)

Actual Sentence	Present Value Sentence (in months)	Change in Present Value from previous sentence
6	5.45	
12	10.91	5.45
18	15.86	4.96
24	20.82	4.96
30	25.33	4.51
36	29.83	4.51
48	38.03	8.20
60	45.48	7.45
72	52.25	6.77
84	58.40	6.16
96	64.01	5.60
108	69.10	5.09
120	73.73	4.63
144	81.76	8.03
180	91.26	9.51
240	102.17	10.91
300	108.94	6.77
360	113.12	4.24
480	117.36	4.20

Since a year in prison now is viewed more seriously than a year in prison ten years from now, *it is necessary for judges to add ever-increasing blocks of time to sentences to achieve a given level of total disutility, or, in other words, sentence severity.* Consequently, assuming that judges view the disutility of prison declining over time, discounting to present value provides a rationale for expecting that the intervals between judges' uttered sentences will increase as severity increases. Calculating the present value of the prominent sentences (assuming a 10% discount rate) produces a fairly consistent scale, with the difference between successive intervals being approximately 4-6 months (Table 4-4). While there are some exceptions (e.g., 48, 144, 180, and 240), it is remarkable that the prominent elements are approximately interval in nature. It is clear, therefore, that rather unequal increases in sentence length can be seen as approximately equal if judges engage in a form of psychological discounting.

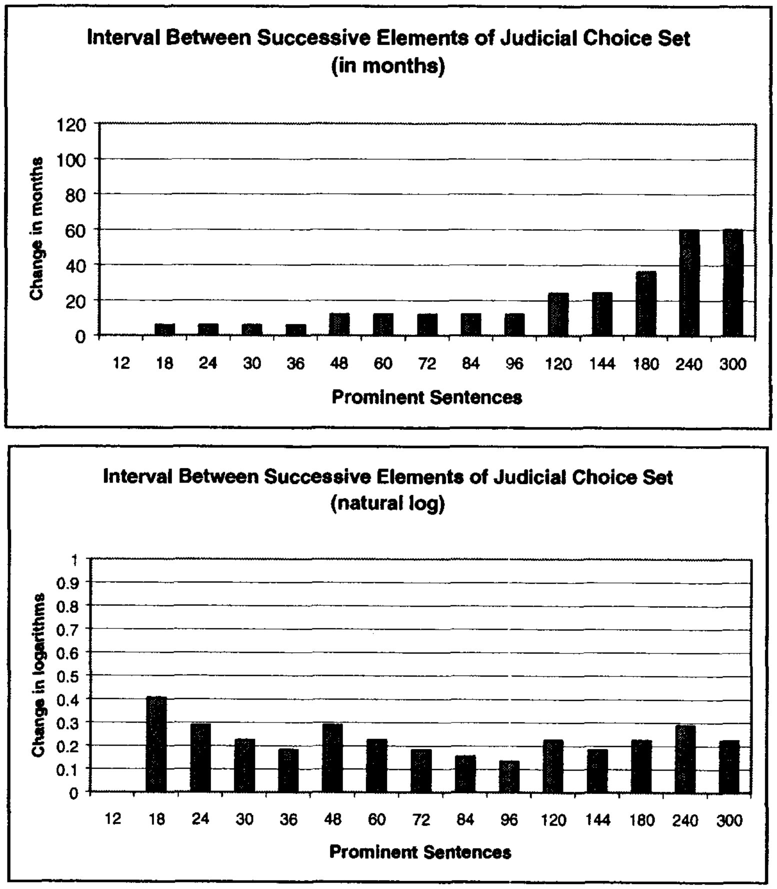
To model the just noticeable difference nature of the choice set, we employ a natural logarithmic transformation of the months of incarceration. As Tufte (1974, 108) noted, the logarithmic transformation is useful when the distribution is skewed; that is, when a few observations cluster together at one end of the scale with few outlying values. The transformation serves to spread out the clustered values and to pull the outliers into the middle. While this is a mathematical transformation, it also provides a useful model for the nature of the judges' choice set.

While the log transformation has been employed before (e.g., Wheeler, et al. 1982; Albonetti 1997; Petersilia et al., Bushway and Piehl, forthcoming), its use has not been tied to an explicit theoretical argument. The closest to a theoretical argument for its can be found in the following passage from Wheeler et al.:

> Because of the discrete nature of sentencing decisions, the natural log of prison length was used as the response variable rather than the actual distribution of sentences. This served to pull the longest sentences closer to those of six or twelve months, better approximating the actual intervals of the decision the judges make.

Although somewhat opaque, their rationale recognizes the non-constant interval between observed sentences. To see that this is the case, Figure 4-2 presents the interval between the 15 elements in the hypothesized judicial choice set using both actual months and the natural log of months.

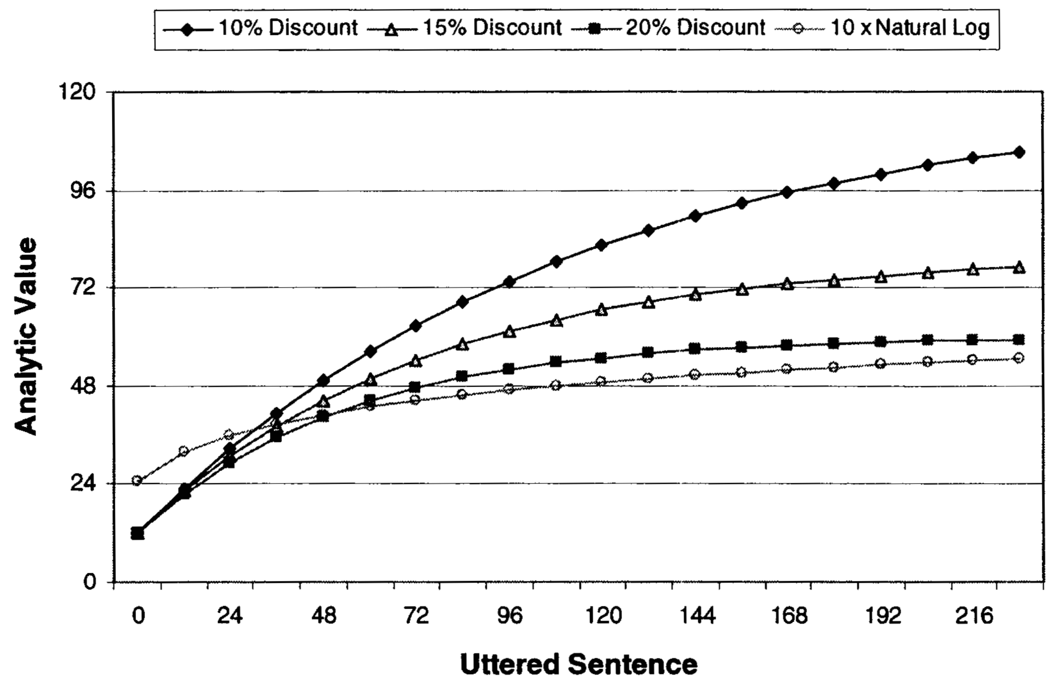
Figure 4-2: Interval Between Successive Elements of Judicial Choice Set in Months and Natural Log of Months



As one can see in Figure 4-2, the natural logarithmic transformation is closer to an interval scale than is months of incarceration. Consequently, we have chosen to use the natural logarithmic transformation as a model of implicit or underlying values of the 14 to 20 prominent sentences. We recognize that the use of the log transform is a hypothesis. To keep this in mind, our initial analysis of the data will compare the logarithmic results to those obtained using the actual months of sentence.

To conclude our discussion of the sentence severity measurement model, we present, in Figure 4-3, a graphic comparison of the natural logarithm of months, with months discounted at 10%, 15%, and 20%. As we can see, the logarithm (multiplied by 10 for comparability) most closely mirrors prison months at the 20% discount rate. Without having to assume a specific discount rate, it seems clear that the natural logarithm provides a reasonable model (and approximation) of discounted prison months.

Figure 4-3: Comparing Natural Log and Discounted Prison Months



A Final Caveat

Based upon the discussion to this point, there is little doubt that the interval between prominent sentences *increases at an increasing rate*. There are at least two ways to deal with this. The first is to transform the actual months of incarceration – using, for example, a log transform – to match the interval nature of the latent severity scale. The second is to leave the dependent variable alone and focus on building a set of independent variables that account for the nonlinear nature of the sentencing outcome.[13] While we have discussed the first set of options extensively, it is worthwhile looking at the second set more closely.

Engen and Gainey (2000, 1209), who raised a number of important issues about the analysis of sentencing data (especially that gleaned from a sentencing guidelines state), suggested "most analyses predicting sentence length under guidelines fail because they incorrectly assume linear, additive relationships between the principal legally relevant factors and the sentence length." They based this, in part, on the observation that "sentencing guidelines typically increase the severity of sentences more sharply for more serious offenses and for offenders with extensive criminal histories." They further argued "the joint influence of offense seriousness and criminal history on sentencing ranges is not additive." In summarizing their findings, Engen and Gainey (2000, 1209)

[13] In a recent paper, Mustard (2001) introduces one dummy variable for each cell of the Federal Sentencing Guidelines grid to control for the built-in non-linearity. As noted in Chapter 1, while our data comes from a state with a voluntary guidelines system, there are many reasons to expect that the guidelines did not interfere with what judges wanted to do. When this is coupled with the fact that 25% of the cases were not subject to the guidelines, it seems clear that this type of adjustment is not necessary. Finally, there is the practical constraint – the 1988 Michigan Guidelines have 800 grid cells and we only have 1500 cases.

concluded that "the legally prescribed effects of offense seriousness and criminal history are, *by definition*, nonlinear, and there is an interaction between offense seriousness and prior history built into most sentencing guideline systems (emphasis added)" (see also Mustard, 2001).

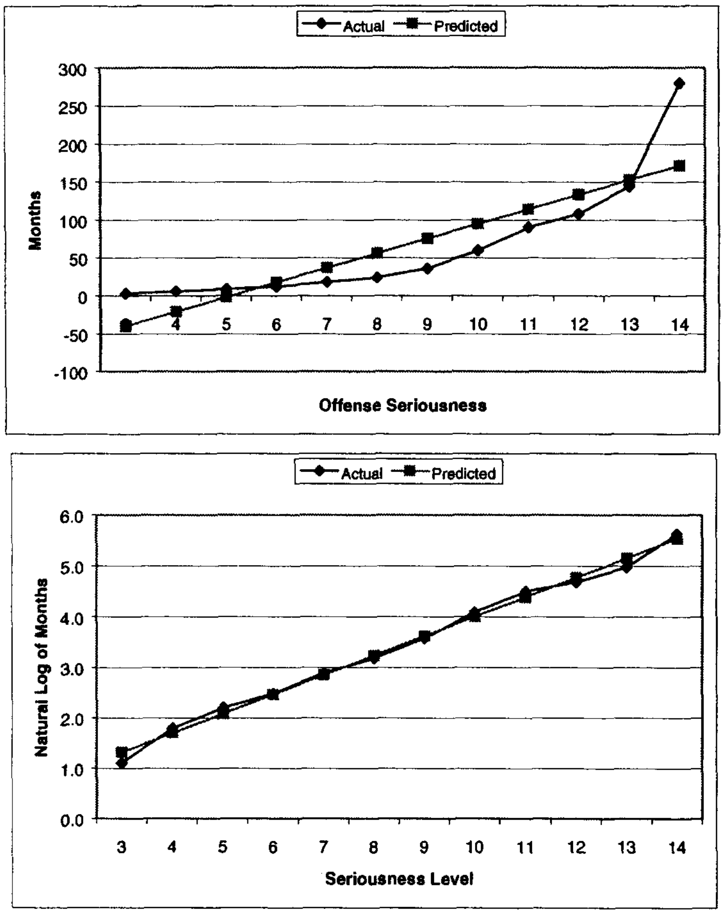
We believe that Engen and Gainey spoke to an important problem, but were too restrictive, both in ascribing it to guideline sentencing data and in their suggested remedy. While they correctly observed that sentences – in most sentencing guidelines grids – increase in a nonlinear fashion, they failed to extend their finding to sentencing under any kind of system. As noted earlier, to make the complex task of sentencing feasible judges simplify by reducing the choice set to a small number of preferred sentences. It is our hypothesis that the nonlinearity arises because while sentences are meted out in months, they are decided in a fashion consistent with the cybernetic model. This suggests that the uttered sentence may not constitute an interval variable.

It is possible that this non-intervalness – which appears as nonlinearity – is an important research issue. If the metric of the dependent variable is not consistent with judicial sentencing practices, statistical models will be mis-specified, and will produce coefficient estimates that cannot be reliably interpreted. This, in turn, affects the validity of conclusions about such perennial policy issues as disparity and discrimination in sentencing.

Engen and Gainey observed that sentencing guidelines often enshrine a degree of nonlinearity in the recommended sentences. They argued that the way to deal with this is to construct a model whose right-hand variables are able to account for the nonlinear growth in sentence severity. It is our contention that the reason that guidelines enshrine nonlinearity is that it is a direct reflection of the way that judges themselves make the sentencing length decision.

If our surmise is correct, the Engen and Gainey remedy – namely, trying to capture nonlinearity using some combination of prior record and offense severity, or through using the midpoint of the guideline range – is a contrivance that misses the underlying reason for the nonlinearity. To illustrate our point, we have developed a simple example using the same Washington State Guidelines' structure as Engen and Gainey. We take the *seriousness* level and regress it on the midpoint of the cell range for *offender score* of 0. The results are plotted in the top panel of Figure 4-4. As one can see, the pattern is similar to that presented by Engen and Gainey (2000, 1211). The relationship is indeed non-linear. Sentences are underestimated when the serious level is low and when the seriousness level is very high; otherwise the regression overestimates the sentence. When the dependent variable is transformed into the logarithmic measure, we see the results in the bottom panel of Figure 4-4. Clearly, transforming the "dependent" variable, in line with the theoretical issues raised earlier, makes the relationship linear.

Figure 4-4: An Empirical Example From Washington State Guidelines Comparing Months and Log of Months as Measures of Severity



Based upon the discussion to this point, we will use the log of months as our measure of sentence severity. In addition, throughout our analysis, we will compare our results to those using actual months.

Conclusion

The goal of this chapter has been two-fold. First, we looked at the entire range of prison sentences given in Michigan in 1995 and noted several interesting features. Even though we are using data from a single state in a single year, we found evidence in the broader sentencing literature that these patterns have been around for over 100 years. Second, we have reviewed the existing literature on sentencing severity. In doing so, we see that the empirical studies reflect a great deal of ambivalence about how to measure severity. Third, using the cybernetic theory that underlies our theory of sentence decision-making, we developed three theoretical principles that a measure of sentence severity should take into account. Finally, we offered our measure – the natural log of prison months – as an alternative that meets these theoretical requirements. We realize that we are not the first to use this measure. We believe, however, that we have developed a sound theoretical foundation for using this measure in our empirical assessment of sentence severity.

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CHAPTER 5: DATA CONSIDERATIONS AND THE SENTENCING RELEVANT VARIABLES

Sentencing Relevant Variables

A general weakness of sentencing research is the lack of a well-developed theory of the structure and content of judicial decision-making (Wheeler et al. (1982, 647)). In the previous three chapters we have developed a theoretical argument to explain the set of offender attributes judges use in assessing offender seriousness, the sentence type decision, and the sentence severity decision. Our theory of offender assessment offers a guide to operationalize a set of independent variables for both the model of sentence type and sentence severity. In addition, we ended Chapter 2 with a series of hypotheses about how judges interpret and apply a select set of sentencing relevant variables (sentencing base, offense factors, prior record factors, court processing, defendant characteristics, and court process and culture) in determining sentence type and sentence severity. Our fundamental theoretical assumption is that judges pay attention to a small number of dichotomous factors in assessing the subjective probability of blameworthiness and recidivism.

In the first section of this chapter, we will compare the sentencing relevant variables used in our study to the type of variables traditionally used in empirical sentencing literature, and generate a set of hypotheses on the likely impact of each variable on the sentence type and sentence severity decisions. Figure 5-1 summarizes the variables collected for our sample of offenders convicted in Michigan in 1995 and reflects the framework of Michigan's sentencing guideline system. The structure of Michigan's sentencing guidelines and more extensive detail on the development of this data set is provided in the second section of this chapter as well as Appendix 5-1.

Table 5-1: Variables and Operationalizations

Variables	Description	Coding	Mean	Std Dev	Min	Max
Dependent Variables						
Prison/No Prison		1= yes; 0 = no	0.227	0.419	0	1
Months of Prison	Minimum sentence in months	logarithm	3.505	0.969	1.3863	7.08
Sentencing Base						
Statutory Maximum	Legislatively-Mandated Maximum Sentence	logarithm	4.389	0.915	3.18	4.787
Offense Factors						
Use of Weapon	Did offender use a firearm?	1= yes; 0 = no	0.096	0.295	0	1
Physical Injury	Was the victim injured?	1= yes; 0 = no	0.048	0.213	0	1
Intent to Kill or Injure	Did the offender intend to kill or injure victim?	1= yes; 0 = no				
Exploitation of Victim	Did the offense involve age, size, disability, or domestic relationship	1= yes; 0 = no	0.056	0.229	0	1
Leader		1= yes; 0 = no	0.150	0.357	0	1
Continuing Pattern	Is there a pattern over 5 year period involving 3 or more crimes?	1= yes; 0 = no	0.109	0.312	0	1
Drug Offense	Is the conviction offense drug related?	1= yes; 0 = no	0.256	0.437	0	1
Property Offense	Is the conviction offense a property crime?	1= yes; 0 = no	0.357	0.479	0	1
Prior Record Factors						
High Severity Prior Conviction	Does the offender have a prior conviction for violent felony?	1= yes; 0 = no	0.115	0.319	0	1
Low Severity Prior Conviction	Does the offender have a prior conviction for non-violent felony?	1= yes; 0 = no	0.297	0.457	0	1
Misdemeanor Conviction	Does the offender have one or more prior misdemeanor convictions?	1= yes; 0 = no	0.201	0.401	0	1
Current Relationship CJ System	Was the offender in custody, on bail, bond, probation, parole at the time of the offense?	1= yes; 0 = no	0.228	0.420	0	1
Juvenile Arrest	Arrest before age 18	1= yes; 0 = no	0.317	0.465	0	1

Table 5-1: Variables and Operationalizations (continued)

Court Processing						
Trial	Convicted at Trial	1= yes; 0 = no	0.080	0.271	0	1
Attorney	Private Attorney	1= yes; 0 = no	0.207	0.406	0	1
Defendant Characteristics						
Gender	Male or Female	1= Female; 0 = no	0.215	0.411	0	1
Race	Black or White	1= Black; 0 = no	0.560	0.497	0	1
Drug User		1= yes; 0 = no	0.431	0.495	0	1
21 <= Age < 30		1= yes; 0 = no	0.297	0.457	0	1
31 <= Age < 40		1= yes; 0 = no	0.231	0.421	0	1
41 <= Age < 50		1= yes; 0 = no	0.114	0.318	0	1
Age > 50		1= yes; 0 = no	0.151	0.358	0	1
Young Drug User	Drug User and Age < 21	1= yes; 0 = no	0.080	0.271	0	1
Young Black Male	Black, Male, and Age < 21	1= yes; 0 = no	0.053	0.224	0	1
Court Context						
County 1		1= yes; 0 = no	0.076	0.265	0	1
County 2		1= yes; 0 = no	0.046	0.210	0	1
County 3		1= yes; 0 = no	0.028	0.165	0	1
County 4		1= yes; 0 = no	0.041	0.199	0	1
County 5		1= yes; 0 = no	0.096	0.295	0	1
County 6		1= yes; 0 = no	0.057	0.232	0	1
County 7		1= yes; 0 = no	0.038	0.191	0	1
County 8		1= yes; 0 = no	0.147	0.354	0	1
County 9		1= yes; 0 = no	0.025	0.155	0	1
County 10		1= yes; 0 = no	0.046	0.210	0	1
County 11		1= yes; 0 = no	0.017	0.128	0	1

A Comparison Of Sentencing Relevant Variables

To ground and focus our analysis in the existing criminal justice literature, we build upon an extensive set of relevant empirical sentencing studies. Spohn (2000, 453), in a recent review article on the relationship between race and sentencing, identified a set of forty state and federal-level studies that use appropriate statistical techniques, including controls for crime seriousness and prior record, and measures of association between race and sentencing. To a subset (26) of these studies, we have added seven additional empirical studies that meet at least the first two of her three requirements. Appendix 5-2 contains basic bibliographic information on these 33 foundational studies.[1]

[1] While there is extensive literature concerning sentencing in general, there is newer literature that focuses on the analysis of data from states with sentencing guidelines. Please see Ulmer and Kramer (1996) for an overview of this literature. In addition, see Ostrom et al (1996) for an overview of purpose, design, and structure of all state sentencing guideline systems.

There is considerable agreement between our study and previous research concerning sentencing relevant variables (independent variables) (Figure 5-2). For example, most prior studies have controlled for some aspects of statutory severity, type of offense, prior criminal record, gender, race, age, and county of sentencing. However, in our study the data sources (i.e., PSI and sentencing guideline forms) provide greater detail on factors related to prior record, elements of the offense, and aspects of offender socio-demographics. For example, we distinguish between high and low severity prior convictions, account for prior juvenile adjudications, and indicate whether the conviction offense involved a weapon and physical injury to the victim. Our model also includes interaction terms that control for certain "offender profiles," such as young black males.

The following section offers a comprehensive overview of the types of variables used in prior studies and develops a set of testable hypotheses derived from theoretical expectations. The payoff is that we explicitly link the factors that impinge on sentencing to hypotheses of their impact on judicial decision-making.

Figure 5.2: Sentencing Relevant Variables in Recent Studies

	Albonetti	Albonetti	Chiricos and Bales	Crawford, Chiricos, and Kleck	Dixon	Engen and Gainey	Engen and Gainey	Holmes, Hosch, Daudistel, Perez, and Graves	Klein, Petersilia, and Turner	Kramer and Steffensmeier	Kramer and Ulmer	Miethe and Moore	Moore and Miethe	Myers and Talarico	Myers and Talarico	Myers
	1991	1997	1991	1998	1995	2000	2000	1996	1990	1993	1996	1985	1986	1986	1987	1989
Sentencing Base																
Statutory Severity	x	x		x	x	x	x	x		x	x	x	x	x	x	x
Offense Factors																
weapon	x				x	x	x	x	x			x	x			
physical injury								x	x							
intent to kill																
victim exploitation																
leader																
continuing patterns																
offense type	x	x		x		x	x		x	x	x			x	x	x
Prior Record Factors																
high severity prior conv.																
low severity prior conv.																
misdemeanor convictions								x								
current relationship with cj									x							
juvenile adjudications									x							
# of priors/prior criminal history	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Processing Factors																
plea or trial	x	x			x	x	x	x	x	x	x	x	x			
private attorney			x		x			x	x							
Defendant Characteristics																
gender	x	x				x	x	x	x	x	x	x	x	x	x	x
race	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
drug use																
age			x			x	x	x		x	x	x		x	x	x
young black male														x		
young drug user																
Court Size																
court size																
county of sentencing (urban/rural)		x		x	x					x	x	x	x	x	x	x
Dependent Variables																
prison/no prison	x		x		x				x	x	x	x	x	x	x	x
actual days/mos./yrs			x		x	x	x	x	x	x	x		x	x	x	x
log of days/months		x							x							
sentence scale	x															

	Nelson	Nelson	Nobiling, Spohn, and DeLone	Peterson and Hagan	Simon	Spohn and DeLone	Spohn and Holleran	Spohn and Spears	Steffensmeier, Kramer, and Streifel	Steffensmeier, Ulmer, and Kramer	Ulmer and Kramer	Ulmer	Walsh	Wheeler, Weisburd, and Bode	Wooldredge	Zatz	Zimmerman and Frederick
	1994	1995	1998	1984	1996	2000	2000	1996	1993	1998	1996	2000	1987	1982	1998	1984	1984
Sentencing Base																	
Statutory Severity	x	x	x	x	x	x	x		x	x	x	x	x		x		x
Offense Factors																	
weapon				x	x			x								x	
physical injury	x																
intent to kill																	
victim exploitation								x									
leader																	
continuing patterns																	
offense type	x	x	x		x	x	x	x	x	x	x	x			x	x	x
Prior Record Factors																	
high severity prior conv.																	
low severity prior conv.																	
misdemeanor convictions																	
current relationship with cj			x			x	x						x			x	
juvenile adjudications																	
# of priors/prior criminal history			x	x	x	x	x	x	x	x	x	x	x		x	x	x
Processing Factors																	
plea or trial			x	x		x	x	x	x	x	x	x			x	x	
private attorney			x			x	x						x				
Defendant Characteristics																	
gender		x	x	x		x	x		x	x	x	x			x	x	x
race	x	x	x	x	x	x	x	x	x	x	x	x	x		x	x	x
drug use					x												
age			x	x	x	x	x	x	x	x	x	x			x	x	x
young black male							x			x		x					
young drug user																	
Court Size																	
court size										x		x					
county of sentencing (urban/rural)	x	x	x		x	x	x		x		x						x
Dependent Variables																	
prison/no prison	x	x	x	x		x	x	x	x	x	x	x	x		x		x
actual days/mos./yrs		x	x	x		x		x	x	x	x	x			x		
log of days/months	x	x			x												
sentence scale													x				

Sentencing Relevant Variables

The sentencing literature suggests that judges use certain key attributes in assessing a defendant's blameworthiness and disposition to future criminal activity. To reduce uncertainty, judges develop "rules of thumb" to quickly assess an offender's dangerousness and likelihood for rehabilitation, as well as the degree of punishment the offender deserves (Kramer and Ulmer 1996). In making these decisions judges rely on a constrained mix of factors. This section provides an overview of the factors the sentencing literature deems most relevant, and the apparent relationship between these factors and sentencing outcomes. Where applicable, we will also measure these factors.

As noted in Chapter 2, we anticipate that sentencing is affected by six subsets of relevant variables.

- Sentencing Base
- Offense Factors
- Prior Record Factors
- Case Processing
- Offender Characteristics
- Court Characteristics

Sentencing Base. We contend that a sentencing model must include some "base" that represents the judge's search area.[2] The statutory seriousness

[2] In a recent, and important, article Engen and Gainey (2000, 1210) wrote, "the model will underestimate the explanatory power of the legally relevant variables, leading us to underestimate the degree of uniformity in sentencing decisions under guidelines." While we agree with this observation, we also wish to generalize it to include all sentencing decisions, whether or not it is done under the auspices of guidelines. Following the lead of Moore and Miethe (1986), Engen and Gainey (2000, 1214) suggested that it is important to include some variable that captures the "presumptive sentence." Their choice is to use the midpoint of the sentencing guideline grid cell as an independent variable. In a response to Engen and Gainey,

of an offense not only sets the maximum penalty for the offender, it also serves as a proxy for offense severity.[3]

Albonetti (1991) stated that "statuatory severity is a legally relevant variable in determining sentencing outcome and consistent with earlier research is expected to exert an influence on judicial sentencing behavior" (255). We hypothesize that some indicator of the legislatively mandated maximum penalty anchors the sentencing decision. We believe that this anchor not only provides an initial reference point for judges, but also turns the remainder of the decision process into a "marginal" calculation. Statutory severity reduces uncertainty and complexity by establishing a discrete "sentencing zone" within which judges can quickly make relevant marginal adjustments and reach a sentencing decision.

Because it sets an upper limit for exposure to prison, we therefore use the legislatively mandated statutory maximum as the measure of the sentencing base.[4] We operationalize this base as the natural logarithm of the statutory maximum penalty set by the Michigan Legislature. We hypothesize that the

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Ulmer (2000) showed that the same effect could be obtained using the guideline minimum sentence, as well as several other more esoteric options.

[3] Some previous research has treated the level of offense severity as a ten-point scale based on state statutes (Crawford, Chiricos, and Kleck 1998; Steffensmeier et al. 1998; Ulmer 1997; Ulmer and Kramer 1996; Kramer and Ulmer 1996; Dixon 1995; Kramer and Steffensmeier 1993; Albonetti 1991; Moore and Miethe 1986; Miethe and Moore 1985). Other researchers have seen it as a categorical variable capturing the class of the most serious conviction charge (Spohn and DeLone 2000; Spohn and Holleran 2000; Nobiling, Spohn and DeLone 1999), or as the sum of the minimum number of months a defendant could receive for each charge or conviction (Wooldredge 1998). Still other studies have posited it as the midpoint of the range in the prison term stipulated by law for each offense (Simon 1996; Myers 1989; Myers and Talarico 1987; Myers and Talarico 1986), or as a magnitude point estimation scale as perceived by judges (Chircos and Bales 1991.

[4] It is also important because it reflects the non-intervalness of the judges' choice set. In our data set the statutory maxima are: 24, 48, 60, 120, 180, 240, and Life (coded as 1188, the number of months in 99 years). The Michigan Department of Corrections uses the value of 99 years as a proxy for "life sentence."

relationship between the statutory maximum and sentence severity is one of constant elasticity (Johnston 1984, 65). Therefore, the base "mirrors" the measurement of the dependent variable – hence both variables will be measured by taking the natural logarithm.[5]

Offense Factors. We hypothesize that judges monitor the nature of an offense in estimating both blameworthiness and the likelihood of recidivism. We suggest judges make this assessment in two ways. First, they monitor factors thought to make the offender more blameworthy (e.g., use of weapon, inflicting injury, intent to kill). Second, they view the offender's actions in the context of offense type (e.g., drug, property). We constructed an "offender profile" using the following factors to assess their influence on the judicial sentencing decision:

- Use of Weapon
- Physical Injury
- Intent to Kill/Injure
- Victim Exploitation
- Leader in a multiple offender offense
- Continuing pattern
- Drug Offense
- Property Offense

Hawkins (1981) and Shaver (1975) argued that judges link the level of violence of a crime to judgments of the offender's likelihood of future criminal activity and the offender's threat to society. If judges believe the likelihood of future criminal activity coupled to violence is great, the probability that an offender will go to prison increases, as does the severity of the prison sentence.

[5] We discussed at length in Chapter 4 our reasons for taking the logarithm of the dependent variable.

Similarly, Steffensmeier, Kramer, and Streifel (1993) asserted that judges possess cognitive schemata for dealing with normal crimes. Exceptional cases, with aggravating or mitigating factors, fall outside of the schemata and require additional attention, and perhaps a redefinition of an offender's situation. For example, "most assaults are expected to entail certain limits of violence, which exceeded, imply unusual aggression" (533). Thus, we expect that judges treat exceptional cases differently; they increase the severity of punishment for aggravating circumstances and reduce the severity for mitigating circumstances.

Prior Criminal History. Including an offenders' prior criminal history in a model of sentencing has two purposes. First, several scholars (Engen and Gainey 2000; Steffensmeier, Ulmer, and Kramer 1998; Kramer and Steffensmeier 1993; and Klein et al. 1990) believe that in estimating the impact of extralegal factors on sentencing outcomes one must first control for differences in prior offending and in the seriousness of the current offense so that the model is not misspecified.

Second, and most relevant, judges inspect an offender's prior criminal history in deciding upon a sentence. Prior criminal history increases both the probability of prison, as well as sentence severity, because it indicates a heightened risk of recidivism (Albonetti, 1991, 251). Prior criminal history has been measured in many ways, including using a dichotomous variable to indicate prior incarceration/no prior incarceration (Myers and Talacrico 1986; Wooldredge 1998), or using a continuous variable for the number of times sentenced to prison for a duration exceeding one year (Spohn and DeLone 2000; Spohn and Holleran 2000; Zatz 1984). It has also been measured by the number of prior felony convictions (Holmes et al. 1996), the number of prior misdemeanor convictions (Holmes et al. 1996), the number of prior felony arrests (Chiricos and Bales 1991), and a variety of other prior record scales (Steffensmeier, Ulmer, and Kramer 1998; Ulmer 1997; Ulmer and Kramer 1996; Moore and Miethe 1986; Miethe and Moore 1985; Zimmerman and Frederick 1984). Wooldredge (1998) argued that the best measure of prior record is whether an offender has ever received a prison sentence of more than one year. Furthermore, Kramer and Ulmer (1996) claimed, "a prior record containing at least one felony may be a 'tipping point' that inclines judges to view offenders as dangerous or committed criminals, and to typify offenders as bad risks for the probation or treatment alternatives" (98).

To accommodate a comprehensive assessment of the role of prior record in judicial decision-making, we include the following five factors in our analysis:

- Serious Prior Felony
- Less Serious Prior Felony
- Misdemeanor Conviction(s)
- Current Relationship with CJ System
- Juvenile Arrest

By examining prior record measures that get at severity, type, length, and currency, we can distinguish which factors are most influential.

Court Processing. There are two court processing-type variables available to us from the Michigan data set – "convicted at trial" and "privately retained attorney." For many reasons, offenders convicted at trial are believed to receive harsher punishments than similarly situated offenders who plead guilty. Because the trial process is costly, judges may be inclined to punish defendants who pursue the trial process on "frivolous" grounds. Defendants tried and convicted in cases without legitimate legal concerns may receive longer sentences, sentences that reflect this perceived waste of court resources (LaFree 1985). This differential is likely regardless of whether the crime is viewed as serious or petty (Brereton and Casper, 1982).

Related to the belief that judges punish such frivolousness, is the notion that they tend to reward cooperation and contriteness. Albonetti (1991) wrote, "It is hypothesized that net of other variables in the model, offenders pleading guilty will receive less severe sanctions than comparable offenders insisting on a trial disposition. Defendant cooperation exemplified by a willingness to plead guilty is viewed, by the sentencing judge, as an indication of the defendant's willingness to 'play the game' in a routine, system defined manner" (Albonetti 1991, 255). The flip side of this is that offenders who do not play the game are met with trial penalties (Hagan et al. 1979; Uhlman and Walker 1980; Spohn 1990; Zatz (1984)). In addition, Ulmer and Kramer (1996) noted that in one of the counties they studied a guilty plea was viewed as a sign of remorse and of rehabilitative potential.

Another consideration behind such sentence differentials is that more adverse information about the defendant may emerge at trial. This does not imply that trial elicits new facts about a case, but rather that the trial process can enhance the "vividness" of those facts. Graphic portrayals of an offense by the victim or other prosecution witnesses, particularly in crimes of violence, may adversely affect the judge or jury. Certain characteristics of an offense may be viewed more harshly at trial and, consequently, defendants convicted at trial may be treated more severely at sentencing (McDonald, 1979).

However, the existence of these sorts of sentencing differentials is not uniformly accepted. Eisenstein and Jacob (1977), in their three-court study of sentencing, which controlled for other relevant offense and offender factors, concluded, "The effect of dispositional mode was insignificant in accounting for variance in sentence length (270)." Likewise, Rhodes (1978) stated, "Contrary to expectations, sentence concessions were not routinely awarded to suspects entering guilty pleas . . . (515)." Of course, some cases go to trial because they raise legitimate questions over the guilt of the defendant. As noted by Berenton and Casper (1982), defendants in cases with reasonable concerns are less likely to receive a sentence enhancement because they are not considered to have wasted the court's time.

By including the mode of disposition (plea v. trial) in the analysis, we can assess more fully the existence and/or extent of sentencing differentials. Our results will provide an estimate of the increase in sentence "exposure" that defendants risk by taking their case to trial.

Dixon (1995) argued that privately retained attorneys are more effective than court appointed attorneys. Thus, offenders with private attorneys are thought to receive less severe sentences than offenders with court appointed attorneys. Holmes expressed a similar view (1996, 12). He noted, "Private attorneys may be more experienced than those appointed by the courts in the cases of indigent defendants, and their relatively affluent clients may be able to afford more intensive investigative work and filings of delays. Thus, they may be more effective than court-appointed attorneys in obtaining favorable pretrial release decisions and less severe sentences." Holmes argument also suggested that access to a private attorney serves as a proxy for an offender's financial status, thus raising the issue of "wealthy" offenders perhaps being treated more leniently than "poor" offenders.

But both Willison (1984) and Hanson and Ostrom (1992) found that case and defendant related variables, not the identity of the counsel, are responsible for sentencing differentials. In addition, both Hanson and Ostrom (1992) and Ostrom and Hanson (1999) found that public defenders typically have more experience than their primary adversaries, assistant prosecuting attorneys, and their competitors, private defense attorneys.

Our current study distinguishes whether the offender had a privately retained attorney. The impact of this variable provides insight into whether the level of performance varies between publicly appointed and privately retained attorneys. In addition, we view this variable as a surrogate for being on above average financial footing, or as evidence that family or friends are willing to cover the cost of private counsel.

Defendant Characteristics. Following Albonetti (1991, 253), we investigate the proposition that judges causally attribute high risk to certain stereotypical groups. With respect to race, Albonetti (1991, 253) wrote, "I suggest defendant's race influences sentencing due to stereotypical images relating race to location in a social group thought to account for a disproportionate amount of crime." As Farrell and Holmes (1991) suggested, such attributions can become informal norms that help rountinize sentencing. Spohn and DeLone (2000) echoed this sentiment: "[f]aced with organizational constraints, such as limited time in which to make decisions and limited information about offenders, judges may resort to stereotypes of deviance and dangerousness that rest on considerations of race, ethnicity, gender, age, and unemployment" (301). Steffensmeier et al. (1998, 768) pointed out that while the defendant characteristics may have an effect in isolation, they may also have interactive effects. They wrote, "Our main premise is that race, age, and gender will interact to influence sentencing because of images or attributions relating these statuses to membership in social groups thought to be dangerous and crime prone." The discussion that follows focuses on the impact of race, gender, age, and drug use on the two sentencing outcomes.

Race – Many observers of the criminal justice system believe judicial sentencing decisions are linked to a defendant's race. Steffensmeier and DeMuth (2001) stated that the "lack of resources coupled with attributions that associate black offenders with a stable, enduring predisposition to future criminal activity or dangerousness, is thought to increase sentence severity for black defendants" (152). However, research over the past 40 years has produced inconsistent and contradictory findings regarding the effect of race on sentencing (Spohn, 2000). Spohn (2000, 429) offered the following summary:

> Some studies have shown that racial/ethnic minorities are sentenced more harshly than whites (Holmes et al. 1996; Kramer and Ulmer 1996; Petersilia 1983; Spohn, Gruhl, and Welch 1981-82; Zatz 1984), even after crime seriousness, prior criminal record, and other legal variables are taken into account. Other studies have found either no significant racial differences (Klein, Petersilia, and Turner 1990) or that blacks are treated more leniently than whites (Bernstein, Kelly, and Doyle 1997; Gibson 1978; Levin 1972). Still other research has concluded that race influences sentence severity indirectly through its effects on variables such as bail status (LaFree 1985b; Levin 1972), type of attorney (Spohn, Gruhl, and Welch 1981-82), or type of disposition (LaFree, 1985a, Spohn 1992; Uhlman and Walker 1980), or that race interacts with other variables and affects sentence severity only in some types of cases (Barnett 1985; Spohn and Cederblom 1991), in some types of settings (Chiricos and Crawford 1995; Hawkins 1987; Kleck 1981; Myers and Talarico 1986), or for some types of defendants (Chiricos and Bales 1991; LaFree 1989; Nobiling, Spohn, DeLone 1998; Peterson and Hagan 1984; Spohn 1994; Walsh 1987).

Chiricos and Crawford (1995) examined both the incarceration in/out decision and sentence length decision in relation to race. They concluded that blacks are consistently at a disadvantage when the in/out decision is considered, but that race does not influence sentence length. Moreover, the effect of race may be magnified when considered in combination with other demographic factors. For example, Spohn and Holleran (2000) found that young black males (Spitzer referred to this segment of the population as "social dynamite") face greater odds of incarceration than middle-aged whites; apparently the cost of being black, young, and male is high (789). Although race should clearly be an illegitimate factor in the sentencing decision, we investigate the effect of race, alone and in combination with other factors (e.g., age, gender), for evidence that certain racial groups are viewed as higher risk offenders, and are hence the recipients of harsher sanctions.

Gender – One consistent finding in the literature is that female defendants are treated more leniently than their male counterparts (see reviews in Bickle and Peterson 1991; Daly and Bordt 1995; Steffensmeier et al. 1993, 1998). There are several reasons for this. Albonetti (1991) suggested that female defendants are thought to have a lower probability of future criminal behavior, and that this works to decrease uncertainty and reduce sentence severity (254). Daly argued that male judges are more patronizing toward women defendants, and don't take seriously the crimes of women (Daly 1987). Furthermore, Steffensmeier, Kramer, and Streifel (1993) argued that previous studies have substantiated the "widely held belief that female defendants receive more lenient treatment (apparently) because of judicial paternalism, the social costs to children and families of sending women to prison, or the view that female defendants are less dangerous and more amenable to rehabilitation than male defendants" (439). Finally, Kruttschnitt and Green (1984) argued that females are insulated from harsher sanctions because their social attributes satisfy sex-role expectations (e.g., being mothers and economically dependent; possessing characteristics in accord with their conventional role). In accord with previous literature and expectations, we hypothesize that women receive less severe sanctions.

Age – The age of an offender is often associated with the risk of recidivism. Steffensmeier et al. (1998) noted that studies that treat age as a continuous variable and assume a linear relationship (Myers and Talarico 1987) often report a small or negligible effect. Using an alternative specification, Seffensmeier et al. (1995) found a nonlinear, or inverted U shape, for the influence of age. They found that young adult offenders (21-29) received more severe sentences than either young offenders (18-20) or offenders in their thirties, and that offenders aged 50 and over received the most lenient sentences. Steffensmeier et al. (1997) wrote, "[I] t appears that judges see youthful offenders as more impressionable and more likely to be harmed by imprisonment than young 'adult' offenders, while they see older offenders as less risky prospects for release into the community" (765-766). In keeping with studies that treat age as subgroups of old and young offenders (Spohn and Holleran 2000; Klein et al. 1990; Zatz 1984), our study allows for a curvilinear (or nonlinear) age effect.

Drug Use – Few studies have explicitly examined the impact of drug use on sentencing, though speculation is common (e.g., Simon 1996). It may be that drug use encourages and intensifies drug related crimes, leading to more severe sanctions. On the other hand, evidence of drug use may reduce the severity of sanctions if a judge views drug addiction as the root cause of criminal activity and if he believes that this is best handled through rehabilitation and treatment rather than prison. We investigate the role of drug use on sentencing outcomes, as well as the interaction between age and drug use.

Court Community. The act of sentencing takes place in local courts, in organizational contexts within which judges have substantial discretion (Dixon, 1995). Local courts can be viewed as communities with their own cultures, politics, and organizational arrangements (Eisenstein et al. 1988). In a study of "Court Communities" and sentencing, Ulmer and Kramer (1996, 384-85) wrote, "local courts are policy arenas (see Hall 1995) in which two sets of standards meet—the logically formal rational ones articulated by [statute] (offense severity) and the substantive, extralegal criteria deemed relevant by local court actors." Therefore, as Myers (1989) argued, "[I]t has become abundantly clear that an understanding of sentencing requires a consideration of both the community and the court where sentencing occurs" (313). This is consistent with a contextual perspective on sentencing, which holds that the sentencing in a given court is influenced by an amalgam of political, social, and organizational details (Dixon

1995). Studies that have attempted to control for "court culture" have developed separate models for separate jurisdictions (Spohn and DeLone 2000; Spohn and Holleran 2000; Nobiling, Spohn, and DeLone 1998; Ulmer and Kramer 1996; Holmes et al. 1996), and have used dummy variables to note the court in which sentencing took place (e.g., Albonetti 1997; Nelson 1995).

Another way to model these differences is to look at characteristics thought to determine sentencing differences. For example, one can use dummy variables to denote contextual characteristics like urban versus rural counties (Simon 1996; Moore and Miethe 1986; Miethe and Moore 1985). Other studies have included more diverse contextual characteristics, such as the percent of a county's population that lives in urban areas, the percent of a county's population that is black, the percent of a county's population aged 15-19, the percent of a county's population that is Republican, or the number of judges in a county (Kramer and Ulmer 1996; Kramer and Steffensmeier 1993). Crawford, Chiricos, and Kleck (1998) included the rate of violent crime, the drug arrest rate, and measures of racial composition as their contextual factors.

Dixon (1995) viewed courts as formal organizations that vary in levels of judicial and prosecutorial bureaucratization. Following the work of Nardulli et al. (1998), Eisenstein et al. (1988), and Flemming et al. (1992), Dixon found that the impact of legal and extralegal variables variables and on sentencing differs between rural and urban courts. These authors suggested that rural courts have non-bureaucratic organizations and stable local legal cultures that reduce discretion in court processes. In contrast, they suggested that urban courts are highly bureaucratic and have informal local legal cultures that allow for increased discretion in decision-making, and hence they are more likely to use legally irrelevant criteria in sentencing.

As noted in the previous discussion, there are a wide range of potential measures of "county context", including county population, race, poverty rate, index crime rate, and personal income. In addition, we can focus on small, medium, and large courts through the use of appropriate dummy variables. Through several exploratory analyses, we examined many different combinations of the above variables. In the course of our analyses, we uncovered two basic problems. First, because we are looking only at the twelve largest counties in Michigan, many of the demographic data elements are quite similar across the twelve counties.[6] This produced a high level of multicollinearity and insignificant coefficient estimates.

Second, the courts in Michigan are divided into three groups that function separately from each other: circuit (general jurisdiction), district (limited jurisdiction), and probate. Felony sentencing in Michigan occurs in Circuit Courts. Given our focus on the twelve largest courts in the state, it is not surprising that there is little variation in size (most courts are in the range of from five to nine judges) so that blunt size distinctions based on number of

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[6] This seems to have been similar to a problem faced by Ulmer (1997) who introduces demographic variables and then does not use them in his analysis of sentence length. The Myers and Talarico (1987) study also had the good fortune to have data from more than one year for an entire state.

judges or felony filings fail to provide sufficient differentiation. Consequently, the conventional approaches to modeling court context at the aggregate level do not fit the context of our particular study.

An interesting aspect of Ulmer's (1997) study is how he combines statewide aggregate analysis with a small number of case studies. One of his principal findings is that individual jurisdictions are characterized by distinctive cultures that manifest themselves in different "going rates."[7] Although we did not conduct individual case studies, we can still determine the extent to which local variation manifests itself in the form of different going rates. We accomplish this assessment of "local legal culture" through the inclusion of individual site dummy variables (leaving the largest court as the base category).

Sentencing in Michigan

The empirical foundation of this book is a research project conducted by the National Center for State Courts in conjunction with the Michigan Sentencing Commission and Michigan Department of Corrections. In 1997 the Michigan Sentencing Commission collected data from 1995 to evaluate the likely impact of updating and expanding Michigan's existing sentencing guidelines. This 1995

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[7] Quoting Strauss (1978, 124-5), Ulmer (1997 27) illustrates the role that individual court organization might have.

> Within each social world, various issues are debated, negotiated, fought out, force, and manipulated by representatives of the manipulated subworlds. . . . Some and probably most organizations can be viewed as arenas wherein members of various subworlds engage in various strategies, stake different claims, seek differential ends, engage in contests, and make or break alliances in order to do the things they wish to do.

One consequence of such social worlds should be the presence of variation in the local "going rates."

data, which reflects the structure of the sentencing guidelines system instituted by the Michigan Supreme Court in 1988, is fundamental to our analysis, and our ability to test our theory of sentencing. The Michigan Sentencing Guidelines, which have received little coverage in published reviews, warrant a closer look.

A Short History of the 1988 Sentencing Guidelines

The Michigan Sentencing Guidelines have gone through several distinct stages of development. The movement toward sentencing guidelines began in late 1978 with the Michigan Felony Sentencing Project (MFSP). The project collected extensive data on one-fourth of the state's felony sentences from 1977, approximately 6,000 cases. After a rigorous statistical analysis, the MFSP produced a report entitled *Sentencing in Michigan* (Zalman and Ostrom, 1979). The report found significant disparities in Michigan sentencing practices – the most troubling of which was that black offenders received significantly longer sentences than similarly situated white offenders. In addition, it also found a troublesome lack of consistency in sentencing practice – from a given fact situation it proved impossible to predict accurately the resulting sentence. The report concluded with a set of recommendations that included developing a set of sentencing guidelines.

Around this time, guideline efforts were also underway in both Minnesota (a sentencing commission formed in 1978 and guidelines took effect in 1980) and Pennsylvania (a sentencing commission formed in 1978 and guidelines took effect in 1982). In both states the guidelines were simple two-dimensional designs. In both systems a criminal history score was placed on the horizontal axis, and a severity of the offense score was palced on the vertical axis. These two guideline systems gained national notoriety and soon became the model for most of the twenty or so sentencing guideline systems in the United States.[8]

Despite occasional conversations with representatives from the Minnesota and Pennsylvania commissions, Michigan's guidelines were developed and implemented in relative isolation and outside the national spotlight. In many ways, the development of guidelines in Michigan was akin to evolution on an isolated island – a different species of sentencing guidelines evolved.[9] Primarily, this is because the Michigan guidelines were developed under the auspices of the Michigan Supreme Court as a means of institutional self-restraint and to keep the Legislature from engaging in its own guidelines effort. Because the effort progressed out of the limelight, much of the design initiative came from the research staff in Michigan.[10] A short review of the process is informative.

In late 1979 and early 1980 a sentencing guidelines advisory committee developed an initial set of sentencing guidelines. The idea was to create guidelines to structure judicial decision-making through the predictable application of uniform rules. The guidelines were then pilot tested in three

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[8] The following sentencing guideline systems build upon the original Minnesota and Pennsylvania model: Arkansas (1994), Kansas (1993), Louisiana (1992), Massachusetts (proposed), Missouri (1997), North Carolina (1994), Ohio (1996), Oklahoma (1998), Oregon (1989), South Carolina (proposed), Utah (1995), Washington (1984).
[9] Interestingly, the other unique guideline system was developed in Virginia. To our knowledge there was no cross fertilization between the two systems. Not only are these two systems different from the other systems, they are different from one another.
[10] Staff included: Charles Ostrom, Brian Ostrom, James McComb, Garret Peaslee, and Kevin Bowling.

courts in 1981. After some minor alterations, the Michigan Supreme Court issued Administrative Order 1983-3, which indicated that judges were "invited" but not required to use the guidelines for a one-year period. The purpose of the pilot test was "to assist the Supreme Court in evaluating the sentencing guidelines." But voluntary usage of the guidelines did not generate a sufficient sample for a comprehensive evaluation because few judges voluntarily complied. To enlarge participation, the Supreme Court issued Administrative Order 1984-1, which required all judges to use the guidelines. This order was then extended indefinitely with the Court's Administrative Order 1985-1. During this period, the Sentencing Guideline Advisory Committee gathered information from 70,000 cases to evaluate the guidelines. The 2nd edition of the Sentencing Guidelines (1988) was promulgated via Administrative Order 1988-4, which declared:

> Whenever a judge of the circuit court or of the Recorder's Court for the City of Detroit determines that a minimum sentence outside the recommended minimum range should be imposed, the judge may do so. When such a sentence is imposed, the judge must explain on the sentencing information report and on the record the aspects of the case that have persuaded the judge to impose a sentence outside the recommended minimum range.

Over the next ten years, the 1988 sentencing guidelines were used without alteration.

An Overview of the Michigan Sentencing Guidelines

Sheila Robertson Deming has been active in many phases of guideline development in Michigan, and is knowledgable as both an insider and a practitioner. In a recent article in the *Michigan Bar Journal* she offered a short summary of sentencing in Michigan. She concluded that the purpose of the sentencing guidelines "was to provide sentencing norms, to minimize disparity, and to promote consistency in sentencing without eliminating sentencing discretion," and provided the following historical overview:

> Michigan has primarily an indeterminate felony sentence structure in which all three branches of government play a role: The maximum term is set by the Legislature, the minimum is set by the sentencing judge, and the actual time served by a defendant sentenced to prison is determined by the parole board in the executive branch. The determination of an appropriate minimum sentence was traditionally left to the broad discretion of the trial court bench. In some cases, that discretion allowed a minimum sentence as short as a few months or up to a life sentence. The judiciary implemented institutional self-restraints within that broad discretion over the years to temper the potential for abuse. In 1983, the Michigan Supreme Court unanimously held in *People v Coles* that it had the power to review sentences imposed by trial courts for an abuse of sentencing discretion that "shocked the conscience" of the appellate courts. In 1990, having determined that the "shocks the conscience" standard had proved insufficient for meaningful appellate review of sentencing, the Court held in *People v Milbourn* that sentencing discretion would henceforth be reviewed to determine whether a sentence was proportionate to the offense and the offender. In the meantime, the Michigan Supreme Court established a task force to consider the development and use of sentencing guidelines to determine the appropriate minimum term of a sentence. In 1984, the Court promulgated its first edition of sentencing guidelines, which it required the trial bench to use by administrative order. The judicial guidelines, which included less than 100 frequently occurring felony offenses, were not policy directed, but were a statistical reflection of the actual sentences being imposed by the trial bench. A second edition was promulgated in 1988, reflecting additional sentencing data collected in the interim. While use of the guidelines for included offenses was required, actual sentencing within the guidelines was not. A judge could "depart" from the guidelines' range by simply explaining the aspects of the case that warranted departure. A departure from the guidelines in the absence of factors not adequately reflected in the guidelines served to "alert" the appellate court to the possibility of a disproportionate sentence. Although the Supreme Court continued its data collection on the use of, and departure from, the guidelines after 1988, it never issued another edition of the guidelines and, over time, placed less reliance and emphasis on its guidelines in appellate review of sentencing.

The key points here are that the guidelines were "descriptive," in that they closely reflected past judicial behavior in sentencing, and that there was no penalty for judges who departed from the guidelines (i.e., "actual sentencing within the guidelines was not required"). The 1988 guidelines were not modified or revised until after the formation of the Michigan Sentencing Commission in the late 1990s.[11]

Design Features

Dimensionality. From the beginning the Michigan sentencing guidelines have been four dimensional in design – for each statutory maximum (dimension #1) in each of ten crime types (dimension #2) the sentence is determined by the intersection of a Prior Record Score (dimension #3) and an Offense Severity Score (dimension #4). The first dimension captures the statutory seriousness of the instant offense. The Michigan Compiled Laws note the following statutory maximums: life, 20 years, 15 years, 14 years, 10 years, 8 years, 5 years, 4 years, 3 ½ years, 3 years, 2 ½ years, and 2 years. The second dimension relates to the type of offense. In Michigan all felonies are divided into ten

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[11] The legislative guidelines were developed in response to lack of action on the part of the Michigan Supreme Court. Public Act 445 of 1994 created the Michigan Sentencing Commission to evaluate and recommend legislative sentencing guidelines. Among the first actions taken by the MSC was the adoption of a mission statement. "It is the mission of this Commission, based upon statutory mandates and the collective philosophy of its members, to: Develop sentencing guidelines which provide protection for the public, are proportionate to the seriousness of the offense and the offenders' prior criminal record, and which reduce disparity in sentencing throughout the state. Recommend intermediate sanctions and alternatives to traditional incarceration where appropriate. Evaluate and consider the impact and effectiveness of the recommended guidelines on state and local correctional resources. Develop a system to facilitate the initial and continued training of judges, probation officers and others who will use the guidelines and to monitor compliance once the guidelines are enacted."

generic classes of crimes: *assault, burglary, CSC, drug, fraud, homicide, larceny, property destruction, robbery, and weapons possession.* Combining these ten classes of crimes with various statutory maximums for each produces 50 separate sentencing grids. The third dimension captures the specifics of the instant offense. To our knowledge, the Michigan guidelines were the first to include factors relevant to the instant offense.[12] The final dimension focuses on the extent of the offender's prior record.

The factors included in the latter two dimensions – offense severity and prior record – meet five criteria:

- The variables are "non-prejudicial" in that potentially discriminatory factors based on demographic and socioeconomic considerations have been excluded.
- The variables are uniformly mitigating or aggravating. Factors such as the nature of the prior relationship between the offender and the victim have been excluded because the effect could be either aggravating or mitigating, depending on the circumstances.
- The variables focus on matters that occur frequently. The guidelines are not cluttered with rare occurrences.
- The variables relate to the goals of sentencing (e.g., deterrence, punishment).

[12] At least two states have developed slightly different ways of incorporating factors related to the nature of the offense into their guidelines system – Florida and Virginia.

- The variables are "objective" to the extent that it is possible to write instructions that lead most people to the same categorical decisions. For example, given the difficulty of measuring "regret," there is no variable for "remorse."

As examples of offense and prior record variables consider the following:

OV 1	**Weapon: Presence, Type, and Use**
25	Firearm discharged by offender during commission of the offense.
15	Firearm pointed toward victim, or victim touched with another weapon.
5	Firearm displayed, implied, possessed, or another weapon displayed.
0	No firearm displayed, implied, or possessed, or no other weapon.

PRV 1	**Prior High Severity Felony Convictions**
50	Two or more prior high severity felony convictions.
25	One prior high severity felony conviction.
0	No prior high severity felony convictions.

Determining the Sentence. For each combination of statutory maximum and crime class an offender's sentence is determined by the intersection of the offense and prior record scores. The offense dimension concerns the nature of the instant offense. Offense level is determined by evaluating each offender in relation to as many as twenty-five offense variables; including *aggravated use of weapon, physical attack/injury, multiple victims, exploitation of a vulnerable victim, psychological injury to victim, and contemporaneous criminal acts*. After scoring each of the relevant offense variables, offenders are placed into one of four offense levels—I (lowest), II, III, and IV (highest) – based upon the following point values:

Offense Variable Levels

I	0-9 points
II	10-24 points
III	25-49 points
IV	50+ points

The prior record dimension measures the extent and composition of the offender's prior record. The prior record level is determined by evaluating each offender on the following seven variables: *prior high severity felony convictions, prior low severity felony convictions, juvenile—high severity adjudications, juvenile—low severity adjudications, prior misdemeanor convictions, prior relationship to the criminal justice system,* and *subsequent/concurrent felony convictions.* After each of these variables is scored, offenders are placed into one of four prior record levels—A (lowest), B, C, or D (highest) – based on the following point values:

Prior Record Levels

A	0 point
B	1-24 points
C	25-49 points
D	50+ points

To get an idea of how these features work together, Figure 5-3 presents the sentencing grids for all of the five statutory maximums that fall into the assault crime group.

Figure 5-3 – Assault Sentencing Guidelines

LIFE

Offense Level	Prior Record Level A	B	C	D
I	0-36	12-36	24-60	60-120
II	12-48	24-60	48-96	96-240
III	60-144	72-180	96-240	120-300
IV	84-180	96-180	120-300	180-300

120 Months

Offense Level	Prior Record Level A	B	C	D
I	0-9	0-12	0-24	12-60
II	0-12	0-24	12-36	24-72
III	0-24	12-36	24-60	36-80
IV	12-48	24-60	36-80	48-80

60 Months

Offense Level	Prior Record Level A	B	C	D
I	0-6	0-12	0-12	12-36
II	0-12	0-12	0-12	18-40
III	0-12	0-12	12-36	24-40
IV	12-40	18-40	24-40	30-40

48 Months

Offense Level	Prior Record Level A	B	C	D
I	0-6	0-9	0-12	12-32
II	0-9	0-12	0-12	12-32
III	0-12	0-12	6-24	12-32
IV	0-12	12-24	12-32	24-32

24 Months

Offense Level	Prior Record Level A	B	C	D
I	0-6	0-9	0-12	6-12
II	0-9	0-12	0-12	6-12
III	0-12	0-12	0-12	9-16
IV	6-12	6-12	12-16	12-16

When the offense and prior record dimensions are taken together, there are 16 cells in each sentencing grid. The various combinations of statutory maximum and crime group create 50 4x4 sentencing grids. Taken as a whole the Michigan Sentencing Guidelines consists of 800 grid cells.

Recommended Ranges. The recommended ranges in each grid cell were based upon data from over 50,000 actual cases. They are – like the Virginia Sentencing Guidelines – historically based with normative adjustments. In most instances, the ranges were set to encompass 75% of the actual sentences, in anticipation that departures above and below would be of a similar magnitude. Thus the recommended ranges represent the current practice of the majority of Michigan Circuit and Recorder's Court judges. Finally, it should be clear that the recommended ranges in Michigan are not presumptive – they are intended to provide judges with information concerning current practice in relation to various types of offenses.

With respect to the impact of the guidelines on the sentence type decision, it is important to note that every grid – with the exception of the *homicide – life* grid - has at least one sentence range minimum of 0. Any grid cell with a minimum of less than 12 months allows the judge to give any available intermediate sanction. In other words, values below 12 do not mandate jail time, but were included to provide judges with some indication of the relative seriousness of the particular combination of offense and prior record.

Furthermore, the sentence range in most grid cells is wide (compared to the statutory maximum). Analysis of the 1995 data shows that in 57% of cases a judge could sentence the offender to either a local jail community sanction or a prison sentence without departing from the sentencing guidelines. Taken together, the 1988 sentencing guidelines did not proscribe judges from much of what they had already been doing.

Departure Policy. Not only are the recommended ranges wide, there is no onus for departing from the guidelines. In theory, the idea is that departures were to be encouraged, and after collecting the reasons for such departures future iterations of the guidelines could be adjusted to include additional factors. Through many interviews the authors found that Michigan judges did not feel at all constrained by the sentencing guidelines

Judges who departed from the recommended range were required to include a "substantial and compelling" reason on the record, as well as on the sentencing information report (SIR). As shown in Figure 5-4, over 87% of all sentences fall within the recommended ranges (what is not obvious is that many judges/courts did not turn in their forms; it is estimated that only 65% of the forms were actually turned in). There was little in the way of appellate review of sentences, and more often than not the reasons given for departing from the guidelines – as recorded on the SIR – were absent or cursory. This provides further evidence that departing from the 1988 guidelines was permissible. In fact, it was encouraged, as this was viewed as a learning period, and the guidelines were viewed as experimental. As we can see, the higher statutory maximums, which give judges the greatest overall discretion, produced the highest rates of departure.

Figure 5-4 -- Sentencing Guideline Compliance, 1995

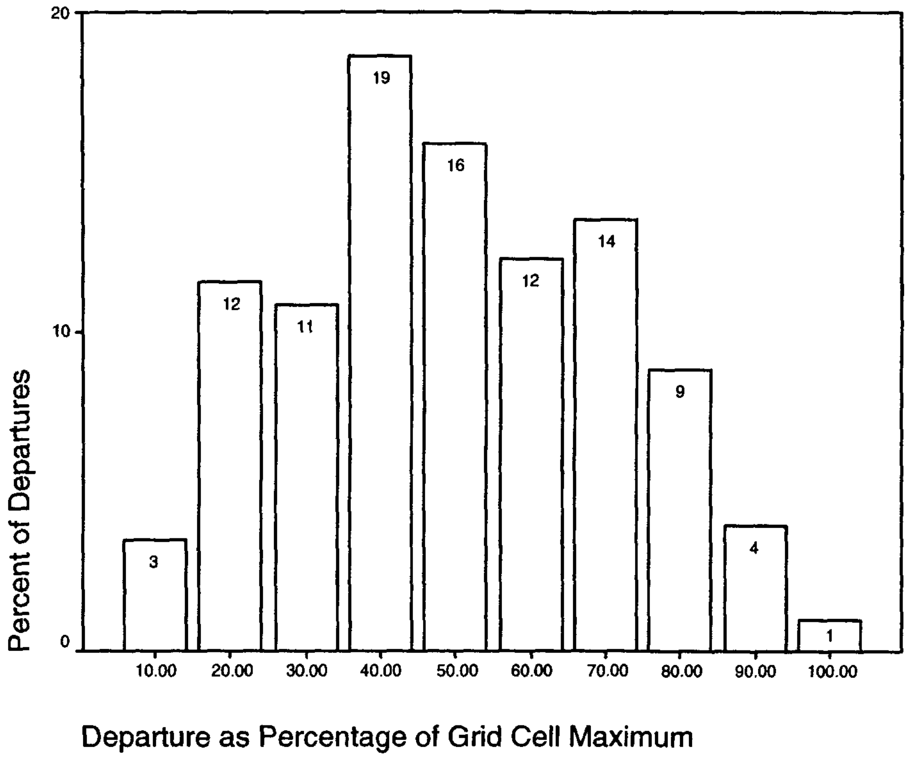
Crime Group	Statutory Maximum	Depart Below	Within Guidelines	Depart Above	Cases Sentenced
Assault	Life	22.5%	68.2%	9.3%	129
	120	13.4%	80.2%	6.4%	313
	60	4.8%	90.5%	4.8%	42
	48	8.4%	87.8%	3.9%	957
	24	4.4%	91.5%	4.1%	615
	Total	8.8%	86.6%	4.7%	2,056
Burglary	180	13.0%	83.3%	3.6%	192
	120	7.1%	88.4%	4.5%	688
	60	3.8%	93.3%	2.9%	315
	36	6.7%	93.3%		15
	30	12.5%	81.3%	6.3%	16
	Total	7.3%	88.8%	3.9%	1,226
CSC	Life	18.7%	73.3%	8.0%	187
	180-CSC 3rd	19.0%	77.4%	3.6%	221
	180-CSC 2nd	24.3%	70.2%	5.5%	403
	120	15.5%	77.3%	7.2%	97
	60	10.7%	85.5%	3.8%	234
	30	7.7%	84.6%	7.7%	13
	24	3.9%	91.1%	5.0%	360
	Total	15.2%	79.5%	5.3%	1,515
Drug	240	40.6%	58.8%	0.6%	1,030
	84	3.0%	89.6%	7.5%	67
	60	3.5%	93.6%	3.0%	404
	49	4.8%	90.9%	4.3%	2,270
	48	86.3%	11.8%	2.0%	51
	42	8.3%	91.7%		12
	30	25.0%	75.0%		4
	24	1.1%	95.4%	3.5%	804
	Total	12.9%	83.9%	3.2%	4,642

Figure 5-4 -- Sentencing Guideline Compliance, 1995 (continued)

Crime Group	Statutory Maximum	Depart Below	Within Guidelines	Depart Above	Cases Sentenced
Fraud	168	14.2%	83.8%	1.9%	464
	120	9.6%	87.4%	2.9%	477
	84		100.0%		5
	60	2.4%	95.1%	2.6%	508
	48	1.5%	97.3%	1.2%	401
	42		100.0%		2
	30		81.8%	18.2%	22
	24	3.1%	91.9%	5.0%	383
	Total	6.3%	90.9%	2.8%	2,262
Homicide	Life	8.9%	77.4%	13.7%	146
	180	12.4%	77.7%	9.9%	121
	Total	10.5%	77.5%	12.0%	267
Larceny	60	5.2%	90.4%	4.4%	1,794
	48	2.3%	93.3%	4.4%	566
	30	2.9%	94.2%	2.9%	549
	24	2.0%	89.8%	8.2%	635
	Total	3.8%	91.3%	4.9%	3,544
Property Destruction	240	10.2%	87.8%	2.0%	49
	120	18.8%	72.9%	8.3%	48
	60		100.0%		12
	48	5.1%	91.7%	3.2%	506
	24	2.2%	87.9%	9.9%	232
	Total	5.3%	89.5%	5.2%	847
Robbery	450	14.5%	80.7%	4.7%	592
	180	16.4%	81.9%	1.8%	226
	120	11.3%	86.0%	2.7%	150
	60	5.9%	85.9%	8.2%	85
	Total	13.8%	82.1%	4.1%	1,053
Weapons	60	3.4%	93.1%	3.4%	1,167
	30	1.1%	94.0%	4.9%	367
	Total	2.9%	93.4%	3.8%	1,534
TOTAL		**8.6%**	**87.2%**	**4.1%**	**18,947**

To get an idea of the extent to which judges departed, when they departed, from the recommended range, Figure 5-5 presents the distribution from 1995:

Figure 5-5: Departures from Recommended Range, 1995



As we can see, once the judge decided to depart the magnitude of the departure (expressed as a percentage of the grid cell maximum) was quite large. Despite the 1988 sentencing guidelines, the reality is that judges faced few constraints on their sentencing practices. As Deming noted: "The use of the guidelines for included offenses was required, actual sentencing within the guidelines was not."

Time Served. During the period of this study the maximum amount of "good time" that an offender could receive was 17%. The average offender served 85%-90% of the uttered sentence. Michigan's parole board is reluctant to parole violent offenders the first time they are eligible. In a recent review of the Michigan Parole Board[13], the Michigan Department of Corrections concluded that between 1992 and 1995 the likelihood of parole decreased, especially for violent and assaultive offenders. The report showed that only 55% of all parole board decisions approved parole (down 11%), and the average violent offender served 105% of the minimum sentence.

Caveat. The Michigan Guidelines were not modified after their inception in 1988. Consequently, as new offenses were created they were statutorily excluded from the sentencing guidelines. As a result, in 1995 over 25% of all convictions did not fall under the purview of the sentencing guidelines. Couple this with relatively wide ranges within the grid cells (over half of all offenders sentenced under the 1988 sentencing guidelines were eligible for an intermediate sanction, jail, or prison sentence), and a laissez-faire departure policy, and it seems clear that the sentencing guidelines in place during the study period placed only limited constraint on judicial discretion.

[13] *Five Years After: An analysis of the Michigan Parole Board since 1992.* Michigan Department of Corrections (September 1997)

The 1995 Data Set

The evaluation data set contained 1,509 cases chosen in a disproportionate and stratified random sample[14] from among 40,493 convictions in 1995. Because the data was originally collected to evaluate Michigan's sentencing guidelines, prison-bound cases were over-sampled. Furthermore, to streamline the data collection process, the Commission chose to extract the sample cases from Michigan's twelve largest counties.

The data was chosen so that each county's contribution to the final data set was proportional to its percentage of the total convictions among the twelve target counties. In 1995 these twelve counties accounted for 74% of all of the convictions in the entire state. As such, even though they were not representative of the state as a whole – the other 25% of the cases come from 71 smaller counties – they were representative of those portions of the state where the vast majority of felony cases were resolved.

For each case in the sample the MSC obtained the pre-sentence investigation report and the Basic Information Report[15] (BIR). These sources were used, in turn, to score each case using the sentencing guidelines.[16] Scoring

[14] The stratification factor was the nine crime classifications. The more severe the crime type, the higher the sampling rate. To be able to forecast the impact on prison resources, it is necessary to over sample in those classifications that are likely to go to prison. In the resulting data set, it is anticipated that 40% of the offenders will have received a prison sentence compared to the state average of 24% in 1995.

[15] The BIR is the standard cover sheet used by the Department of Corrections. It has basic information on the offender (e.g., race, gender, employment, assets, prior convictions, charges).

[16] The presence of a sentencing guidelines system has a number of important implications for the present study. First, data were collected from the Sentencing Information Report (SIR) and the Basic Information Report (BIR), which are centrally collected for all cases sentenced in Michigan under the guidelines. Second, the factors that are reported on the SIR were developed by the

each case on the proposed sentencing guidelines insured that each case had a similar set of offense severity and prior record factors. For each of the prison cases the MSC had access to the actual prison sentence received by the offender. Many of the files did not contain sentencing information for those offenders who were not sent to prison. Since the MSC was primarily interested in the impact of the proposed guidelines on prison population this was not deemed a serious problem.

Given that the focus of our research required that we know the nature of the sentence for all offenders, it was necessary to augment the MSC data set. We asked each local probation staff to provide a copy of the *Judgment of Sentence* for each offender. In cooperation with the Department of Corrections, we obtained the *Judgment of Sentence* for most offenders who received a sentence other than prison in the twelve counties under study.[17]

We collected the relevant data for 100% of the prison sentences and 75% of non-prison sentences. Overall, 15% of the cases we studied did not include a sentencing outcome. Three quarters of the missing data was from Wayne County. As a result, while data problems existed in Wayne County, the remaining eleven counties were essentially complete. Appendix 5-1a addresses our solution to the problem of Wayne County's missing data.

Supreme Court Sentencing Guidelines Advisory Committee as representative of the legitimate considerations in sentencing of violent offenders. Moreover, use of the guidelines meant that each judge did look at each of these factors prior to handing down the sentence.

[17] The files for those offenders sentenced to prison are available in a central location in Lansing, Michigan. The files for offenders given a non-prison sentence remain in the local jurisdiction. While we had access to the central files for prison cases, it was necessary to secure the cooperation of the local officials to get access to data on the non-prison cases.

Conclusions

Chapter 5 concludes our presentation of the conceptual issues that guide the development of our two-equation model of sentencing and the data sources used to test it. The data and variables presented in this chapter will be used in subsequent chapters to account for the observed variations in sentencing patterns among judges in both the sentence type and sentence severity decisions. In chapters 6 and 7, we will estimate models for both of these equations. And, after doing so, we will thoroughly investigate the existence and degree of disparity and discrimination in sentencing decisions.

Appendix 5-1: The Data Set

Appendix 5-1a: Weighting the Sample

The sample was drawn according to the Michigan Sentencing Commission's crime classification system, which arrays all possible offenses into ten crime classes. We kept *murder 2nd* in its own category, but the rest of the categories identify sets of offenses similar in terms of seriousness in the eyes of the MSC. Figure A5-1a provides some basic information about the completeness of the sample. As we can see, in the top panel the sample was designed to over-sample classes A, B, C, D, and *murder 2nd*. The second panel in Figure A5-1a shows that the primary reason for missing data is that we did not receive the Judgment of Sentence for one-third of the Wayne County offenders.

Figure A5-1a: The Basic Data Set

Crime Class	Total	% of Sample	Crime Class as % of Population	In Sample	% Missing
A	182	12%	4.2%	171	6%
B	100	7%	1.1%	98	2%
C	247	16%	6.5%	214	13%
D	247	16%	10.4%	207	16%
E	262	17%	27.6%	199	24%
F	217	14%	10.6%	185	15%
G	48	3%	3.6%	31	35%
H	91	6%	15.6%	74	19%
I	96	6%	18.2%	79	0%
M2	31	2%	0.7%	30	3%
Total	1,521			1,288	15%

County	In Sample	Missing	Total	% Missing
Genesee	102	9	111	8%
Ingham	56	2	58	3%
Jackson	35	5	40	13%
Kalamazoo	67	2	69	3%
Kent	146	2	148	1%
Macomb	82	10	92	11%
Muskegon	49	0	49	0%
Oakland	221	14	235	6%
Ottawa	30	3	33	9%
Saginaw	62	4	66	6%
Washtenaw	46	1	47	2%
Wayne	392	181	573	32%
Total	1,288	233	1,521	15%

Outcome	In Sample	Missing	Total	% Missing
Prison	577	0	577	0%
No Prison	711	233	944	25%
Total	1,288	233	1,521	15%

Given that the original sample is a disproportionate random sample, it is necessary to weight the data prior to analysis.[18] Because the original sample was drawn from a clear sampling frame – the MDOC list of all convictions in the State of Michigan – it is possible to weight the data to reflect the intended sample, and thereby the population of Michigan offenders from the 12 largest counties.

The bottom panel of Figure A5-1a divides the sample into prison and non-prison sentences. As we can see, we collected all of the data for prison cases. Figure A5-2a reveals, however, a substantial variation, by both county and crime class, in the percentage of data that is present in the final data set. While we can use the original weights for the prison cases (based solely on the crime class as a percentage of the overall population), we can adjust the crime class weights to reflect the proportion of the county's cases for which data is available.

Figure A5-2a presents the weighting matrices that we used in this study. The weights in the first row are those that were applied to the prison cases in the sample. The weights are constructed to insure that the prison cases reflect the overall population composition – by crime class – of the prison population. The second set of county level weights accounts for the missing data in each county. There is one weight for each of the 120 combinations of county and crime class. The primary effect of this weighting scheme is to insure that cases

[18] In addition to weighting the data to represent the population distribution of the crime classes, it is also possible to weight the data in a way that overcomes some of the missing data problems.

from Wayne County are proportionally represented in the final data. The sample size remains at approximately 1500 cases.

Figure A5-2a

Table A1-2: The Weighting Matrix

	Weight factor for all prison bound cases									
	0.35	0.16	0.40	0.64	1.60	0.74	1.14	2.60	2.89	0.35
County	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**M2**
	Weight factor for all alternative sentencing cases (crime class and county)									
Genesee	0.70	0.16	0.40	0.70	2.13	0.74	1.52	5.20	2.89	0.35
Ingham	0.35	0.16	0.40	0.64	1.79	0.74	1.14	2.60	2.89	0.35
Jackson	0.35	0.16	0.60	0.96	1.60	1.85	1.14	2.60	2.89	0.35
Kalamazoo	0.35	0.16	0.40	0.80	1.60	0.74	1.14	2.80	2.89	0.35
Kent	0.47	0.16	0.43	0.64	1.60	0.74	1.14	2.60	2.89	0.35
Macomb	0.35	0.16	0.48	0.96	2.00	0.78	1.14	3.90	4.62	0.35
Muskegon	0.35	0.16	0.40	0.64	1.60	0.74	1.14	2.60	2.89	0.35
Oakland	0.35	0.16	0.43	0.77	1.64	0.85	1.71	2.60	3.13	0.35
Ottawa	0.35	0.16	0.40	0.64	3.20	0.74	1.14	3.47	2.89	0.35
Saginaw	0.35	0.16	0.40	0.64	1.96	0.85	1.14	2.60	2.89	0.35
Washtenaw	0.35	0.16	0.40	0.77	1.60	0.74	1.14	2.60	2.89	0.35
Wayne	1.75	0.20	0.83	1.28	3.71	1.48	2.59	5.20	4.68	0.35
	Weight factor for all alternative sentencing cases (crime class only)									
	0.37	0.16	0.46	0.76	2.11	0.87	1.77	3.20	3.51	0.36

Appendix 5- 1b: Analysis Data Set

As noted in our discussion, we drew our sample using disproportionate sampling rates. Consequently, our analysis must utilize the sampling weights. The analysis in the following chapter utilizes Stata statistical package, while the previous analyses have used SPSS. One could take two approaches in weighting the data. First, one could use the iw – the weight procedure in Stata. The problem with this approach is that it does not work for testing of a number of key assumptions. The second approach – and the one we follow – is to utilize the following SPSS procedure:

```
COMPUTE WAIT4=WAIT3*(100/16).
IF (WAIT3 = 99)WAIT4=0.
LOOP V1= 1 TO WAIT4.
XSAVE OUTFILE = 'TEMP5.SAV'.
END LOOP.
EXE.
GET FILE = 'TEMP5.SAV'.
```

We multiple the original sampling weights, WAIT3, by a number that insures that the smallest sampling weight is 1.00; in this case the 100/16 term accomplishes this. The remaining steps duplicate the sample cases as many times as called for by the revised sampling weights. The result is that the data set is inflated to 20,542 observations. To get our analysis sample, we took a random sample from the inflated data set that yielded approximately 1500 sample cases (Figure A5-1b).

```
USE ALL.
COMPUTE filter_$=(uniform(1)<=.058).
```

```
VARIABLE LABEL filter_$ 'Approximately 5.8 % of cases (SAMPLE)'.
FORMAT filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE .
```

This procedure resulted in a data set with 1509 observations.

Figure A5-1b

	Weighted Sample			Estimation Sample			Difference of
Variabless	N	Mean	Std. Dev	N	Mean	Std. Dev	Means t-test
Sentence Type	1493	1.479	1.171	1509	1.510	1.170	-0.71
Senunit	352	5.801	4.057	343	6.044	4.336	-0.76
Maxunit	1493	9.837	4.472	1509	9.847	4.462	-0.06
Offense Seriousness Scale	1493	-0.115	1.491	1509	-0.153	1.466	0.71
Prior Record Scale	1493	0.440	1.658	1509	0.384	1.613	0.94
Drug Conviction Offense	1493	0.246	0.431	1509	0.257	0.437	-0.66
Property Conviction Offense	1493	0.366	0.482	1509	0.357	0.479	0.52
Convicted at Trial	1493	0.082	0.274	1509	0.080	0.271	0.23
Privately Retained Attorney	1493	0.198	0.399	1509	0.207	0.406	-0.65
Gender	1493	0.789	0.409	1509	0.785	0.411	0.21
Race	1493	0.557	0.497	1509	0.560	0.497	-0.17
Drug Use	1493	0.425	0.495	1509	0.431	0.495	-0.30
Age <= 21	1493	0.201	0.401	1509	0.199	0.399	0.15
Arrest < 18	1493	0.322	0.467	1509	0.317	0.465	0.28
Metropolitan Courts	1493	0.234	0.424	1509	0.221	0.415	0.89
Northern Courts	1493	0.109	0.312	1509	0.123	0.328	-1.16
Western Michigan Courts	1493	0.215	0.411	1509	0.200	0.400	1.04

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CHAPTER 6: A MODEL OF THE SENTENCE TYPE DECISION

Introduction

In the context of sentencing decision making, there have been many attempts to model the judge's decision concerning the type of sentence given the convicted offender. Chapter 3 provides a theoretical argument that the sentence type decision cannot be organized along a single dimension – at a minimum there are at least two operative dimensions to the decision. The possibility of a second dimension increases the complexity of the modeling process. To analyze judicial decision-making, it is imperative that we know the options that judges consider. Once the options are identified, it is possible to assess the impact of the wide range of sentencing relevant variables on the five options facing the sentencing judge. This assessment should provide a firm foundation from which to assess the possibility and/or extent of consistency and discrimination in sentencing.

We develop a typology of 20 distinct sentence types in Chapter 3. Within each type, many options exist. Recognizing that individuals are constrained in their consideration of alternatives, we explored the way in which judges might organize the sentencing options. A sample of judges were asked to compare the 20 sentencing options through a paired comparison exercise. The multidimensional scaling analysis showed four primary classes of non-prison sentences that we labeled Restraint, Rehabilitation, Rebuke, and Restitution. These five categories of sentence (i.e., Prison, Restraint, Rehabilitation, Rebuke, and Restitution) form the judicial choice set used in the remainder of this chapter. Moreover, the earlier analysis also showed that these sentence types do not fall along a single dimension and call for a different type of statistical model than has previously been used in the sentencing literature.

A Statistical Model of the Sentence Type Decision

Our specification of the statistical model for sentence type is based on a decision rule that captures the process used by the judge to evaluate the offender's sentencing relevant attributes and select from the sentencing choice set. In the statistical model that follows, we assume each judge associates a value or utility with each option and selects the sentencing alternative with the highest utility. The model also accommodates uncertainty in the decision process. We follow in the tradition of those who assume a deterministic decision rule and that uncertainty enters the process due to limitations of the decision maker (e.g., limited capacity to recognize attributes). The uncertainty is captured by a random component in the utility function. This type of model is classified as a random utility model.

Random Utility Model

Because sentencing is a complex task, any decision rule should include a probabilistic dimension. Random utility models, as Ben-Akiva and Bierlaire (1999) point out, provide one means to model the decision rule. While the random utility model assumes that the judge has perfect discrimination ability, it is also assumed that a judge has incomplete information and a degree of uncertainty is incorporated. Utility is modeled as a random variable to reflect the inherent uncertainty in the choice situation. The utility that judge n associates with alternative i in the choice set C_n is given by:

$$U_{in} = \mu_{in} + \varepsilon_{in} \tag{6.1}$$

where μ_{in} is the deterministic part of the utility and ε_{in} is the random term that captures the inherent uncertainty of the choice situation. The alternative with the highest utility is chosen. As an example consider choosing between two elements of the set C_n. The probability of choosing i over j is given by:

$$\begin{aligned}
&\Pr(y_i = 1) = \Pr(\mu_{i1} > \mu_{i2}) \\
&\Pr(y_i = 1) = \Pr(\mu_{i1} + \varepsilon_{i1} > \mu_{i2} + \varepsilon_{i2}) \\
&\Pr(y_i = 1) = \Pr(\varepsilon_{i1} - \varepsilon_{i2} > \mu_{i2} - \mu_{i1}) \\
&\Pr(y_i = m) = \Pr(\mu_m > \mu_j \, for\ all\ j \neq m)
\end{aligned} \tag{6.2}$$

The deterministic part of the utility μ_{in} of each alternative is assumed to be a linear function of the sentencing relevant variables; that is

$$\mu_{im} = x_i \beta_m \tag{6.3}$$

where x_{in} is the vector of sentencing relevant attributes presented in Chapter 5. Hence, the deterministic part of the utility is fully specified by the vector of parameters β. With respect to the random component, we follow convention and assume the error terms are independent and identically Gumbel distributed.

Multinomial Logit

As McFadden (1973) has shown, a multinomial logit model (hereafter MNLM) results if and only if the ε's are independent and have a type I extreme-value distribution:

$$f(\varepsilon) = \exp[-\varepsilon - \exp(-\varepsilon)] \qquad (6.4)$$

A type I extreme-value distribution looks like a normal distribution skewed to the right. Following upon this assumption, the probability that a judge gives a particular sentence j within the choice set is give by (Greene, 1997, 915)

$$\Pr(Y = j) = \frac{e^{b_j x_i}}{1 + \sum e^{b_j x_i}} \qquad (6.5)$$

Substituting the sentencing relevant variables from Chapter 5 and normalizing the odds ratio yields the following:

$$\ln\left[\frac{P(Z_i = j)}{P(Z_i = 0)}\right] = \gamma_0 + \sum_{j=1}^{J}\gamma_j B_{ij} + \sum_{k=1}^{K}\gamma_k O_{ik} + \sum_{l=1}^{L}\gamma_l P_{il} + \sum_{m=1}^{M}\gamma_m D_{im} + \sum_{n=1}^{N}\gamma_n C_{in} + \sum_{p=1}^{P}\gamma_p W_{ip}$$

where

Z_i = sentence type
B_{ij} = sentencing base
O_{ik} = offense factors
P_{il} = prior criminal history
D_{im} = defendant characteristics
C_{in} = case processing factors
W_{ip} = court community characteristics

As can be seen, the odds are computed without reference to any outcomes other than j or k. This is known as the independence of irrelevant alternatives property or IIA. McFadden (1973) provides an example that shows the relevance of this property.[19]

[19] As reported by Long (160) the example goes as follows: "A person has two choices for commuting to work: a private car that is chosen with Pr(car)=1/2 and a red bus with Pr(red bus)=1/2. The implied odds

The IIA assumption states that the ratio of the probability of any two alternatives is independent of the choice available – or the ratio of the choice of probabilities of any two alternatives is entirely unaffected by the systematic utilities of any other alternatives (Ben-Akiva and Bierlarie 1999). This assumption implies that the ratio of choosing a given sentencing option versus another sentencing option is unchanged if another sentencing option were added or subtracted from the choice set of sentencing alternatives.

Estimating the Model

We begin by assuming five sentencing outcomes available to judges (i.e., Prison, Restraint, Rehabilitation, Rebuke, and Restitution) and that these outcomes are mutually exclusive and exhaustive.[20] Unless otherwise stated, we use robust estimation with Prison as the baseline category.

The assumption of IIA and hence the applicability of multinomial logit can be tested by utilizing the Hausman test (Hausman and McFadden 1984).[21] This procedure tests the null hypothesis that the odds (outcome j versus outcome k)

---

of taking the car versus the red bus are 1 = (1/2)/(1/2). Suppose that a new bus company is started that is identical to the current service except that the buses are blue. IIA requires that the new probabilities are: Pr(car)=1/3; Pr(red bus)=1/3; and Pr(blue bus)=1/3. This is necessary so that the odds of a car versus a red bus remain at 1=(1/3)/(1/3). However, if the only thing to distinguish the new bus service from the old is the color of the bus, we would not expect car travelers to start taking the bus. Instead, the share of the red bus riders would be split, resulting in Pr(car)=1/2; Pr(red bus)=1/4; and Pr(blue bus)=1/4. The new, implied odds ratio for car versus red bus are 2=(1/2)/(1/4), which violates the IIA assumption. The IIA assumptions requires that if a new alternative becomes available, all probabilities for the prior choices must adjust in precisely the amount necessary to retain the original odds among all pairs of outcomes. Thus the probability of driving a car can be made arbitrarily small by adding enough different colors of buses!"

[20] Having established that multinomial logit is an appropriate technique, the actual estimation process will be undertaken utilizing the *mlogit* command in Stata.

[21] We used the mlogtest command presented in Stata Technical Bulletin STB-58 (November 2000). The authors of the technical bulletin are Freese and Long. Hereafter we refer to the bulletin as Freese and Long (2000).

are independent of other alternatives. If the Hausman test for IIA is not met, multinomial logit is an inappropriate technique for estimation.

The number of parameters estimated in the basic model is considerable (Table 6-1). With twenty-four variables plus a constant term, there are 100 parameter estimates displayed in Table 6-1.[22] After testing for the important statistical assumptions and looking at some aggregate results, we turn our attention to making sense of these estimates.

[22] We have chosen to not include the court dummy variables in this analysis. Given the large number of parameters and the sometimes small N's, the estimation algorithm is more stable when these are omitted. We will take an in-depth look at the individual court effects in Chapers 7 and 8.

Table 6-1: Multinomial Logit Estimates

Variable	Coef.	Robust Std. Err	z	P>|z|	Variable	Coef.	Robust Std. Err	z	P>|z|
	Restraint					Rebuke			
Statutory Maximum	-0.96	0.11	-8.52	0.00	Statutory Maximum	-1.37	0.15	-9.35	0.00
Weapon	-1.74	0.39	-4.43	0.00	Weapon	-1.38	0.48	-2.90	0.00
Physical Injury	-1.02	0.47	-2.15	0.03	Physical Injury	-2.85	1.11	-2.56	0.01
Exploitation	-0.80	0.40	-2.01	0.04	Exploitation	-0.02	0.43	-0.05	0.96
Leader	0.06	0.33	0.19	0.85	Leader	0.20	0.39	0.51	0.61
Pattern	-1.19	0.27	-4.41	0.00	Pattern	-1.28	0.32	-3.96	0.00
Drug	-0.24	0.25	-0.97	0.33	Drug	0.92	0.31	2.92	0.00
Property	0.24	0.23	1.04	0.30	Property	0.21	0.30	0.71	0.48
High severity prior	-1.20	0.28	-4.34	0.00	High severity prior	-0.06	0.37	-0.15	0.88
Low severity prior	-0.34	0.21	-1.60	0.11	Low severity prior	-1.33	0.31	-4.23	0.00
Misdemeanor conv.	-0.17	0.23	-0.74	0.46	Misdemeanor conv.	-1.10	0.37	-2.95	0.00
Current relation CJ	-0.42	0.21	-1.99	0.05	Current relation CJ	-1.22	0.29	-4.15	0.00
1st arrest before 18	-0.24	0.21	-1.16	0.24	1st arrest before 18	-1.32	0.29	-4.53	0.00
Trial	-0.42	0.31	-1.36	0.18	Trial	-0.85	0.39	-2.18	0.03
Attorney	0.36	0.24	1.47	0.14	Attorney	1.08	0.28	3.92	0.00
Gender	-0.36	0.30	-1.18	0.24	Gender	-0.36	0.35	-1.01	0.31
Race	0.06	0.20	0.27	0.79	Race	0.49	0.25	1.93	0.05
Drug Use	-0.50	0.22	-2.25	0.03	Drug Use	-1.18	0.32	-3.74	0.00
Age 21-29	-1.11	0.32	-3.49	0.00	Age 21-29	-1.34	0.36	-3.73	0.00
Age 30-39	-0.30	0.34	-0.88	0.38	Age 30-39	-1.41	0.39	-3.58	0.00
Age 40-49	-0.92	0.39	-2.36	0.02	Age 40-49	-1.58	0.42	-3.73	0.00
Age >50	-0.63	0.43	-1.48	0.14	Age >50	-1.85	0.50	-3.71	0.00
Young black male	-1.43	0.42	-3.37	0.00	Young black male	-1.56	0.48	-3.27	0.00
Young drug user	0.01	0.48	0.03	0.98	Young drug user	0.29	0.58	0.50	0.62
Constant	6.68	0.63	10.57	0.00	Constant	8.34	0.76	10.94	0.00
	Rehabilitative					Restorative			
Statutory Maximum	-1.42	0.14	-10.23	0.00	Statutory Maximum	-0.93	0.13	-6.95	0.00
Weapon	-0.44	0.35	-1.27	0.20	Weapon	-1.24	0.57	-2.18	0.03
Physical Injury	-0.85	0.50	-1.70	0.09	Physical Injury	1.80	0.56	3.21	0.00
Exploitation	-0.08	0.46	-0.19	0.85	Exploitation	-1.34	0.69	-1.92	0.05
Leader	-1.01	0.43	-2.37	0.02	Leader	-0.06	0.37	-0.16	0.87
Pattern	-1.92	0.39	-4.96	0.00	Pattern	-0.05	0.37	-0.13	0.89
Drug	1.02	0.27	3.74	0.00	Drug	-0.18	0.57	-0.31	0.75
Property	0.49	0.27	1.82	0.07	Property	1.85	0.38	4.88	0.00
High severity prior	-0.97	0.32	-3.01	0.00	High severity prior	-1.47	0.59	-2.47	0.01
Low severity prior	-1.29	0.24	-5.34	0.00	Low severity prior	-0.68	0.33	-2.07	0.04
Misdemeanor conv.	-0.46	0.26	-1.77	0.08	Misdemeanor conv.	-0.15	0.35	-0.44	0.66
Current relation CJ	-1.33	0.25	-5.29	0.00	Current relation CJ	-0.44	0.36	-1.22	0.22
1st arrest before 18	-0.59	0.23	-2.53	0.01	1st arrest before 18	-1.58	0.40	-3.95	0.00
Trial	-2.45	0.42	-5.90	0.00	Trial	-0.11	0.37	-0.29	0.77
Attorney	0.65	0.26	2.54	0.01	Attorney	-0.23	0.38	-0.60	0.55
Gender	0.09	0.31	0.29	0.77	Gender	0.14	0.38	0.38	0.71
Race	0.83	0.23	3.56	0.00	Race	-0.05	0.30	-0.17	0.86
Drug Use	-0.86	0.24	-3.53	0.00	Drug Use	-0.82	0.32	-2.52	0.01
Age 21-29	-0.53	0.37	-1.45	0.15	Age 21-29	-0.94	0.52	-1.79	0.07
Age 30-39	-0.31	0.40	-0.78	0.44	Age 30-39	-1.52	0.67	-2.26	0.02
Age 40-49	-0.48	0.44	-1.07	0.28	Age 40-49	-0.74	0.61	-1.21	0.23
Age >50	-0.21	0.52	-0.40	0.69	Age >50	-0.29	0.57	-0.52	0.61
Young black male	-2.00	0.49	-4.06	0.00	Young black male	-0.22	0.61	-0.37	0.71
Young drug user	1.42	0.53	2.70	0.01	Young drug user	-0.46	0.92	-0.50	0.62
Constant	8.04	0.74	10.86	0.00	Constant	4.37	0.85	5.11	0.00
				Prison is the Comparison Group					

The results of the Hausman test of the IIA assumption show that each of the four chi-square values are positive and the null hypothesis cannot be rejected (Table 6-2). As such, we conclude that if a new sentencing option becomes available, all probabilities for the prior choices will adjust so as to retain the original odds among all pairs of outcomes. This result means multinomial logit is an appropriate technique for estimation.

Table 6-2: The Hausman Test

Omitted		*Degrees of Freedom*	*p>chi2*	*Evidence*
Restraint	2.12	75	--	For Null
Rehabilitation	20.22	75	1	For Null
Rebuke	24.41	75	1	For Null
Restorative	11.24	75	1	For Null

Null: Odds (Outcome J vs Outcome K) are independent of other alternatives.

Long (1997, 183) suggests that there are two additional tests that are useful when using MNLM: (1) a test to determine whether categories of the dependent variable can be combined and (2) a test to see whether the effect of each independent variable – across all categories – is zero. To determine if any of the outcome categories in the dependent variable can be combined, we conducted a series of Wald tests for combining outcome categories; these tests ascertain whether all coefficients except intercepts associated with a given pair of outcomes are zero. The results, presented in Table 6-3, show the hypothesis is rejected – all of the categories in the dependent variable are meaningful. In other words, none of the outcome categories of the dependent variable can be collapsed or combined. We conclude, therefore, that all categories of the sentence type variable are independent of one another. This finding supports the underlying assumption that judges consider five distinct types of sentences at the time of sentencing.

Table 6-3: The Wald Test for Combining Categories

Categories Tested	Chi Square	DF	P>chi square
Q1-Q2	194.21	24	0.00
Q1-Q3	114.50	24	0.00
Q1-Q4	155.52	24	0.00
Q1-Prison	224.56	24	0.00
Q2-Q3	85.24	24	0.00
Q2-Q4	167.52	24	0.00
Q2-Prison	375.96	24	0.00
Q3-Q4	158.36	24	0.00
Q3-Prison	311.90	24	0.00
Q4-Prison	280.70	24	0.00

Ho: All coefficients except intercepts associated with given pair

The results of a second test, conducted to see if all the coefficients associated with an independent variable are simultaneously equal to zero, are presented in Table 6-4. The Wald tests reveal that the null hypothesis (i.e., all coefficients associated with given variables are zero) can be rejected for each independent variable, except misdemeanor. This implies that (other than misdemeanor) all variables included in the model have a statistically significant effect on the predicted sentencing outcome.

Table 6-4: The Wald Test for Coefficient Significance

Variable	Chi Square	DF	P>chi square
Sentencing Base			
Statutory Maximum	144.45	4	0.00
Offense Factors			
Use of Weapon	24.58	4	0.00
Physical Injury	25.30	4	0.00
Exploitation of Victim	9.16	4	0.06
Leader (in multiple offender)	10.60	4	0.03
Continuing Pattern	38.90	4	0.00
Drug Offense	37.47	4	0.00
Property Offense	26.17	4	0.00
Prior Record Factors			
High severity prior	25.67	4	0.00
Low severity prior	39.31	4	0.00
Misdemeanor conv.	10.24	4	0.04
Current relation CJ	36.81	4	0.00
1st arrest before 18	32.27	4	0.00
Processing Factors			
Trial	38.29	4	0.00
Attorney	20.55	4	0.00
Defendant Characteristics			
Gender	6.76	4	0.15
Race	23.04	4	0.00
Drug Use	19.09	4	0.00
Age 21-29	20.34	4	0.00
Age 30-39	21.26	4	0.00
Age 40-49	17.01	4	0.00
Age >50	21.29	4	0.00
Young black male	23.16	4	0.00
Young drug user	13.85	4	0.01
Block Test			
Sentencing Base	144.45	4	0.00
Offense Factors	173.95	28	0.00
Prior Record Factors	256.16	20	0.00
Processing Factors	56.42	8	0.00
Defendant Characteristics	142.57	36	0.00

Null: All coefficients except intercepts associated with a given pair of outcomes are 0 (i.e., categories can be collapsed).

An examination of Table 6-4 reveals considerable variation in the magnitude of the chi-square statistics for this series of Wald Tests (i.e., testing the the null hypothesis that for a given variable all of the coefficients in the four equations are zero). The size of the chi-square statistic allows one to assess the relative importance of each regressor. The base or statutory maximum is the most significant variable in the model with a chi-square in excess of 140. The variable representing court size has the next highest chi-square. While the substantive interpretation of each of the variables in the model will be discussed in the remainder of the chapter, it is important to note that all of the factors included in the model – except prior misdemeanor convictions --play some sort of role in the type of sentence an offender receives once convicted.

Bloc-χ^2 tests for the five sets of independent variables are shown at the bottom of Table 6-4. The offense variables – when taken together – have the most significant impact on the sentence type decision. The set of prior record factors have the second largest chi-square value followed closely by the sentencing base. The overall impact of the extra-legal factors is somewhat less, although still very significant. Therefore, an important initial finding is that judicial choice of sentence type is determined primarily by factors related to the conviction offense, prior record and the sentencing base--all factors that have historically been determined to be legitimate in judicial decision-making.

Having determined that the basic assumptions underlying the model are supported and that the variables have a statistically significant impact on the sentencing decision, we turn briefly to an assessment of the overall fit of the model. The overall χ^2 for the change in the log likelihood function is 845 with 96 degrees of freedom. The pseudo R^2 is over .23. Each of these is reasonable in the confines of a large cross sectional analysis. On the basis of our preliminary assessment, the model does a good job of explaining the variation in the types of sentences received by convicted offenders.

To get a better idea of how well the model does in predicting specific sentencing outcomes, we associate each individual with the sentencing outcome that had the highest probability on the basis of the estimated model. Note that this does not mean that the predicted probabilities are above .50 –each case is simply assigned to the outcome with the highest probability. These predictions are associated with the actual sentencing outcomes in Table 6-5.

Table 6-5: Comparison of Predictions to Actual

				PREDICTION			
		Prison	**Restraint**	**Rehabilitation**	**Rebuke**	**Restorative**	**TOTAL**
ACTUAL	**Prison**	**202**	92	39	5	5	343
	Restraint	71	**232**	126	11	13	453
	Rehabilitation	24	83	**268**	23	17	415
	Rebuke	2	60	96	**39**	0	197
	Restorative	9	41	16	4	**31**	101
	TOTAL	308	508	545	82	66	1509

Model Correct	772	% Correct (Model)	51%
Null Correct	453	% Correct (Null)	30%
		% Improvement	71%

The results in Table 6-5 indicate that the model made predictions into all five outcomes. In addition, the highest number of cases in each column corresponds with a correct prediction. Finally, the model is able to accurately predict 815 cases or 51% (772/1509), which represents a considerable improvement over the null of 30% (453/1509).[23]

Looking closely at the results in Table 6-5, we note that of the 343 actual Prison cases, the model correctly predicts 202 (59%); 92 of the remaining cases are predicted to receive a sentence in the Restraint category. Therefore, of the 343 Prison cases, over 84% are predicted to receive some sort of incarceration. Looking at the Restraint category we find that 232 of the 453 cases are correctly predicted (51%). Of the remaining cases, 71 are predicted to fall into the Prison category. Together, over two-thirds of all Restraint cases are predicted to receive Restraint or Prison. In the case of outcomes that received a pure Rehabilitation sentence, the model predicts 268 of 415 (65%) correctly. The model predicts less well in the remaining two categories, although this can be partially explained by the fact that they are not as frequently occurring in the present Michigan context. An additional examination of the estimated probabilities is explored using a simulation exercise in Appendix 6-1. All in all, we find the performance of the model to be quite encouraging. Furthermore, we believe that there is ample reason to delve more deeply into the implications contained in the estimated model.

[23] The null model is assumed to be the one in which we predict every case into the category with the largest number of cases. In this case it is the Restraint category.

Interpreting the Results

The estimated coefficients presented earlier in Table 6-1 measure the change in the log of the probability of the four outcomes relative to the probability of being sentenced to prison. Unlike single equation regression models, the estimated coefficients of multinomial logit analyses are difficult to interpret in a meaningful way. Long (1997, 164) notes that

In even a simple MNLM, there are a lot of parameters. With three outcomes and five independent variables, there are 12 unique parameters. With five outcomes, there are 24 parameters. With seven outcomes, there are 36 parameters. If every possible contrast is examined, the numbers are even larger. All too often in practice, the MNLM is estimated, the parameters are listed, and statistical significance is noted, while the magnitudes and even directions of the effects are ignored.

In a similar vein, King, Tomz, and Wittenberg (2000, 341) observe that ". . . social scientists do not take full advantage of the information available in their statistical results and thus miss opportunities to present quantities that could shed the greatest light on their research questions." Thankfully, both of the authors cited above have taken steps to assist social science researchers in the interpretation of MNLM results. Cheng and Long (June, 2000) have developed *Xpost – An Excel Workbook For The Post-Estimation Interpretation Of Regression Models With Categorical Variables.*[24] The workbook provides a number of

[24] The workbook is available at: http://www.indiana.edu/~jsl650/xpost.htm

calculations and graphical summaries that provide enormous assistance in the interpretation of MNLM results. Long (1997, 164) suggests that by utilizing odds ratios, discrete and partial changes, predicted probabilities, and graphical summaries, all available by using the workbook, "it is possible to readily interpret the many parameters of the multinomial logit model." Tomz, Wittenberg, and King (1999) have developed and made available *Clarify* – software for interpreting and presenting statistical results.[25] We utilize aspects of both of these interpretation aids in the pages that follow.

The sections that follow provide a discussion of the ways various attributes and their impact on the imposition of the five sentencing type outcomes. Each section will provide an in-depth focus on the likelihood of receiving a particular outcome in comparison to other outcomes and the impact of discrete changes on the probability of the imposition of a particular sentencing outcome.

To interpret the probabilities in MNLM models, it is necessary to discuss probabilities and their changes from some baseline. In the sections that follow – unless otherwise stated – we make use of the following baseline model: all variables held at their mean value. Using this basic model we have two additional ways (odds ratios and discrete change in probabilities) to look at the probability of ending up in each of the five sentence types.

[25] The software is available at: http://gking.harvard.edu/stats.shtml#clarify

Table 6-6 presents the odds ratios for ten pair-wise comparisons. When the odds ratio is greater than 1.00, it provides information on the degree to *which a one unit change in the variable in question increases the odds of the non-base sentence type. For example, Property offenders are 1.27 times more likely to receive Restraint than they are Prison sentence. When the odds ratio is less than 1.00, the odds are in favor of the base category. For example, for offenders who use a weapon the odds ratio for Restraint when compared to Prison is 0.18. This suggests that these offenders are 5.5 times (1/.18) more likely to receive Prison than Restraint as a sanction.*

Table 6-7 presents the discrete changes in probabilities over the entire range of each of the variables. For example, offenders who exploit a vulnerable victim increase their odds of Prison by .25. Additionally, exploiting a vulnerable victime decreases the probability of receiving sanctions from the Restraint, Rebuke, and Restitution quadrants. In addition, for the sentencing base and crime type variables, the table presents the actual probability of S=j for each value of the variable.

Table 6-6: Odds Ratios for All Possible Contrasts

Variable	Base = Prison				Base = Restraint			Base = Rehabiliation		Base = Rebuke
	Q1	Q2	Q3	Q4	Q2	Q3	Q4	Q3	Q4	Q4
Sentencing Base										
Statutory Maximum	0.42	0.27	0.29	0.43	0.63	0.66	1.03	1.06	1.63	1.54
Offense Factors										
Weapon	0.18	0.65	0.25	0.29	3.67	1.44	1.65	0.39	0.45	1.15
Physical Injury	0.36	0.43	0.06	6.02	1.18	0.16	16.64	0.13	14.12	104.58
Exploitation	0.45	0.92	0.98	0.26	2.04	2.18	0.59	1.07	0.29	0.27
Leader	1.06	0.36	1.22	0.94	0.34	1.15	0.89	3.36	2.59	0.77
Pattern	0.30	0.15	0.28	0.95	0.48	0.91	3.13	1.88	6.47	3.44
Drug	0.78	2.76	2.50	0.84	3.52	3.19	1.07	0.91	0.30	0.34
Property	1.27	1.63	1.24	6.36	1.29	0.98	5.02	0.76	3.90	5.14
Prior Record Factors										
High severity prior	0.30	0.38	0.95	0.23	1.27	3.15	0.77	2.48	0.61	0.24
Low severity prior	0.71	0.28	0.26	0.51	0.39	0.37	0.72	0.96	1.84	1.92
Misdemeanor conv.	0.85	0.63	0.33	0.86	0.75	0.40	1.01	0.53	1.35	2.56
Current relation CJ	0.66	0.26	0.29	0.64	0.40	0.45	0.98	1.11	2.43	2.18
1st arrest before 18	0.79	0.56	0.27	0.21	0.71	0.34	0.26	0.48	0.37	0.77
Processing Factors										
Trial	0.66	0.09	0.43	0.90	0.13	0.65	1.37	4.95	10.39	2.10
Attorney	1.43	1.91	2.95	0.79	1.34	2.06	0.56	1.54	0.42	0.27
Defendant Characteristics										
Gender	0.70	1.09	0.70	1.15	1.56	1.00	1.65	0.64	1.05	1.65
Race	1.06	2.29	1.63	0.95	2.16	1.54	0.90	0.71	0.42	0.58
Drug Use	0.61	0.42	0.31	0.44	0.69	0.50	0.73	0.73	1.04	1.44
Age 21-29	0.33	0.59	0.26	0.39	1.78	0.79	1.18	0.44	0.67	1.50
Age 30-39	0.74	0.73	0.25	0.22	0.99	0.33	0.30	0.33	0.30	0.89
Age 40-49	0.40	0.62	0.21	0.48	1.56	0.52	1.20	0.33	0.77	2.31
Age >50	0.53	0.81	0.16	0.75	1.53	0.30	1.41	0.19	0.92	4.73
Young black male	0.24	0.14	0.21	0.80	0.57	0.88	3.33	1.56	5.89	3.78
Young drug user	1.01	4.14	1.34	0.63	4.09	1.32	0.62	0.32	0.15	0.47

Table 6-7: Discrete Change in Probability Over the range of the Legally Relevant Variables

		Probability S=j					Change in Probability				
Variable	Variable Value	Prison	Quad 1	Quad 2	Quad 3	Quad 4	Prison	Quad 1	Quad 2	Quad 3	Quad 4
Sentencing Base											
	0	0.001	0.271	0.598	0.127	0.003					
	24	0.084	0.646	0.194	0.069	0.008	0.082	0.375	-0.404	-0.058	0.005
	48	0.170	0.646	0.125	0.050	0.008	0.087	0.000	-0.068	-0.019	0.000
	60	0.210	0.631	0.106	0.044	0.008	0.039	-0.014	-0.019	-0.006	0.000
Statmax	120	0.366	0.541	0.059	0.027	0.007	0.156	-0.091	-0.047	-0.017	-0.001
	180	0.474	0.462	0.039	0.019	0.006	0.108	-0.079	-0.020	-0.008	-0.001
	240	0.552	0.400	0.028	0.015	0.005	0.078	-0.062	-0.011	-0.005	-0.001
	Life	0.870	0.123	0.003	0.002	0.002	0.396	-0.339	-0.036	-0.017	-0.004
Offense Factors											
Weapon	0 → 1						0.207	-0.253	0.112	-0.051	-0.016
Physical Injury	0 → 1						0.086	-0.181	-0.098	-0.114	0.307
Exploitation	0 → 1						0.069	-0.151	0.071	0.039	-0.029
Leader	0 → 1						0.031	0.091	-0.172	0.046	0.004
Pattern	0 → 1						0.251	-0.089	-0.183	-0.034	0.055
Drug	0 → 1						-0.059	-0.198	0.205	0.072	-0.020
Property	0 → 1						-0.062	-0.046	0.035	-0.016	0.088
Prior Record Factors											
High severity prior	0 → 1						0.166	-0.165	-0.067	0.091	-0.026
Low severity prior	0 → 1						0.125	0.106	-0.157	-0.070	-0.003
Misdemeanor conv.	0 → 1						0.059	0.050	-0.042	-0.073	0.006
Current relation CJ	0 → 1						0.132	0.077	-0.159	-0.058	0.008
1st arrest before 18	0 → 1						0.087	0.079	-0.037	-0.086	-0.042
Processing Factors											
Trial	0 → 1						0.154	0.091	-0.252	-0.021	0.029
Attorney	0 → 1						-0.074	-0.038	0.053	0.085	-0.025
Defendant Characteristics											
Gender	0 → 1						0.026	-0.080	0.065	-0.024	0.013
Race	0 → 1						-0.054	-0.092	0.139	0.022	-0.015
Drug Use	0 → 1						0.113	0.034	-0.072	-0.065	-0.010
Age 21-29	0 → 1						0.155	-0.136	0.052	-0.062	-0.009
Age 30-39	0 → 1						0.077	0.032	0.019	-0.091	-0.038
Age 40-49	0 → 1						0.146	-0.104	0.040	-0.077	-0.005
Age >50	0 → 1						0.096	-0.068	0.069	-0.104	0.007
Young black male	0 → 1						0.301	-0.129	-0.176	-0.047	0.050
Young drug user	0 → 1						-0.085	-0.177	0.322	-0.030	-0.030

Sentencing Base

In Chapter 5 it was hypothesized that the sentencing base – when measured as a statutory maximum – would play an important role in the sentence type decision. And it does: every one point increase in the log of the statutory maximum increases the odds of receiving a Prison sentence compared to a Restraint sentence by 2.5 times (1/.412) or the odds of a Restraint sentence compared to Rehabilitation by 1.7 times (1/.63) (Table 6-6). Clearly, as the statutory maximum increases, so do the prospects of incarceration.

The effect of changes in statutory maximum on the probabilities of obtaining one of the five sentences is displayed in Table 6-7. These results show that each increase in the statutory maximum increases the probability of receiving a Prison sentence – in fact, the change over the range of the variable is .87. Furthermore, the probability of each sentence type is quite sensitive to the values of the statutory maximum. As the statutory maximum increases from 24 months to 60 months, the probability of Rehabilitation and Rebuke steadily drops while the probability of Prison and Restraint increases. If the statutory maximum changes from 60 months to 120 months, the probability of Prison doubles and the probability of Restraint remains the same with a marked drop in Rehabilitation and Rebuke. As the statutory maximum of the conviction offense moves to 180 months the probability of Prison is greater than the probability of Restraint for the first time. Together these two options account for over 90% of the probability. When the statutory maximum is Life, the probability of prison is .87 holding all other variables at their mean values.

Finally, Figure 6-1 illustrates how the probabilities of the five-sentence types vary as the statutory maximum increases. Referencing Figure 6-1, it is possible to see the relative likelihood of the five options over the range of the statutory maximum. To connect the statutory maximum to offense titles, we offer the following abbreviated list:

- 24 months – Felonious Driving
- 48 months – Felonious Assault
- 60 months -- OUIL 3rd offense, Carrying a Concealed Weapon, attempts for offenses with statutory maximums greater than 60 months
- 120 months – Assault with Intent to do Great Bodily Harm less than murder, Breaking and Entering, Larceny from Person
- 180 months – Manslaughter, Home Invasion 2nd, CSC 3rd
- 240 months – Arson of Dwelling, Home Invasion 1st, Possession of 50-224 grams
- Life – Armed Robbery, 2nd Degree Murder

At the lowest statutory maximum – 24 months – the typical offender is likely to receive a Rehabilitation sentence. From 48 months to 120 months, the typical offender is likely to receive a Restraint sentence. Once the statutory maximum reaches 180 months, the typical offender is likely to receive Prison. At the highest levels of statutory severity, the probability of Prison approaches certainty.

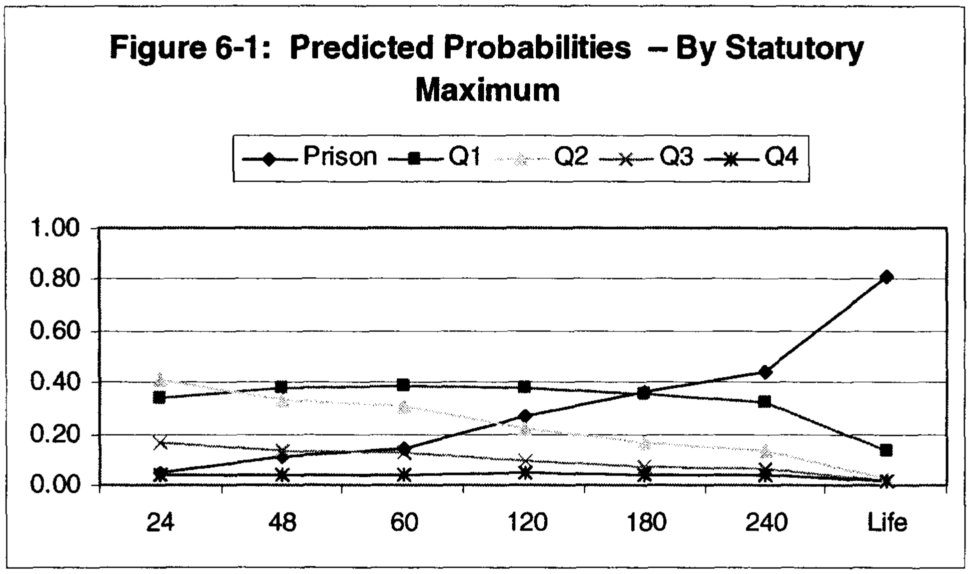

Figure 6-1 also provides a means to assess the impact of the plea bargain. A typical bargain involves an offender pleading guilty to the attempt version of the underlying offense. The statutory maximum of all offenses with a statutory maximum of 120 months or higher becomes 60 months. The consequence of the plea bargain is that the most likely sentence moves from Prison to Restraint. It is easy to understand the powerful allure of such plea agreements from the point of view of the offender. It also underscores the important role that the statutory maximum plays in the sentencing decision.

Offense Factors

The sentencing literature holds that various characteristics of the offense help determine judicial views on offender severity and play an important role in the sentencing type decision (see Chapter 5). It was hypothesized that offenders with aggravating offense factors would be viewed as more blameworthy and more likely to receive Prison as a sanction. The results in Tables 6-6 and 6-7 confirm these theoretical expectations. The probability of receiving Prison relative to Restraint is greater for offenders who use a weapon, commit a physical injury, are exploitive of victim vulnerability, and exhibit a continuing pattern.[26] For example, Table 6-6 shows that the presence of a weapon also increases the odds of a Prison sentence versus Restraint by 450%, versus Rehabilitation by 45%, versus Rebuke by 285%, and versus Restitution by 255%.[27]

Furthermore, Table 6-7 reveals the use of a weapon increases the probability of Prison (.21) and Rehabilitation (.11) and decreases the probability of Restraint (-.25), Rebuke (-.05) and Restitution (-.02) when all other sentencing relevant factors are held at mean value. Not surprisingly, judges take the use of a weapon seriously in evaluating the offender's blameworthiness. A continuing pattern of criminal behavior over a three year period leads to an increase in the probability of Prison of .25 holding all else at its mean value. This suggests that this offense factor affects perceptions of both recidivism and blameworthiness and affects the type of sentence offenders receive.

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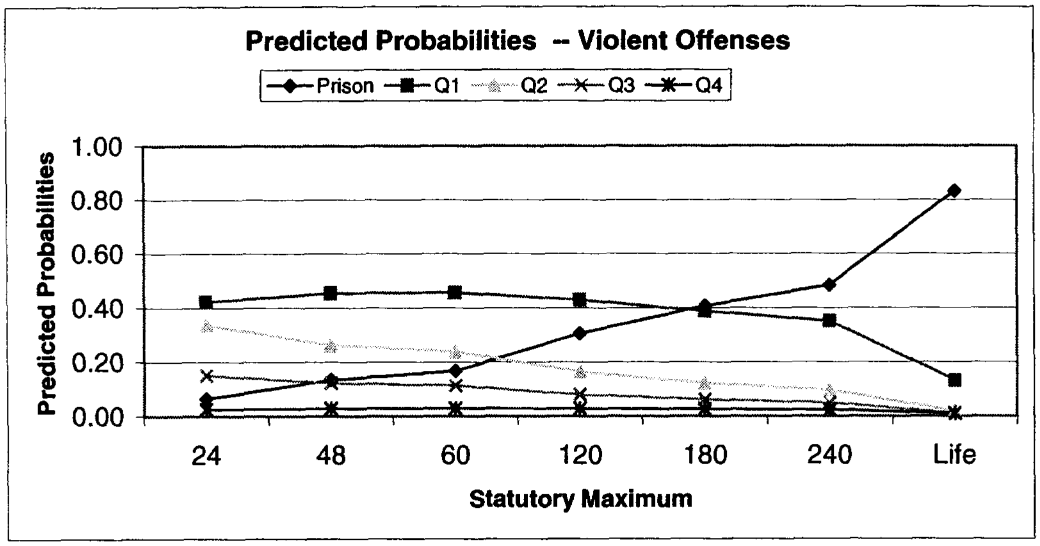
[26] The Michigan Sentencing Guidelines define a continuing pattern as one in which there are 3 or more offenses within a five-year period. The commentary to the guidelines declares "all crimes within a five-year period, including the sentencing offense, shall be counted regardless of whether the offense resulted in a conviction." While this variable has aspects of a prior record factor, the Michigan Sentencing Commission included it as an offense variable. For this study we follow their lead.

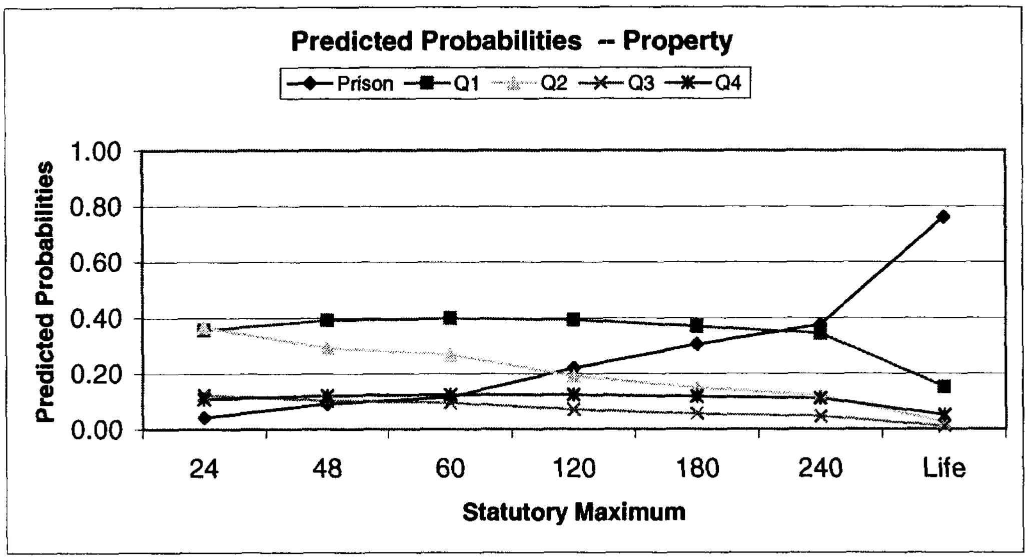
[27] The percent increase is calculated by taking the inverse of the odds ratio, multiplying by 100 and then subtracting 100.

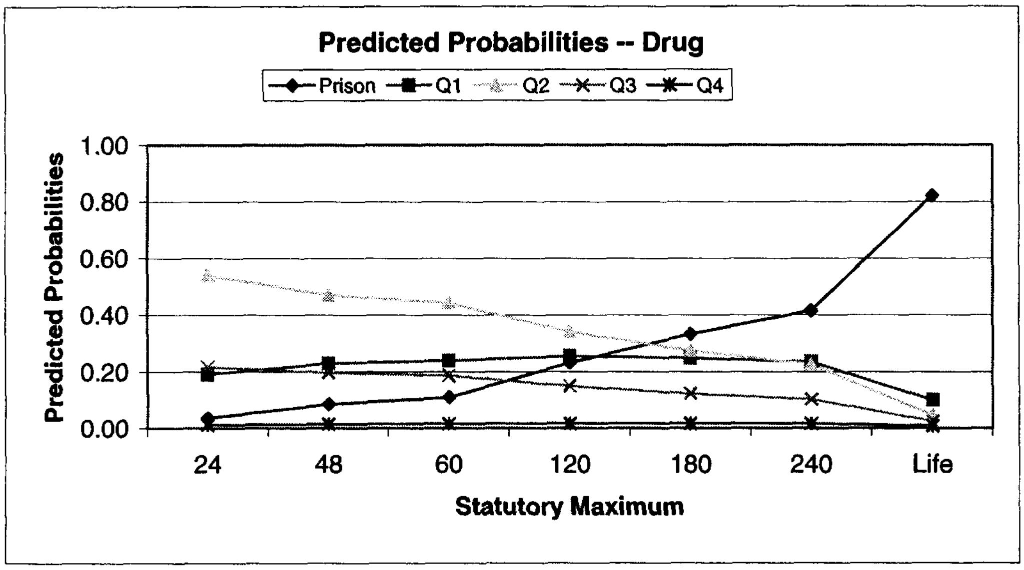
Furthermore, we hypothesized that the type of conviction offense would play an important role in the sentence type decision. We find that Drug offenses have a substantial impact on the type of sentence received. Table 6-7 shows that probability of Prison and Restraint are lower for both Drug and Property offenses (relative to Violent crimes). Offenders convicted of a drug offense have an increased probability of Rehabilitation (.20) and Rebuke (.07). On the other hand, Property offenses increase the probability of Restitution sanctions by .09. These results suggest that when all other factors are held at their mean, Drug offenders are most likely to receive a sanction from the Rehabilitation quadrant and Property offenders from the Restitution quadrant.

To get an idea of the impact of type of offense, Figure 6-2 presents the probabilities of the five sentence types by statutory maximum varying the type of conviction offense. For violent offenses, the highest probability is Restraint until 180 months when Prison dominates. For property offenses, we have a similar pattern except the "crossing point" occurs at 240 month maximum. In drug offenses, the dominant outcome is Rehabilitation until the 180 month maximum. This suggests that both the type of crime and the statutory maximum of the offense play a role in the judge's decision.

Figure 6-2: Predicted Probabilities by Conviction Offense Type







Prior Record Factors

The results of the empirical analysis confirm the hypothesis that offenders with prior records will be viewed as an increased threat to society and hence increase the probability of receiving Prison. Important factors include high and low severity prior felony convictions and 1st arrest before age 18. In addition, offenders with a current relationship with the criminal justice are more likely to receive Prison than any other sanction when all other factors are held at their mean. In the context of the Michigan Sentencing Guidelines, an individual is said to have a current relationship with the criminal justice system if one of the following holds: prisoner, on parole, probation, delayed sentencing, or on bond. Table 6-6 shows that a the odds ratios for all of the prior record variables are less than 1.00 suggesting that the odds of receiving a Prison sentence are higher when any of them occur. As can be seen in Table 6-7, the High Severity Felony increases the probability of Prison by .17, a Low Severity Felony by .13, a Misdemeanor conviction by .06, a Current Relationship by .13, and an Arrest<18 by .09 respectively. Judges view the prior factor as a failure and seek to add substance to the sentence.

Court Processing Factors

In Chapter 5 we hypothesized that certain court processing factors such as manner of disposition (e.g., guilty plea, trial) and type of attorney (e.g., court appointed v. privately retained) would have an impact on the type of sentence imposed.

Convicted At Trial. In Table 6-6, we see that the odds ratios – when compared to Prison – are .66, .09, .43, and .90 respectively suggesting that those offenders who are convicted at trial are more likely to receive a Prison sentence than any of the other sentence types. Similarly, having been convicted at trial increases the probability of Restraint when compared to two of the other three sentence types.

Turning to Table 6-7, we find that when all variables are held at their means, conviction at trial increases the probability of Prison by .15, increases the probability of Restraint by .09, decreases the probability of Rehabilitation by .25, lowers the probability of Rebuke by .02 and increases the probability of Restitution by .03. The results indicate that judges impose a "trial tax" on those offenders who exercise their constitutional right to trial or, from another angle, a "guilty plea discount". A possible explanation for the tax is that during the course of a trial there is often additional evidence or a first hand account by the victim that provides a heightened sense of the crime's severity. On the other hand, the discount may accrue to those offenders who admit their guilt and do not take additional (and unwarranted) time of the court. In conclusion, offenders convicted at trial are more likely to be sentenced to prison.

Privately-Retained Attorney. The inclusion of this variable captures two possible influences on sentencing. First, the privately retained attorney may be more skilled than the court-appointed counterpart. Second, the privately retained attorney is a surrogate for the economic wherewithal to afford private counsel. Regardless of which influence is posited, the results are expected to be the same – offenders with court appointed attorneys are more likely to be incarcerated.

In Table 6-6, we see that the odds ratios – when compared to Prison – are 1.43, 1.91, 2.95, and .79 respectively suggesting that offenders represented by privately-retained attorneys are less likely to get Prison when compared to Restraint, or Rebuke. Offenders able to afford a privately-retained attorney are less likely to be incarcerated than a similarly situated offender represented by indigent defense counsel.

Referencing Table 6-7, we find that when all variables are held at their means, the shift to a privately-retained attorney decreases the probability of Prison by .075, lowers the probability of Restraint by .04, increases the probability of Rehabilitation and Rebuke by .05 and .09 respectively and lowers the probability of Restitution by .03. It is worth noting that an offender who is represented by private counsel is more likely to receive Rebuke, which typically takes the form of community service, than any other sanction type.

Defendant Characteristics Variables

Gender. The variable for Gender takes on the value of 0 for male offenders and 1 for female offenders. In Table 6-6, we see that the odds ratios – when compared to Prison – are .70, 1.09, .70, and 1.15 respectively suggesting that female offenders are more likely to get Prison rather than Restraint or Rebuke but more likely to get Rehabilitation or Restitution than

Prison. When compared to Restraint, being female increases the probability of receiving a sanction from Rehabilitation or Restitution. The evidence here supports the notion that females are sentenced less severely than otherwise similarly situated men.

Turning to Table 6-7, we find that when all variables are held at their means, the shift from a male to a female offender increases the probability of Prison by .03, lowers the probability of Restraint by .08, increases the probability of Rehabilitation by .07, lowers the probability of Rebuke by .02, and increases the probability of Restitution by .01. While the impact of gender is quite modest when all other variables are held at their mean values, it does seem that female offenders are marginally less likely to receive Restraint than a similarly situated male and more likely to receive Rehabilitation.

Race. The variable for Race takes on the value of 0 for white offenders and 1 for non-white offenders. Although there is widespread evidence in the literature that there are racial variations in sentencing, this study is among the first to look at the impact of race across the entire menu of sentencing types. In Table 6-6, we see that the odds ratios – when compared to Prison – are 1.06, 2.29, 1.63, and .95 respectively suggesting that race has no effect on the likelihood of Prison versus Restraint and that non-white offenders are twice as likely to get Rehabilitation as Prison. When compared to Restraint, being non-white increases the probability of Rehabilitation or Rebuke or Restitution. As can be seen the evidence on the impact of race is mixed. While it is clear that Race plays a role in sentencing decision making, it does not appear that non-white offenders are sentenced more severely than white offenders.

When all variables are held at their means, the shift from a white to a non-white offender lowers the probability of Prison by .05, lowers the probability of Restraint by .09, increases the probability of Rehabilitation by .14, and has little impact on Rebuke or Restitution (Table 6-7). However, following the lead of Steffensmeier et al. (1998), we included an interactive variable that takes on the value of 1 when the offender is young, black, and male and 0 otherwise. The results of this variable suggest that race, in concert with age and gender, may play a very significant role in the sentence type decision. From Table 6-6, we see that a young black male is 4 times more likely to receive Prison than Restraint, 7 times more likely to receive Prison than Rehabilitation, and 5 times more likely to receive Prison than Rebuke. In addition, the young black male offender is twice as likely to get Restraint rather than Rehabilitation. Turning to Table 6-7, the probability of Prison for the young black male offender increases by .30 over a similarly situated offender who does not have the intersection of these three characteristics. Clearly, there is discrimination for a subset of the black offender population.

Table 6-8 displays of the probability of Prison for White, Non-White, and Young Black Male offenders holding all other variables at their mean values. The Black Male is somewhat less likely to receive prison than a similarly situated White Male. However, the Young Black Male is substantially more likely to receive a Prison sentence. When the statutory maximum is 60 months, the Young Black Male has a 50% increase in the probability of receiving a Prison sentence over a White Male. Although the percentages decrease in magnitude, the Young Black Male is much more likely to receive a prison sentence than a similarly situated White Male. If one compares the Young Black Male probability of prison to that of the typical Age<21 offender, the differences are even more dramatic. In conclusion, race matters in sentencing for certain subsets of offenders.

Table 6-8: Probability of Prison for Race, Age, and Drug Use

	Statutory Maximum						
Category	**24**	**48**	**60**	**120**	**180**	**240**	**Life**
White Male	0.05	0.11	0.14	0.26	0.36	0.43	0.80
Black Male	0.04	0.08	0.10	0.21	0.29	0.37	0.77
Young Black Male	0.09	0.17	0.21	0.37	0.48	0.56	0.87
Age<21	0.03	0.06	0.08	0.16	0.23	0.29	0.70
Age 21-29	0.06	0.13	0.17	0.32	0.43	0.51	0.86
Age 30-39	0.04	0.09	0.12	0.22	0.31	0.38	0.77
Age 40-49	0.06	0.13	0.16	0.30	0.40	0.48	0.84
Age >50	0.05	0.10	0.13	0.25	0.34	0.42	0.80
No Drug Use	0.04	0.08	0.11	0.21	0.30	0.37	0.77
Adult Drug User	0.08	0.16	0.20	0.35	0.46	0.54	0.86
Young Drug User	0.02	0.05	0.06	0.14	0.21	0.27	0.70

Age. Four variables have been included in the model to capture the impact of age. The suppressed category is Age < 21. From Table 6-7, we see that age increases the probability of Prison by .17, .09, .17, .13 for 21<Age<30, 30<=Age<40, 40<=Age<50, and Age>=50 respectively when all remaining variables are held at their mean values. To make the relationship between age and Prison clearer Table 6-8 presents the probability of prison for each age classification over the range of possible statutory maximums. The most striking feature of Table 6-8 is the relative leniency with which young offenders are treated. It is also striking to see that those offenders in the 30-39 age group receive the second most lenient sentences after holding all other variables at the mean. Offenders in their 20's and 40's are the age cohorts most likely to receive Prison as a sanction.

Drug Use. The variable for Drug Use takes on the value of 1 for offenders who are identified by the Probation officer as having evidence of current drug use and 0 otherwise. In Table 6-6, we see that the odds ratios – when compared to Prison – are .62, .42, .31, and .44 respectively suggesting that offenders with a history of drug use are more likely to get Prison than the other types of sentences. When compared to Restraint, being a current drug user decreases the probability of Rebuke or Restitution or Rehabilitation. Turning to Table 6-7, we find that when all variables are held at their means, the presence of drug use increases the probability of Prison and Restraint by .11 and .04 respectively while decreasing the probability of Rehabilitation by .07 and Rebuke by .07.

Another interaction of interest is the judicial response to Young Drug Users. Our contention that these offenders are more likely to receive Rehabilitation than incarceration (i.e., Prison, Restraint) is confirmed in Table 6-7. Here we see that young drug users have a lower probability of Prison and Restraint (.09 and .21 respectively) and have an increased probability of .37 of receiving Rehabilitation. Table 6-8 presents a graphical portrait of the probability of Prison for non-drug users, drug users, and young drug users. Drug users, in general, are treated more harshly than similarly situated offenders who do not use drugs. In contrast, *young* drug users are less likely to receive Prison over the full range of the statutory maximums. Drug use, therefore, cuts two ways. A finding of current drug use increases the probability of Prison for the general offender population, while young drug users tend to be given a chance at rehabilitation.

Conclusions

In this chapter we have estimated and evaluated a model of the sentence type decision. A major innovation of the model is the use of a dependent variable that includes five distinct categories of sentence types. The model provides a means to distinguish between state and community based sanctions as well as to differentiate between different types of community based sanctions. The estimation of a model with a categorical dependent variable requires estimation techniques that have not been in general use in the criminal justice field. The beginning of the chapter provides a short introduction to both the technique and the assumptions underlying its use. Since it is widely available in statistical packages (including SPSS), we anticipate that sentencing researchers will have access to the multinomial logit model should they choose to use it.

Passing all appropriate tests of the underlying assumptions shows that the use of the MNL technique is justified for this analysis. In addition, the model provides a good fit to the Michigan data. With the exception of the misdemeanor variable, all of the variables in the model are statistically significant. The model provides a significant improvement over the null model by predicting 54% of the sentence types correct.

We find that the blocks of Offense and Prior Record variables play the greatest role in the sentencing decision. The nature of the offense (i.e., degree of blameworthiness) and the past criminal behavior (i.e., likelihood of recidivism) play a prominent role in the judges sentencing decision. In terms of the individual variables, the sentencing base proves to be the most important single variable in the model. In line with our earlier hypothesis, judges appear to anchor their sentencing decisions using the underlying seriousness of the conviction offense.

What is somewhat surprising is that once the base, offense, and prior record factors have been taken into account, the defendant characteristics continue to play a prominent role. The age, race, gender, and drug use of the offender are all found significant determinants of the type of sentence. We will investigate the interrelationships between these variables more extensively in Chapter 8. However, these results show that some of the consistency observed in the sentence type decision results from the use of defendant characteristics as relevant considerations.

Size of court also plays a significant role in sentencing and is likely a proxy for an amalgam of issues related to court culture and resources. For example, the prominence of Rehabilitation-type sentences in the large courts versus the use of incarceration in the smaller courts speaks to such issues as the availability and funding of alternative sanctions as well as the likelihood of jail overcrowding in the larger jurisdictions. It appears that judges in smaller jurisdictions think (or are constrained through of a lack of alternative sanctions to think) primarily in terms of which form of incarceration (i.e., prison versus jail) to impose. In the larger jurisdictions, jail and prison beds appear to be reserved for those who commit the more serious crimes. All in all, the results of the estimation suggest that the culture and resources of the local court has a significant impact on the type of sentence meted out.

There is a coherent structure to the sentence type decision. Judges are able to distinguish not only between prison and a community-based sentence but they are able to differentiate between various community alternatives. Using the twin concerns of Control and Treatment, judges assign sentences to offenders who do not meet the prison threshold. Looking at Table 6-6, the following factors appear to increase one's odds of prison:

- Continuing pattern
- Prior felony
- Current relationship with criminal justice system
- Arrest < 18
- Current Drug Use
- Young Black Male

Each of these factors appears to be directly related, in the minds of the judges, to the probability of recidivism. In an effort to protect society, these factors lead judges toward a choice of prison. Table 6-6 also suggests that the following factors appear to steer a judge toward the choice of Rehabilitation:

- Drug Offense
- Property Offense
- Female
- Race
- Young Drug User

Unlike the former list, these factors have not been associated traditionally with recidivistic behavior. Instead, they are factors that suggest either a lower level of blameworthiness or the possibility of successful treatment.

Of considerable importance to the judicial decision making process is the statutory seriousness of the conviction offense. Figure 6-3 provides a snapshot of the probabilities associated with each of the five outcomes when all variables (except the aggravating offense variables) are held at their mean value. As can be seen, when the statutory maximum is relatively low (say 60 months), Restraint, Rehabilitation, and Rebuke are all more prominent than Prison. The probability of Restraint remains stable from 60 to 120 to 180 while the balance shifts from Rehabilitation to Prison. Finally, when the statutory maximum is 240 months, the most likely sentence is Prison. Not surprisingly, a prime mover in determining the type of sentence is the statutory maximum of the conviction offense.

Figure 6-3: Probability of Sentence Type for Various Statutory Maximums

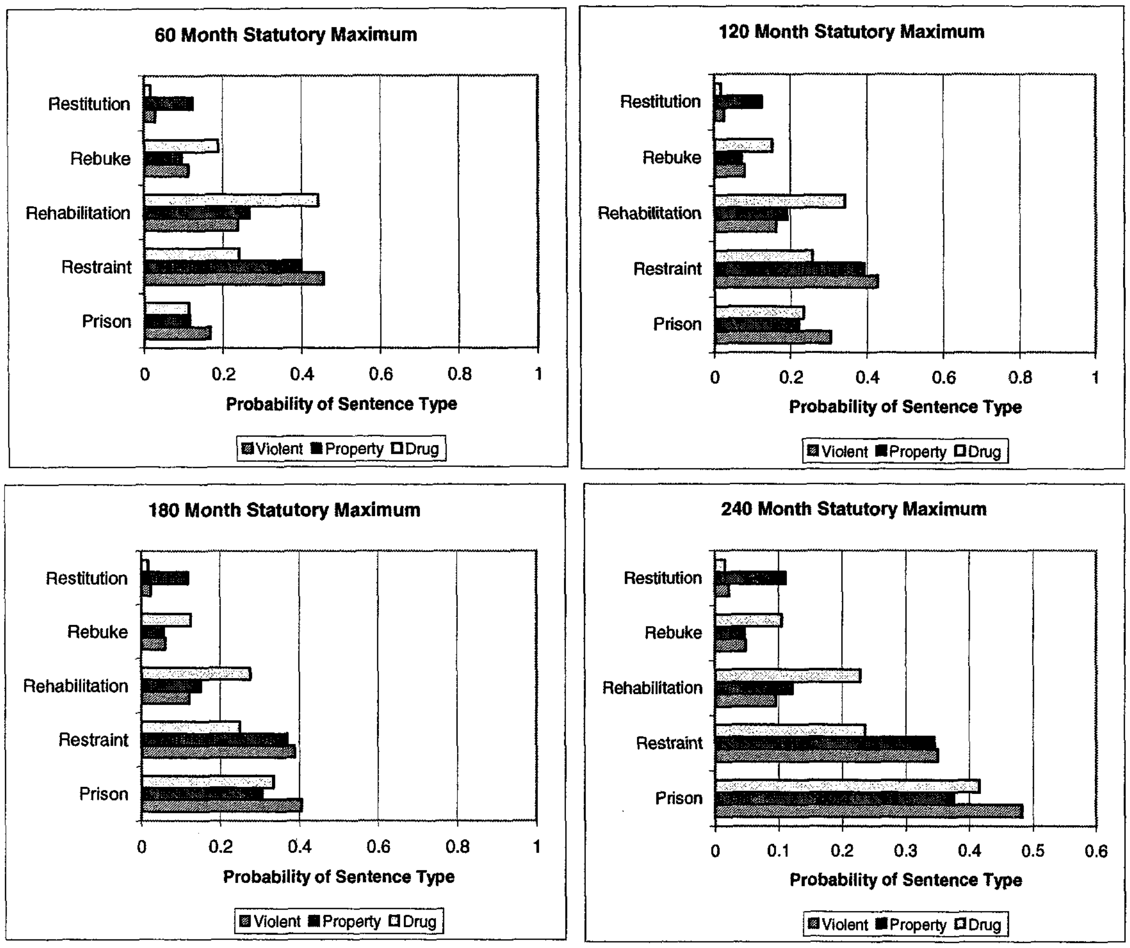


Figure 6-4 provides a summary of our principal findings in the context of the two dimensions from Chapter 3 along which our five sentence types are arrayed – Treatment and Control. Within each quadrant is a brief narrative expressing the types of offenders who are most likely to end up in each sanctioning quadrant. The results support the notion that judges use two dimensions when evaluating offenders and that judges take into account individual blameworthiness and protection of the community when deciding on sentence type. It also illustrates a behaviorally complex decision making process.

Figure 6-4: Offense and Prior Record Factors Associated with each of the Four Quadrants

CONTROL

Offenders most likely to receive sanctions from this quadrant (inpatient and outpatient treatment; probation; behavioral restrictions) typically possess the following attributes: drug offenders, females, young drug users, and offenders with prior misdemeanor offenses. .	Offenders who are more likely to receive prison or jail as a sanction type typically have factors associated with aggravating factors (e.g., weapon; leader). Additionally, these offenders have extensive prior records (e.g., prior felony; arrest <18) or possessing certain demographic characteristics (e.g., current drug user, young black male). Finally, court processing and court culture influences the likelihood of prison/jail. Offenders found guilty at trial often receive a trial tax and offenders sentenced in small courts are more likely to receive prison/jail.	TREATMENT
Offenders who are most likely to receive community service are those who are low-level property offenders and those represented by an attorney. Offenders who are of higher social status and can obtain private counsel are more likely to have their sentence reduced and less likely to receive incarceration.	Offenders who are most likely to receive a restitution-type sanction are property offenders with no prior record.	

Appendix 6-1

The Estimated Probabilities

Another way to look at the estimated model is to see how the model generates predicted probabilities of an observation being in each of the five categories. Table A6-1 presents the results from the estimated model. As can be seen, the model generates probabilities in excess of .50 for four of the five the categories. Consequently, the model is capable of placing over one half of the predicted probability in all five of the possible categories. This suggests that the variables contained in the model are able to discriminate among the various sentencing types.

Table A6-1: Estimated Probalities for Sentence Type

Variable	N	Mean	Std. Dev.	Min	Max
Pr(S=Prison)	1509	0.23	0.26	0.00	1.00
Pr(S=Restraint)	1509	0.30	0.18	0.00	0.81
Pr(S=Rehabilitation)	1509	0.28	0.22	0.00	0.90
Pr(S=Rebuke)	1509	0.13	0.12	0.00	0.69
Pr(S=Restitution)	1509	0.07	0.09	0.00	0.61

Table A6-1 also presents the mean value of the probability for each of the predicted alternatives. For example, the mean probability of receiving a Prison sentence is .23, the mean value of receiving Restraint is .30, the mean value of receiving Rehabilitation is .28, the mean value of receiving Rebuke is .13, and the mean value of receiving Restitution is .07.

To look more closely at the sensitivity of these estimates to changing values of the sentencing attributes, we make use of Tomz, Wittenberg, and King (1999) *Clarify* software. We begin by developing three scenarios for the sentencing attributes: (1) all variables at their mean, (2) all variables at their minimum (assume a drug conviction), and (3) all variables at their maximum. *Clarify* allows one to construct a stochastic simulation. The program draws simulations of all parameters from their asymptotic sampling distributions. The program was used to draw 1000 sets of parameters. Using the simulated parameters it was possible to simulate 1000 probabilities for each of the five outcomes in the model. Table A6-2 presents the results from the simulations.

Table A6-2: Simulated Probalities of Sentence Type

All Variables at Mean Value
Simulated Probability

Sentence Type	Mean	Std. Dev.	95% Conf. Interval	
Pr(S=prison)	0.18	0.01	0.16	0.21
Pr(S=restraint)	0.40	0.01	0.38	0.43
Pr(S=rehabilitation)	0.25	0.00	0.24	0.26
Pr(S=rebuke)	0.12	0.00	0.11	0.12
Pr(S=restitution)	0.05	0.00	0.04	0.05

All Variables at Minimum Value
Simulated Probability

Sentence Type	Mean	Std. Dev.	95% Conf. Interval	
Pr(S=prison)	0.01	0.00	0.01	0.02
Pr(S=restraint)	0.43	0.03	0.37	0.49
Pr(S=rehabilitation)	0.19	0.01	0.17	0.21
Pr(S=rebuke)	0.33	0.02	0.29	0.37
Pr(S=restitution)	0.04	0.00	0.03	0.04

All Variables at Maximum Value
Simulated Probability

Sentence Type	Mean	Std. Dev.	95% Conf. Interval	
Pr(S=prison)	1.00	0.00	1.00	1.00
Pr(S=restraint)	0.00	0.00	0.00	0.00
Pr(S=rehabilitation)	0.00	0.00	0.00	0.00
Pr(S=rebuke)	0.00	0.00	0.00	0.00
Pr(S=restitution)	0.00	0.00	0.00	0.00

Table A6-1 presents the average probabilities for each of the five possible outcomes. Table A6-2 simulates these mean probabilities to provide an indication of how one might expect them to vary under different situations. Using this simulation approach, it is possible to estimate the confidence interval for each of the estimated probabilities. As can be seen in the top and middle panels of Table A6-2, when all of the variables are held at their minimum or mean values most of the probability falls into the Restraint-type sentence with Rehabilitation second. When the variables are at their maximum values, all of the probability falls into the Prison-type sentence.

It seems clear that the model is quite responsive to different combinations of the sentencing relevant variables. There are situations in which offenders are predicted to receive each of the five sentence types. Not only do we have theoretical reasons to expect that judges have five sentence types, the data suggests that there are instances when each can be expected.

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CHAPTER 7: A MODEL OF THE SENTENCE SEVERITY DECISION

Introduction

The sentence severity decision is among the most widely studied aspects of criminal courts. Within the literature there is a growing awareness related to the need to appropriately model this aspect of judicial decision-making taking into account the sentence type (or selection) decision. Because the sentence type and sentence severity decisions are likely related to one another, there is need to consider the statistical issue of "sample selection bias."[1] The most frequently employed approach is to focus on two steps (i.e., the *sentence type* decision (e.g., prison, jail, probation) and the *sentence severity* decision (e.g., length of prison sentence) and to estimate the equations simultaneously.

The sentencing literature is replete with references to the use of "two-step procedures" and the need to control for sample selection bias. Engen and Gainey (2000, 1216) note that they "use the two-stage logistic regression correction to partially correct for sample selection bias in each model." In a footnote, they observe that this is a common procedure in the literature citing Myers and Talarico, 1986; Peterson and Hagan, 1984; Steffensmeier et al., 1998; Ulmer, 1997; Wooldredge, 1998 as examples of a similar approach. Ulmer and Kramer (1996, 388) note that "for sentence length models, we correct for potential selection bias as described by Berk (1983), Peterson and Hagan (1984),

[1] Zatz and Hagan (1985) provide an important survey and discussion of the problem of selection bias in sentencing research (see also Klepper et al, 1983).

and others (e.g., Spohn, 1990)." Ulmer (2000, 1236) – in the response to Engen and Gainey – notes that "using the two-step hazard method . . . is now commonplace in the sentencing literature."

Clearly, there is recognition of this statistical issue and the research community is taking steps to correct for the potential bias.[2] On the other hand, while researchers have been quick to acknowledge the problem, few discuss issues of interpretation. In this chapter, a number of statistical issues underlying the estimation and interpretation of sentence severity models are covered. We begin with the development of the so-called "hazard rate" and its affect on interpretation of coefficients under different modeling decisions (e.g., semi-log, log-log). And the issue is of much more than just theoretical interest. One consequence of including the hazard rate is that the marginal effect of each independent variable on expected sentence severity now consists of two components. Beyond the statistics, we develop the intuition behind each component and show how the hazard rate affects interpretation.

[2] Bushway and Piehl (forthcoming) offer the following observations on the universality of the two-step method:

> The literature is divided on whether to estimate one or two stages. Most researchers argue that it is imperative to model the sentencing decision in two stages and that failure to do so is incorrect and misleading (Spohn 2000, Steffensmeier et al. 1993). . .
>
> Once guidelines were introduced, judicial discretion was curbed, by design, and in many jurisdictions the discretion of the parole board was eliminated. For many defendants, incarceration is the only option unless the judge decides to deviate from the guidelines. The conceptual argument for modeling the sentencing decision as two stages is considerably weaker under determinate sentencing than when it was when it first became standard in the literature, before sentencing reform.

Even if one decides to model sentencing as a one stage process in response to the presumptive nature of a guidelines system, it is still important to take into account the fact that the data are censored. As they note, this leads to the selection of a Tobit model.

We next turn to a comparison of alternative strategies for estimating the two-equation model (e.g., Maximum Likelihood, the two-step approach based upon a prison/no prison selection equation, and a two-step approach based upon a multinomial logit selection equation). The chapter concludes with a thorough discussion of the model results and their implications for the study of criminal sentencing. Two appendices provide additional details on the implications of different modeling options and the use of actual months versus the log of months as the dependent variable. The goal of this comprehensive analysis is to compare and contrast alternative strategies for assessing sentencing severity in the context of a two-stage decision model. Clarity on interpretation and implications is well worthwhile given the extensive reliance on the two-step approach in sentencing research.

Statistical Considerations

The Basic Model

Perhaps the best way to motivate the discussion of sample selection bias is to follow the lead of Greene (1997, 978) and Breen (1996, 34) who characterize the model as follows:

$$z_i^* = \gamma' w_i + \mu_i$$

$$y_i^* = \beta' x_i + \varepsilon_i$$

where z* is a latent scale reflecting the likelihood of receiving a prison sentence for offender i and y* is a latent scale reflecting the seriousness of the punishment for the offender. The latent nature of z* or y* means that these two scales cannot be directly observed. What we do see is connected to these latent scales in the following manner:[3]

$$z_i = 1 \text{ if } z_i{*} > 0$$

$$z_i = 0 \text{ if } z_i{*} \# 0$$

$$y_i = y_i{*} \text{ if } z_i = 1$$

that is, y_i is observed only when the individual receives a prison sentence. Therefore, the model that we estimate looks like the following (Greene 1997, 978):

$$z_i{*} = \gamma' w_i + \mu_I$$

$$y_i = \beta' x_i + \varepsilon_I$$

$$(\varepsilon_I \, \mu_I) \sim [0,0,1, \sigma_\varepsilon, \rho]$$

$$\text{Prob}(z_i = 0) = 1 - \Phi(\gamma' w_i)$$

$$\text{Prob}(z_i = 1) = \Phi(\gamma' w_i)$$

This model assumes that the two disturbance terms have a bivariate normal distribution. The problem arises when the bivariate normal assumption is violated (Berk, 1983, 393).

An Omitted Variable

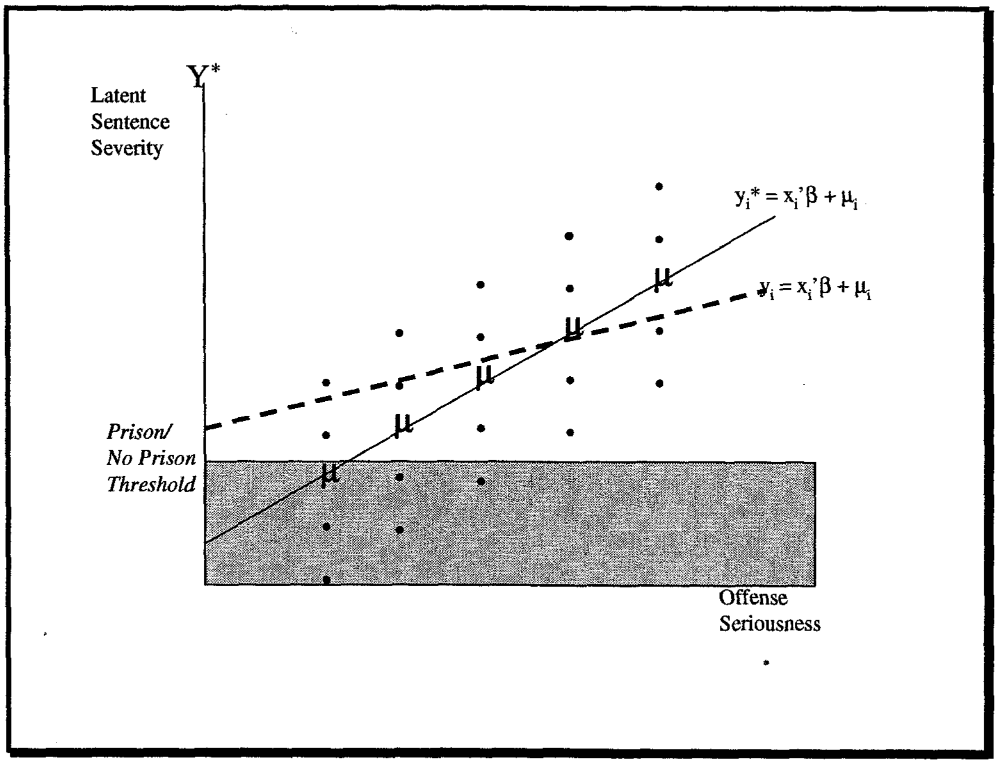
To clarify the issue, Figure 7-1 shows a sample scatterplot for the latent severity variable and a measure of offense seriousness. We can assume that the data are a random sample drawn from a population of convictions. Each person

[3] The present characterization of the selection equation is just one of many possible forms it can take (Breen, 1996, 50-54).

receives some sort of sentence. The only sentences in which we are able to measure the severity of the sanction, however, are those that receive prison. In Figure 7-1, the observations in the shaded area are "missing" because they did not receive a prison sentence. The means for each value of offense seriousness are represented by μ. As can be seen, the true regression line (i.e., $y_i^* = \beta' x_i + \varepsilon_i$) goes through the mean values. When the observations that do not receive prison are excluded, the new regression line (dotted line) overestimates the sentence at the low end and underestimates the sentence at the high end.[4] Thus, y is observed only if the person is sentenced to prison and as such is an incidentally truncated random variable (Breen, 1996, 4; Greene, 1997, 974-5).

[4] Berk (1983, 387) notes that in this case the relationship between sentence severity and offense seriousness is no longer linear; the slope becomes steeper as offense seriousness increases

Figure 7-1: Hypothetical Scatterplot



Berk (1983) notes three implications that follow. First, external validity is undermined since the estimated regression line will systematically misrepresent the relationship between the two variables. Second, internal validity is also jeopardized even if one restricts the inferences to those who receive a prison sentence. The regression line (dotted) falls above the expected values for low values of offense seriousness and above the expected values for high values (Figure 7-1). This suggests that the disturbance term and offense seriousness are correlated with one another; this violates an important regression assumption and leads to biased and inconsistent estimates. Berk (1983, 388) concludes:

> By excluding some observations in a systematic manner, one has inadvertently introduced the need for an additional regressor that the usual least squares procedures ignore (Heckman, 1976; 1979); in effect, one has produced the traditional specification error that results when an omitted regressor is correlated with an included regressor (e.g., Kmenta, 1971, 392-95).

The possibility of an omitted variable leads to the third problem – the expected value of the disturbances is no longer zero. The following example illustrates this problem.

When an individual with low offense severity is given a prison sentence, it is likely that the selection equation predicts "no prison" while the judge gives a "prison" sentence. This will show up as an error in the z* equation. Given that the prison/no prison and sentence severity decisions are made by the same person, in the same location, at the same time, it is likely that the severity of the sentence will be greater than the model for y* predicts. For some reason – outside the purview of the model – a judge sentences the offender more harshly than the model predicts. The harshness will be reflected in both equations – first the offender will go to prison and second the prison sentence will be above some minimum threshold. As Berk (1983, 392) notes: "under these conditions, random perturbations will have a significant opportunity to affect jointly the selection and the substantive outcomes." The reason why a judge views a particular offender as more serious than expected (a higher position on the unobservable z* scale than predicted on the observable z scale) will also likely affect the offender's placement on y*. Thus, errors in the two equations will be correlated. In econometric jargon, the selection and substantive equations are "seemingly unrelated".[5] It is also worth noting that the correlation between the error terms is not always significant.[6]

The Hazard Rate (or Inverse Mills' Ratio)

The key to understanding and modeling the process is to obtain an estimate of the non-zero expectations in the disturbance term. This can be done from an examination of the selection equation. Required is a model that applies to the observations in the sample rather than to the population from which the non-random sample of prison sentences evolves. This can be characterized as follows:

$$\begin{aligned} E[y|y - observed] &= E[y_i|z_i^* > 0] \\ &= E[y_i|u_i > -\gamma' w_i] \\ &= \beta' x_i + E[\varepsilon_i|u_i > \gamma' w_i] \\ &= \beta' x_i + \rho\sigma_e\lambda_i(\alpha_u) \\ &= \beta' x_i + \beta_k\lambda_i(\alpha_u) \end{aligned}$$

where $\alpha(u) = -\gamma' w_i/\sigma_u$ and $\lambda(\alpha) = \phi(-\gamma' w_i/\sigma_u)/\ \Phi(-\gamma' w_i/\sigma_u)$.[7] This, in turn, suggests

[5] As Greene (1997, 676) notes: the equations are only linked by the correlation between their disturbances and hence the name seemingly unrelated regression model.

[6] Hagan and Parker (1985), in their study of white collar crime, find that the addition of the hazard rate to the equation led to the change in sign of some coefficients although none became significant. Furthermore, the coefficient for the hazard rate was not significant. In a discussion of these results, Breen (1996, 44-5) suggests that in addition to the possibility that there are not selection effects, the selection equation could have been modeled incorrectly.

[7] One striking feature of the sentencing severity literature is the use of logit for the first stage equation. The usual citation is to Berk (1993) who in his example uses probit along with linear probability and logit models to construct a hazard rate. The hazard rate for the linear probability model is equal to the predicted probability of non response minus 1.0. The hazard rate from the logit model is simply the predicted probability of nonresponse. Berk (1983, 394) reports that the three rates are correlated at .98 or better. Berk (1983, 394-5) concludes: "clearly it would not matter (and in fact does not matter) which version of the "hazard rate" is used. There is, however, no reason to believe that this is a general result and may be a

$$
\begin{aligned}
y_i | z_i^* > 0 &= E[y_i | z_i^* > 0] + v_i \\
&= \beta' x + \beta_\lambda \lambda_i(\alpha_u) + v_i
\end{aligned}
$$

where λ_i is referred to as the hazard rate.

The selection equation models the probability that the offender will receive a prison sentence. As can be seen, the predicted value – $\gamma' w_i$ – is multiplied by –1; thus, we are capturing the probability that the individual will not receive a prison sentence. The predicted value from a probit equation is a normally distributed random variable with a mean of 0 and a standard deviation of 1.0. The negative of this random variable is then used to compute the hazard rate – the numerator is the density and the denominator is one minus the cumulative probability. As Berk (1983, 391) notes: "this ratio . . . represents the instantaneous probability of being excluded from the sample conditional on being in the pool at risk." Berk (1983, 391) goes on to assert:

> equally important, the hazard rate captures the expected values of the disturbances in the substantive equation after the nonrandom selection has occurred. It was precisely these expected values that are the source of the biased estimates. By including the hazard rate as an additional variable, one is necessarily controlling for these nonzero expectations. Alternatively stated, the deviations of the expected values from the regression line result from an omitted variable that has now been included. The key, then, to consistent parameter estimates is to construct a hazard rate for each observation. And it cannot be overemphasized that it is the selection process that introduces the need for a new variable.

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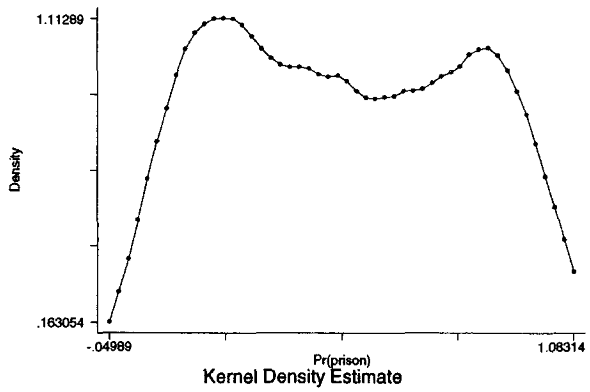
consequence of the small amount of variance explained in each of the three selection equations; all three constructed hazard rates may be insufficiently variable to reveal properly their different forms."

One must be aware of the possibility of this kind of bias/inconsistency in modeling the severity of prison sentences.[8]

For another take on the hazard rate, consider that we have estimated the selection equation using probit. Using the estimated model, it is possible to construct an estimated probability of prison for each offender in the sample. The following diagram provides a hypothetical distribution of the probability of receiving a prison sentence *for those offenders who actually receive a prison sentence* (Figure 7-2):

Figure 7-2: Kernal Density Function for Pr(Prison)



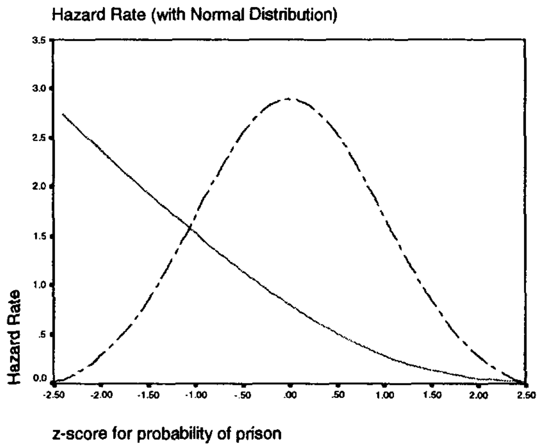
In this example, the model predicts that approximately one half of those who actually receive a prison sentence have a predicted probability below .50. The fact that each of these offenders received a prison sentence – and hence z*

[8] Berk (1983, 392) also adds the following observations. "There is also the problem of infinite regress. Even if one has a random sample from a defined population, that population is almost certainly a nonrandom subset from a more general population. . . . In principle, therefore, there exists an almost infinite regress for any data set in which at some point sample selection bias becomes a potential problem. As for traditional specification errors and measurement errors, the question is not typically whether one has biased (or even consistent) estimates. The question is whether the bias is small enough to be safely ignored.

> 0 for the sentencing judge – suggests that some omitted factor(s) is responsible for the error. Given the limitations of our theory (or data), we do not have additional variables to enter into the selection equation. Instead, we use the hazard rate as a proxy for the omitted variable. The hazard rate is larger to the left of 0 since it takes more to get the offender into the z*>0 zone.

The following figure – Figure 7-3– graphically displays the hazard rate for various z-scores:

Figure 7-3: Inverse of Mills' Ratio for Various Values of z



The further to the left an offender finds himself on the probability of receiving a prison sentence, the greater the hazard rate.

To interpret, recall that the model being estimated includes an additional term:

$$\beta' x + \beta_\lambda \lambda_i(\alpha_u) + v_i$$

Note that when the values of the independent variables result in a low estimate of the probability of prison, the hazard rate becomes larger. In the present instance the severity of sentences is being estimated—this is our substantive equation. All that we observe (or can measure) is the sentences for those who go to prison. We know (or at least suspect) that the decision concerning who goes to prison is not random. Since the same individuals are making the sentence type and sentence severity decisions, it is likely that the disturbances in the two equations will be correlated. Individuals with a low probability of being selected for prison but who in fact receive a prison sentence, will likely get a more severe sentence than the variables in the causal model suggest. This "extra" sentence is captured by $\beta_\lambda\lambda(\alpha_u)$. Note that by construction $\lambda(\alpha_u)$ is always positive and that β_λ places the addition into the appropriate metric.

Interpreting the Estimated Coefficients

The estimated coefficients β represent the impact of a given variable on the latent variable y*; where y* is the sentence severity for all individuals regardless of whether they received a prison sentence. *Consequently, each β is not an estimate of an independent variable on observed values of y.* The marginal effects of each variable on observed (given z*>1) sentence severity consist of two components. The first is the direct effect on the mean sentence severity, which is β. The second is the effect that the variable has on the probability of receiving a prison sentence. Greene (1997, 977) derives the following calculation for the full effect of changes in a regressor that appears in both the selection and the substantive equations:[9]

$$\frac{\partial E[y_i | z_i^* > 0]}{\partial x_{ik}} = \beta_k - \gamma_k (\frac{\rho \sigma_e}{\sigma_u}) \delta_i (\alpha_u)$$

where β_k and γ_k are the coefficients for variable k from the substantive and selection equations respectively and

$$\delta_i = \lambda_i [\lambda_i + \alpha_i]$$

Hence, the marginal effect of each regressor on y in the observed sample consists of two components. There is the direct effect on the mean of y_i, which is β. In addition, for a particular independent variable, if it appears in the probability that z_i is positive, it will influence y_i through its presence in λ_i.

The implications of these results are captured in the following discussion from Greene (1997, p. 977):

> Suppose that p is positive and E[y] is greater when z* is positive than when it is negative. Since $0 < \delta_i < 1$, the additional term serves to reduce the marginal effect. The change in the probability affects the mean of y in that the mean in the group z* > 0 is higher. The second term in the derivative compensates for this effect, leaving only the marginal effect of a change given that z* > 0 to begin with.

Greene (1997, 978) notes that "the sizes of the various parts depend on the setting. It is quite possible that the magnitude, sign, and statistical significance of the effect might all be different from those of the estimate of β_K, a point that appears frequently to be overlooked in the empirical studies." Sigelman and

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[9] The following result holds only for those variables that appear in both the selection and the substantive equations.

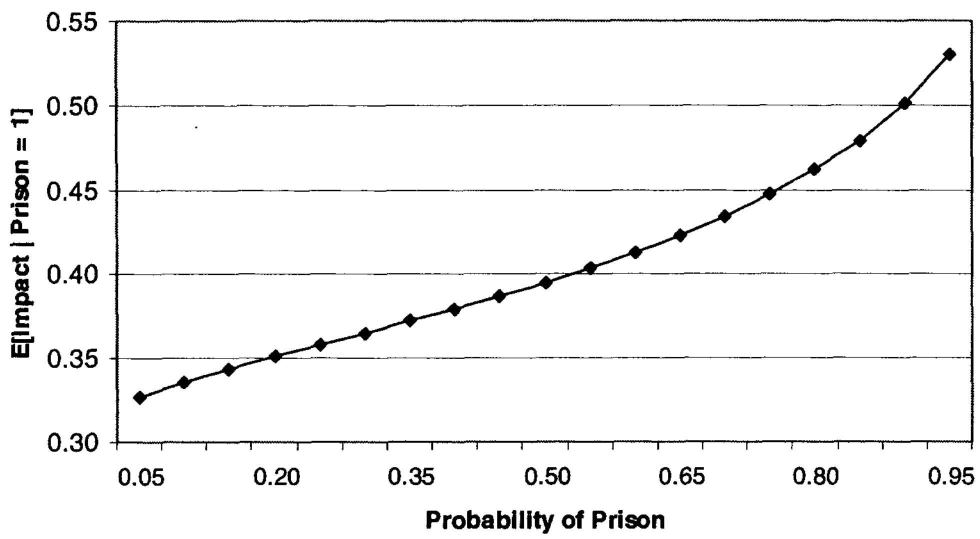
Zeng (1999, 178-9, emphasis added) make a similar point when noting that many applications:

> are problematic due to the presence of nonlinearity in the IMR (Inverse Mills' Ratio) term. As noted earlier, every predictor in the model appears not only as x ... but also as a component of the IMR. One consequence of the nonlinearity is that the effect of n units of change in x is not simply n times the effect of one unit of change in x. *Another consequence is that the effect of a change in x depends not only on the magnitude of the change, but also on the base from which the change takes place.*

We return to these potentially complicating factors when we discuss the results of our estimation.

To further clarify the two-component character of the regressor, consider the possibility that prior record affects both the probability of receiving a prison sentence and the severity of the resulting sanction. Also assume that the severity of the sanction received by those sentenced to prison is higher than those who do not receive a prison sentence. The marginal effect of prior record has two parts, one due to its influence in increasing the probability that an individual receives a prison sentence and one due to its influence on the resulting prison sentence. As such, the coefficient in the sentence severity equation overstates the marginal effect of prior record on prison length for those receiving a prison sentence for low values of Prob($z^*>1$). As the probability of prison moves toward one, the magnitude of the bias moves toward zero. Figure 7-4 portrays the way in which the degree of bias changes with the probability of receiving a prison sentence. As shown, if the individual receives a prison sentence when, in fact, the predicted probability is low, the impact of the coefficient is attenuated. It is only when the probability of prison approaches 1.0 that the impact of the coefficient on the severity decision is fully felt.

Figure 7-4: Hypothetical Impact of unit change in Prior Record for various values of Pr(z*>0)



Specification and Functional Form

Up to this point, our discussion of the two-step model has taken place in the context of a linear model (i.e., the relationship between the dependent and independent variables is assumed to be linear). However, based on our theory of judicial decision-making discussed in Chapter 4, we have argued that it makes more sense to view the sentencing severity decision as nonlinear. Recall that there is little doubt that the interval between prominent sentences *increases at an increasing rate*. And we should try to incorporate this into our empirical specification.[10] The way to do this is through the functional form of our model. In this section, we explore the use of semi-log and log-log transformations.

Interpreting the Coefficients in Semi-Log Model

On a logarithmic scale, or ratio scale, the distance between each constant unit reflects an equal percentage change. In other words, the distance from 20 to 40 (100% increase) is the same as the distance from 40 to 80 (another 100% increase).

The semi-log model has the following form:

$$\ln Y = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i$$

where the β's measure the percentage change in y for a given absolute change in the independent variables. This interpretation of the coefficients of this model derives from the following exponential version of the equation:

$$Y = \alpha e^{bX}$$

Taking logs and letting $c = \log \alpha$, puts the model into the following form:

$$\ln Y = c + bX$$

---

[10] Failing to account for nonlinearities in a regression model is similar to omitting a variable from the model. For example, suppose the true model is:

$$Y = \beta_0 + \beta_1 x_i + \beta_1 x_i^2 + \varepsilon_i$$

But the model estimated is:

$$Y = \beta_0 + \beta_1 x_i + v_i$$

Where $v_i = \beta_1 x_i^2 + \varepsilon_I$

Therefore, a relevant variable (X squared) has been omitted because the researcher is attempting to model a nonlinear relationship using a linear function. Parameter estimates will suffer from omitted variable bias.

As Tufte (1974, 125) notes, in this model "bx100 is approximately equal to the percent increase in Y per unit increase in X, if b is small (say, less than .25)." For the general case, it is first necessary to obtain the series expansion of e^X :

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots = \sum_{n=0}^{\infty} \frac{x^n}{n!}$$

To obtain a formula for the percentage increase in Y per unit increase in X Tufte (1974, 124) offers the following logic:

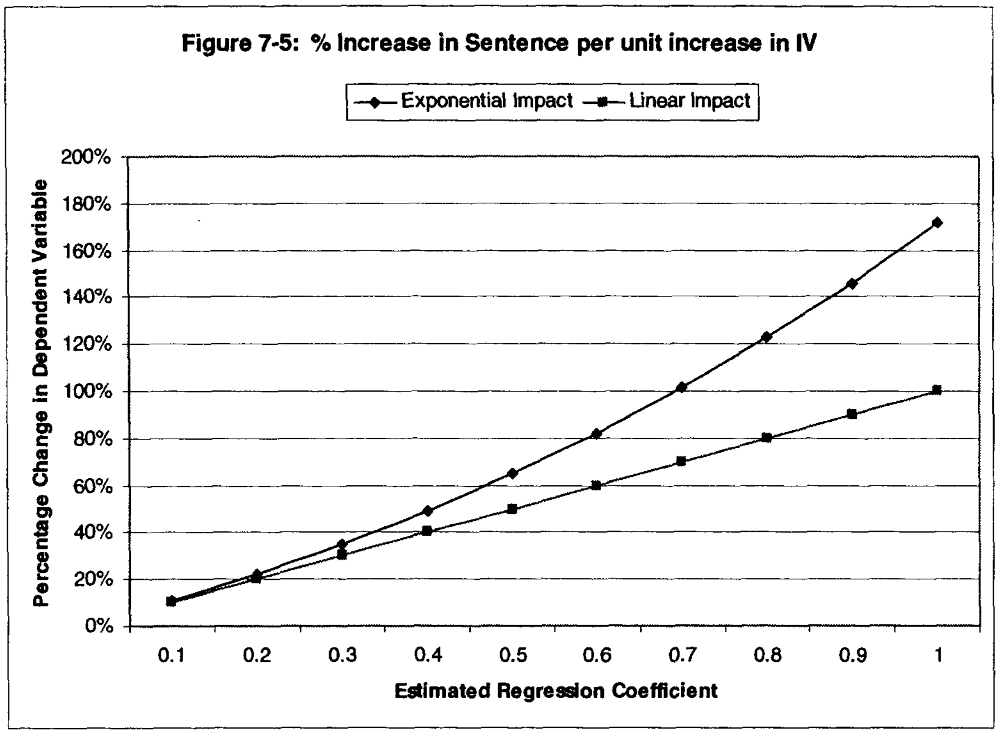
$$\begin{aligned}
&= \frac{\frac{\Delta Y}{Y}}{\Delta X} \\
&= \frac{Y_2 - Y_1}{Y_1} (\text{since } \Delta X = X_2 - X_1 = 1) \\
&= \frac{ae^{bx_2} - ae^{bx_1}}{ae^{bx_1}} \\
&= e^{(bX_2 - bX_1)} - 1 \\
&= e^b - 1 \quad (\text{since } X_2 - X_1 = 1)
\end{aligned}$$

Combining the two results yields the following formula for determining the percentage change in Y for a unit change in X:[11]

$$e^b - 1 = \sum_{n=0}^{\infty} \frac{b^n}{n!} - 1$$

Figure 7-5 provides a graphical display of the percentage increase in Y for a unit change in X for a semilog model. For b < .25, the coefficient can be thought of as an estimate of the percentage impact. As b becomes larger, there is a divergence between the semilog impact and the percentage implied by the estimated coefficient.

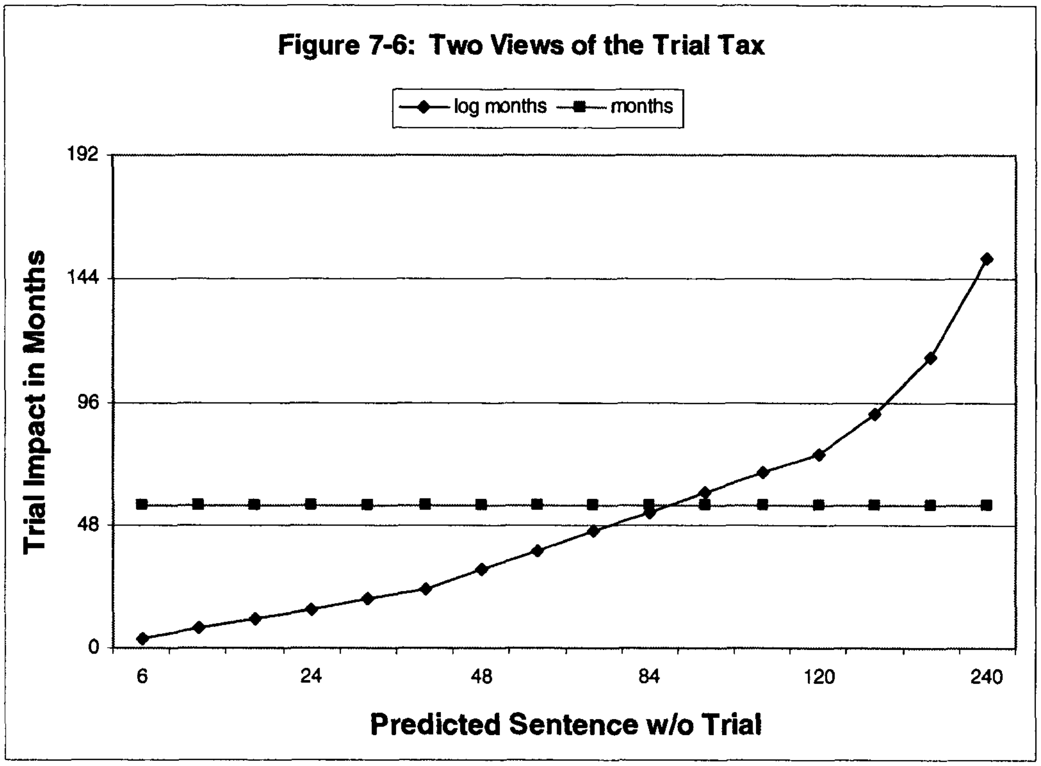
[11] Wooldridge (2002, 188) notes that there is a simple test that gives the exact percentage change in the predicted values of the dependent variable: 100*[exp(b)-1].



An example using the impact of "conviction by trial" makes clear how the estimates from a "semi log" model differ from a model that uses the actual prison months as a dependent variable. The criminal justice literature distinguishes two primary types of plea bargain. The first, the explicit plea bargain, refers to overt negotiations between the prosecutor and the defendant that results in an agreed sanction in exchange for a guilty plea. The second type, the implicit plea bargain, refers to an understanding that the defendant will receive a longer sentence if convicted at trial than a similarly situated defendant convicted by guilty plea. This sentencing differential, based solely on the manner of disposition, is sometimes, following Newman (1966), referred to as a "trial tax."

Let us suppose that the estimated coefficients for trial are 56 and .49 respectively for the actual months and log of prison months equations. In the model that uses the actual months of prison as the dependent variable, the coefficient suggests that the trial tax is 56 months; all other things being equal, the offender sentenced after conviction at trial will receive four and one half more years than a similarly situated offender who pleads guilty. In the model that uses the log of prison months as the dependent variable, the coefficient of .49 suggests that the trial tax is a 63% increase in the sentence (based upon the exponential expansion). In this case, an offender convicted at trial will receive a sentence that is 63% higher than he otherwise would have if he had pled guilty.

To see the implications that follow from the different dependent variables, Figure 7-6 displays the expected impact – in months – of the two estimates. No matter what other factors are considered in the model, the model with prison months suggests that judges add an additional four and one half years for all offenders. In the semi log version of the model, the estimated coefficient says that the judge adds 63% to the sentence that she otherwise would have given. For offenders that would have received a relatively short sentence, the trial tax is substantially less than the 56 months estimated by the prison months' model. For offenders that would have received relatively long sentences (> 48 months), the trial tax is greater than 56 months. The semi log model says that the trial tax is a percentage whose length in months depends upon the other factors in the case. The more that is at stake, the greater the penalty for failure to win an acquittal. Finally, the following figure illustrates that 56 months is an average over the entire range of possible impacts.



Interpreting the Coefficients in the Log-Log Model

The log-log model has the following form:

$$\ln Y = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + \varepsilon_i$$

where the β's are now elasticities. That is they, are the elasticity of y with respect to x. It is also possible to combine the log-log with the semi-log to produce the following specification:

$$\ln Y = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 X_{2i} + \varepsilon_i$$

where the coefficient on X_{1i} is interpreted as an elasticity and the coefficient on X_{2i} is interpreted as a percentage change. This latter specification is used in the present study.

Referencing the above specification, the *sentencing base* is the natural logarithm of the statutory maximum penalty ($\ln X_{1i}$) set by the Michigan Legislature. This provides an indication of the legislative view of offense severity and mirrors that of the public at large. Furthermore, the statutory maximum provides a convenient and easily accessible way to make an initial assessment of the seriousness of the conviction offense. The reasons for taking the logarithm of the dependent variable have been discussed at length earlier on.

Elasticity measures the extent to which Y is responding to a change in X. It is the ratio of the percentage change in Y relative to the percentage change in X. As such, the coefficient β_1 has the following interpretation:

$\beta_1 = 1$ => constant elasticity

$\beta_1 < 1$=> decreasing elasticity

$\beta_1 > 1$ => increasing elasticity

For example, if X increased by 2% and as a result Y increased by 10% the elasticity is 5. If Y decreased by 10% the elasticity is -5. The coefficient β_1, once estimated, is a point estimate of the elasticity (Johnston 1984, 66). That is, β_1 estimates the percent change in Y associated with a percent change in X.

Multicollinearity

There is one remaining issue that needs to be discussed that is germane to the analysis of sentencing data – the specification of the two equations in the model. The usual approach is to include the same independent variables in both equations as in the following example:

$$z_i^* = \sum_{k=1}^{K} \gamma_k X_k + u_i$$
$$y_i = \sum_{k=1}^{K} \beta_k X_k + e_i$$

The only differences between the two equations are that the magnitude and possibly the sign of the variables could differ between equations.[12] One consequence of including identical regressors in each equation, is that it raises the specter of multicollinearity and identification.[13]

While we started out with the intention of using the same variables in both models, our empirical investigation led us to make one change in the two equations. One of the offense factors – intent to kill – was excluded from the selection equation because all offenders with this characteristic received a prison sentence.

[12] Note that the two equations could be estimated as a single tobit model (Albonetti, 1991). However, as Cragg (1971) points out, there is no particular reason to believe that a variable that increases the probability of prison also increases the mean sentence. Fin and Schmidt (1984) have developed a test of whether a tobit model provides as good a fit as the two equation model.

[13] Corrections for sample selection bias often must overcome many practical difficulties. For example, while the set of regressors for the substantive and selection equations may within the Heckman framework be identical, the result (in these circumstances) will always be very high multicollinearity in the substantive equation between the hazard rate and the other regressors. Indeed, if it were not for the non-linear probit form, the regression parameters in the substantive equation would be underidentified (Berk, 1983, 397-97). Breen (1996, 44) notes: as a general rule it is not a good idea to rely on probit's nonlinearity for identification. It is much better to place restrictions on the coefficients, such that a variable that affects the selection stage has no effect on the outcome. This will insure identifiabiilty, although which restrictions are appropriate will depend upon the conceptual model that underlies the analysis.

While there is considerable controversy surrounding multicollinearity (e.g., Belsley, Kuh, Welsch, 1980), we will use the condition number diagnostic to assess the collinearity being introduced by the hazard rate. The condition number provides an indication of whether the data matrix is ill-conditioned or almost not of full rank. An ill-conditioned matrix is one with a small determinant (Belsley, Kuh, and Welsch, 1980, 101). The degree of ill-conditioning depends on how small the minimum singular value is relative to the maximum singular value. According to Belsley, Kuh, and Welsch (1980, 105), weak dependencies are associated with condition numbers between 5 and 10 and moderate dependencies with condition indexes of 30 to 100.

Predicting Prison Length When Using Ln(Prison Length)

One practical problem of using the log of prison sentence length as the dependent variable is that it is necessary to translate the predicted values back into actual months of a prison sentence. As Wooldridge (2002, 208) shows, simply exponentiating the predicted value from the logarithmic regression will systematically underestimate the expected value of the prison sentence. Wooldridge (2002 208-9) suggests the following procedure:

1. Obtain the fitted values from the regression of log sentence on the sentencing relevant variables (loghat)
2. For each observation, create a new variable, m = exp(loghat)

3. Regress prison length on m without a constant term – the coefficient (α) estimates the degree to which the exponentiation underestimates the expected value.

4. Create a predicted value – in levels – by multiplying the estimated coefficient (α) by m.

Using this method it is then possible to determine an R-squared value for the model by correlating the predicted value in (4) with the actual value and squaring it.

ESTIMATION

The two equation model estimated in this study has the following form:

$$Y = \beta_0 + \beta_1 X_{ji} + \varepsilon i \qquad \text{(Selection equation)}$$

$$\ln Y = \beta_0 + \beta_1 \ln(\text{StatMax}) + \beta_2 X_{ji} + \varepsilon_i \qquad \text{(Severity equation)}$$

where ln(StatMax) refers to the log of the legislatively determined statutory maximum and X_{ji} refers to all other independent variables. There are at least three approaches to estimating this model (as well as the models discussed in the previous section): Maximum Likelihood, the two-step approach based upon a prison/no prison selection equation[14], and a two-step approach based upon a multinomial logit selection equation. Greene (1997, 978) notes that the ML approach is quite cumbersome and that an alternative procedure due to

[14] The first equation can be estimated with probit, logit, or linear probability.

Heckman (1979) is often used.[15] One advantage of the ML approach is that the estimates are fully efficient. In addition, a feature of the ML approach is that it is not necessary to include the λ variable discussed earlier (Greene 2000, 716, 739-40). However, it is important to note that the sentencing literature uses the Heckman two-step estimation procedure almost exclusively (Zatz and Hagan, 1984).

As Greene (1997, 978-9) notes, the two-step approach consists of the following steps:

1. Estimate the selection equation by maximum likelihood (usually with PROBIT) to obtain estimates of γ_k . For each observation in the selected sample compute λ_i and δ_i
2. Estimate β_k and $\beta_\lambda = \rho\sigma_e$ by least squares regression of y on X and the estimate of λ.

The estimation was undertaken using both LIMDEP 7.0's *SELECT* and Stata 7.0's *heckman* procedures.[16]

The conventional approach to the two-step estimation is to rely on a PROBIT estimate of the prison/no prison decision. In the previous chapter, we introduced a model of the sentence type decision based upon the sentencing

[15] As a practical matter, the Stata 7.0 Reference Manual H-P (2000, 27-7) notes that the ML approach is strongly dependent on the correct model specification. When the specification is incorrect, the model has a difficult time converging and the model often converges to a value of ρ that is 1.0. This is quite problematic as it implies division by zero. The Manual notes "the two-step model is generally more stable in cases where the data are problematic."

[16] As noted earlier, questions have been raised about the normality assumption. Greene (1997, 983) reports that ". . . parameter estimates are surprisingly sensitive to the distributional assumption that underlies the model." He then offers the opinion that this does not invalidate the normality assumption, it suggests that one proceed with caution.

judge having five options – Prison, Restraint (e.g., jail), Rehabilitation, Rebuke, and Restitution. If this characterization is correct, then the "selection" equation must be estimated with a technique that takes the larger number of choices into account.

To this end, we also employ an approach that is applicable when the selection equation uses the multinomal logit model (Lee, 1983). The primary difference between the two approaches is that in the MNLM one does not have direct access to the underlying z-score from the Probit. Instead, we have the probability that the individual is in class j. Lee (1983) and Greene (2000, 723) suggest employing the following procedure instead[17]

1. Estimate the multinomial logit model by MLE. For those cases that receive prison sentences obtain the predicted probability that the case is in the prison category (P_j). Using this value make the following computations:

$$H_j = \Phi^{-1}(P_j)$$

$$\lambda_j = \phi(H_j)/\Phi(H_j)$$

2. Estimate β_k and $\beta_\lambda = \rho\sigma_e$ by least squares regression of y on X and the estimate of λ

[17] See Trost and Lee (1984) for an example of this approach in examining technical training and earnings.

The Lee approach uses the estimated probability of a prison sentence from the multinomial logit equation to infer the location of the individual on the underlying z^* scale.

Three Estimators – A Comparison

To begin our consideration of possible estimators, we have formulated a model that uses a single dummy variable for court size in place of other possible measures of court context. Once the choice of estimator is made, we will introduce a more complete version of the model.

Table 7-1 presents the estimates for the prison severity equation utilizing each of the three previous estimation methods – ML, Heckman Two-Step, and Lee Two-Step. As can be seen, the coefficient estimates are virtually identical to one another and the variance estimates are substantially smaller for the ML estimates. While the Lee two-step estimates are theoretically important given that they use the results from the multinomial logit specification of the sentence type decision, it is not clear that they can be used to investigate the attenuation or amplification of the estimate.[18] For this reason and because the ML estimates are fully efficient, we will present and discuss the estimates from the maximum likelihood method. We will present relevant comparisons where possible.

[18] In a communication with William Greene, author of the widely referenced test – *Econometric Analysis*, it was confirmed that while possible to solve, the problem is quite complex given that all of the MNL estimates are used to estimate each of the individual probabilities.

Table 7-1: Comparing MLE, Heckman Two-Step, Lee Two-Step Estimators – Dependent Variable – Logarithm of Prison Sentence

	Maximum Likelihood			Heckman Two Step			Lee's Method		
	β	s.e.	z	β	s.e.	z	β	s.e.	z
Sentencing Base									
Statutory Maximum (logarithm)	0.58	0.04	12.84	0.56	0.07	8.32	0.54	0.06	9.20
Offense Factors									
Use of Weapon	0.35	0.11	3.19	0.33	0.11	2.87	0.32	0.11	2.85
Physical Injury	0.34	0.12	2.80	0.37	0.12	3.01	0.36	0.12	3.04
Intent to Kill	1.25	0.17	7.52	1.29	0.16	7.84	1.25	0.16	7.68
Exploitation of Victim	0.37	0.12	2.99	0.37	0.12	2.98	0.35	0.12	3.04
Leader (in multiple offender)	0.24	0.13	1.89	0.25	0.13	1.98	0.25	0.12	2.06
Continuing Pattern	0.29	0.09	3.26	0.27	0.10	2.72	0.25	0.09	2.71
Drug Offense	-0.22	0.10	-2.24	-0.22	0.10	-2.20	-0.19	0.09	-2.07
Property Offense	0.19	0.10	1.89	0.21	0.10	2.01	0.27	0.10	2.82
Prior Record Factors									
High Severity Prior Conviction	0.14	0.09	1.47	0.12	0.10	1.16	0.09	0.10	0.93
Low Severity Prior Conviction	0.02	0.08	0.27	0.00	0.09	0.04	-0.01	0.08	-0.11
Misdemeanor Conviction	0.24	0.08	3.05	0.22	0.08	2.80	0.15	0.07	2.04
Current Relationship CJ System	0.14	0.08	1.72	0.12	0.09	1.41	0.09	0.08	1.13
Arrest < 18	0.19	0.08	2.42	0.18	0.08	2.21	0.15	0.08	1.93
Processing Factors									
Trial	0.44	0.10	4.36	0.44	0.11	4.04	0.47	0.11	4.44
Attorney	0.15	0.09	1.63	0.15	0.10	1.56	0.17	0.09	1.88
Defendant Characteristics									
Gender	-0.19	0.12	-1.55	-0.20	0.12	-1.64	-0.20	0.11	-1.74
Race	0.02	0.08	0.26	0.02	0.08	0.30	0.05	0.07	0.65
Drug Use	0.14	0.08	1.68	0.14	0.09	1.60	0.11	0.08	1.29
21 <= Age < 30	0.32	0.14	2.31	0.30	0.14	2.09	0.23	0.14	1.68
30 <= Age < 40	0.07	0.14	0.49	0.06	0.15	0.43	0.02	0.14	0.13
40 <= Age < 50	0.23	0.16	1.41	0.19	0.16	1.16	0.15	0.15	0.98
Age > 50	0.68	0.18	3.72	0.70	0.18	3.82	0.71	0.17	4.09
Young Black Male	0.18	0.17	1.03	0.16	0.18	0.88	0.08	0.17	0.48
Young Drug User	-0.31	0.17	-1.78	-0.33	0.18	-1.88	-0.35	0.17	-2.10
Constant	-0.77	0.36	-2.12	-0.63	0.62	-1.01	-0.39	0.55	-0.71
Hazard Rate									
λ				0.42	0.18	2.32	0.29	0.16	1.86
SIGMA(1)	0.65	0.04	14.99						
RHO(1,2)	0.71	0.09	7.87						

Having settled on the ML estimation approach, we are in position to move to the fully specify our model of sentencing including the individual court dummy variables. Table 7-2 presents the ML estimates for the two equations making up the sentencing model including the eleven individual court dummy variables. This model uses probit estimates of the prison/no prison decision rather than the MNL estimates presented earlier. Appendix 7-A compares the results using Probit versus MNL estimates and shows the results, as a whole, to be quite similar. Our conclusion is that the Probit estimates capture the prison probability portion of the MNL model.

Comparing the results of Table 7-2 with the left-hand column of Table 7-1 shows many of the site dummy variables significant, yet their inclusion produces virtually no change on the other variables in the model. As a preliminary conclusion this suggests that there are aggregate patterns as well as relatively orthogonal local patterns. The two patterns complement one another in the model. As will be discussed more fully in a later section, there is enough leeway in the sentencing system to allow both types of variation.

A joint significance test for each variable in the two-stage model (far right-hand columns of Table 7-2) shows all but seven of the variables are significant at the .05 level or higher (not including the court dummies).[19] Taken as a whole, the model provides a good fit to the data. Notice that the ML approach to estimation provides separate estimates of σ and ρ. Multiplying these

[19] The variables that do not reach conventional levels of statistical significance are Leader, Drug Offense, Misdemeanor, Gender, Race, Age 30-39, and Young Drug User. The overall chi-square statistic for the model is 611 with 36 degrees of freedom.

two values produces an estimate of λ: .38. The likelihood ratio test for the independence of the type and severity equations rejects the null that the two equations are independent of one another (chi-square of 5.87 with one degree of freedom). The estimated model shows the two decisions are inter-related. Finally, the condition number is 5.21 suggesting that multicollinearity is not a serious problem in spite of the inclusion of the same variables in both the sentence type and sentence severity equations. It makes sense, therefore, to continue to focus on the two equations as a seemingly unrelated system of equations.

Table 7-2: Heckman Maximum Likelihood Estimates
– Dependent Variables – Prison/No Prison & Logarithm of Prison Sentence

	Selection Equation			Severity Equation			Wald Test (both equations)	
	γ	s.e.	z	β	s.e.	z	X^2	p-value
Sentencing Base								
Statutory Maximum (logarithm)	0.72	0.06	12.12	0.57	0.05	11.75	**247.93**	0.00
Offense Factors							**175.04**	**0.00**
Use of Weapon	0.61	0.18	3.44	0.31	0.11	2.91	15.76	0.00
Physical Injury	0.62	0.23	2.77	0.38	0.12	3.27	13.76	0.00
Intent to Kill				1.21	0.16	7.57	58.53	0.00
Exploitation of Victim	0.29	0.20	1.48	0.41	0.12	3.47	11.66	0.00
Leader (in multiple offender)	0.04	0.18	0.23	0.20	0.12	1.62	3.07	0.22
Continuing Pattern	0.66	0.14	4.65	0.28	0.09	3.28	26.93	0.00
Drug Offense	-0.21	0.13	-1.61	-0.25	0.09	-2.67	5.65	0.06
Property Offense	-0.22	0.13	-1.74	0.18	0.10	1.82	11.65	0.00
Prior Record Factors							**133.64**	**0.00**
High Severity Prior Conviction	0.57	0.14	4.11	0.16	0.09	1.76	19.60	0.00
Low Severity Prior Conviction	0.49	0.11	4.30	0.08	0.08	0.93	18.50	0.00
Misdemeanor Conviction	0.11	0.12	0.89	0.17	0.08	2.20	4.40	0.11
Current Relationship CJ System	0.35	0.11	3.04	0.07	0.08	0.84	11.69	0.00
Arrest < 18	0.34	0.11	3.18	0.17	0.08	2.20	12.21	0.00
Processing Factors							**47.59**	**0.00**
Trial	0.69	0.16	4.23	0.49	0.10	4.76	33.32	0.00
Attorney	-0.38	0.13	-2.93	0.14	0.09	1.47	12.85	0.00
Defendant Characteristics							**67.41**	**0.00**
Gender	0.07	0.15	0.45	-0.15	0.12	-1.26	2.75	0.25
Race	-0.06	0.11	-0.57	0.04	0.08	0.57	0.41	0.81
Drug Use	0.37	0.11	3.27	0.08	0.08	1.02	11.98	0.00
21 <= Age < 30	0.62	0.18	3.48	0.24	0.14	1.70	11.22	0.00
30 <= Age < 40	0.36	0.19	1.93	-0.02	0.14	-0.14	3.98	0.14
40 <= Age < 50	0.57	0.22	2.66	0.18	0.16	1.11	6.10	0.05
Age > 50	0.62	0.23	2.66	0.66	0.18	3.71	15.09	0.00
Young Black Male	0.86	0.24	3.65	0.10	0.17	0.59	12.29	0.00
Young Drug User	-0.24	0.26	-0.92	-0.39	0.17	-2.34	4.85	0.09
Court Context							**91.50**	**0.00**
County 1	1.06	0.17	6.36	0.65	0.12	5.30	60.64	0.00
County 2	-0.06	0.26	-0.23	-0.04	0.22	-0.19	0.07	0.79
County 3	0.75	0.28	2.66	0.55	0.20	2.80	11.57	0.00
County 4	0.37	0.25	1.47	0.25	0.21	1.15	2.70	0.10
County 5	0.54	0.16	3.26	0.09	0.12	0.74	10.65	0.00
County 6	0.64	0.22	2.92	0.13	0.16	0.82	8.51	0.00
County 7	0.73	0.23	3.12	0.45	0.16	2.84	14.21	0.00
County 8	0.14	0.16	0.89	0.05	0.12	0.39	0.81	0.37
County 9	-0.23	0.40	-0.56	-0.40	0.29	-1.37	1.91	0.17
County 10	0.44	0.24	1.80	0.17	0.15	1.11	3.68	0.06
County 11	0.14	0.30	0.45	0.07	0.23	0.32	0.23	0.63
Constant	-5.57	0.38	-14.79	-0.71	0.43	-1.63		
Hazard Rate				0.38				
SIGMA(1)				0.59	0.04	14.11		
RHO(1,2)				0.64	0.13	4.88		

Table 7-3 provides a summary of the joint significance tests for the six subsets of variables that make up the model of the sentencing process. All six sets of variables have a statistically significant impact on each step in the two-step sentencing process. Comparing the tests for the two equations, however, indicates that the various subsets of sentencing relevant variables play different roles in the different stages of the sentencing process. One big difference between the Selection and Severity equations is the role of the Prior Record Factors. The offender's prior record is a very important determinant of the prison/no prison decision and plays a much smaller role in the sentence severity decision (Table 7-3). Another difference is that the offense factors are more significant in the Severity decision. Taking the two decisions together, the Sentencing Base, Offense Factors, and Prior Record factors have the most significant impact on sentencing. It is noteworthy, however, that Court Processing, Defendant Characteristics, and Court Context all play a significant role in each of the decisions. Their impact on sentencing decisions will be explored in the subsequent sections of this chapter.

Table 7-3: Joint Significance Tests

Variable Type	Selection		Severity		Both	
	X^2	p-value	X^2	p-value	X^2	p-value
Sentencing Base	146.80	0.00	138.03	0.00	247.93	0.00
Offense Factors	71.57	0.00	145.52	0.00	175.04	0.00
Prior Record Factors	80.74	0.00	14.11	0.01	133.64	0.00
Processing Factors	23.81	0.00	27.47	0.00	47.59	0.00
Defendant Characteristics	29.98	0.00	40.11	0.00	67.41	0.00
Court Context	57.52	0.00	42.31	0.00	91.50	0.00

Table 7-4 translates the estimated coefficients from the severity equation from Table 7-2 into percentage changes. As discussed earlier, when a variable is regressed on a logged dependent variable, the coefficient can be interpreted as the percentage change. For values below .25, the correspondence is almost perfect. However, as the coefficients become larger, the percentage change implications increase. Table 7-4 uses the formula from the previous section to provide a calculation of the percentage change implications.

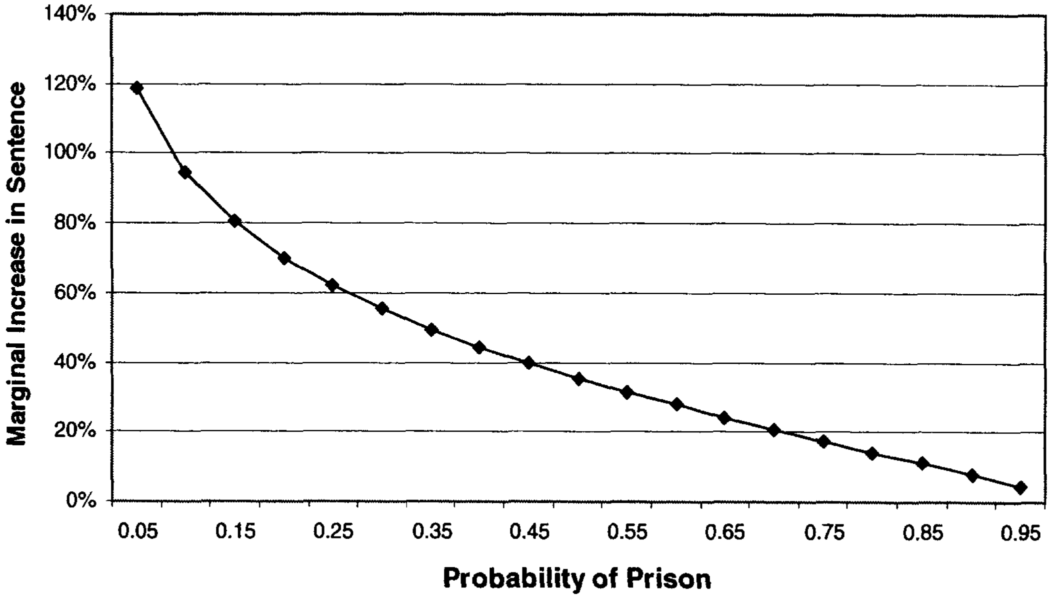
Table 7-4: Translating the Estimated Coefficients into Percentages

Variables	Severity Equation β	Percent Change in Sentence Severity per unit Increase in Independent Variable
Sentencing Base		
Statutory Maximum (logarithm)	0.57	*(coefficient is elasticity)*
Offense Factors		
Use of Weapon	0.31	35.9%
Physical Injury	0.38	46.0%
Intent to Kill	1.21	234.7%
Exploitation of Victim	0.41	50.1%
Leader (in multiple offender)	0.20	22.2%
Continuing Pattern	0.28	32.9%
Drug Offense	-0.25	28.6%
Property Offense	0.18	19.8%
Prior Record Factors		
High Severity Prior Conviction	0.16	17.7%
Low Severity Prior Conviction	0.08	8.1%
Misdemeanor Conviction	0.17	18.2%
Current Relationship CJ System	0.07	7.0%
Arrest < 18	0.17	18.0%
Processing Factors		
Trial	0.49	63.7%
Attorney	0.14	14.8%
Defendant Characteristics		
Gender	-0.15	-17.2%
Race	0.04	-4.3%
Drug Use	0.08	8.6%
21 <= Age < 30	0.24	26.6%
30 <= Age < 40	-0.02	-2.0%
40 <= Age < 50	0.18	19.2%
Age > 50	0.66	93.2%
Young Black Male	0.10	10.5%
Young Drug User	-0.39	44.4%
Court Context		
County 1	0.65	92.0%
County 2	-0.04	-4.1%
County 3	0.55	73.8%
County 4	0.25	28.1%
County 5	0.09	9.1%
County 6	0.13	13.6%
County 7	0.45	57.4%
County 8	0.05	4.8%
County 9	-0.40	48.8%
County 10	0.17	18.6%
County 11	0.07	7.5%

As noted earlier, the hazard rate for the model based upon the log months of prison is .38. If the estimated probability of prison is quite small and the offender receives a prison sentence, it is clear that the judicial rationale for the sentence lies outside the purview of the model. Given the interdependence, the "error" in the selection equation is likely to be correlated with the "error" in the second equation. The value that occurs when β_λ is multiplied by the hazard rate for the probability of prison is added to the predicted sentence to reflect that once the individual is sentenced to prison they are likely to receive a non-negligible sentence.[20] To see how this works in the model, Figure 7-7 presents the percentage increase that is added to the predicted sentence for the underlying probability of prison. For those offenders whose predicted probability of prison is .25 and yet are sent to prison, the model implies that the judge will add 62% to the sentence predicted by the sentencing relevant variables. When the probability of prison is .50 and the person receives a prison sentence, the hazard rate addition is approximately 35% to the predicted prison sentence. It is the inclusion of this factor that requires the consideration of the amplification or attenuation of the marginal impacts given the person is sent to prison. When the probability of prison exceeds .90, the hazard rate plays almost no role in generating the predicted sentences.

[20] The addition is needed because the sentencing relevant variables in the model are not likely to predict a very severe sentence if they did not predict a very high probability of receiving a prison sentence.

Figure 7-7: Impact of Hazard Rate on Sentence Severity



Utilizing the estimates of both equations, it is possible to determine the marginal effect of all variables that appear in both the sentence type and sentence severity equations for those offenders who actually receive a prison sentence (Table 7-5). To provide a visual indication of the implications from Table 7-5, Figure 7-8 shows a graph of the marginal effects for High Severity Felony and Private Attorney over the entire range of the probability of receiving a prison sentence.

Figure 7-8: Marginal Impact over the Range of Pr(Prison)

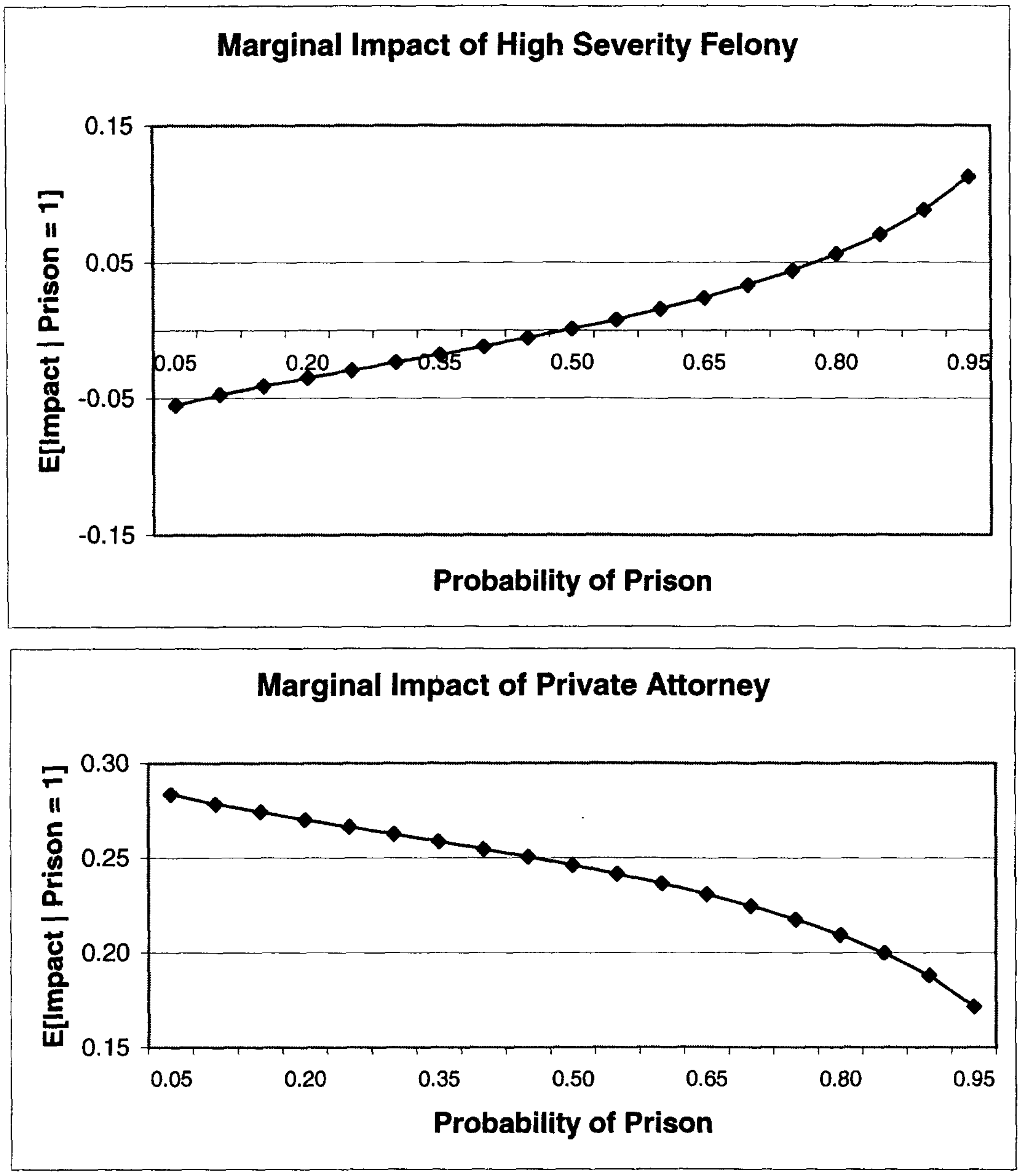


Table 7-5: Marginal Effect of Sentencing Variables on Pr(Prison) for Those Who Receive a Prison Sentence

	Dependent Variable = Log Months of Prison						
	Heckman MLE		Variable Impact When Prison = 1				
			Estimated Prob(Prison) from Selection Equation				
Variable	**Probit Coefficient**	**Regression Coefficient**	**0.050**	**0.250**	**0.500**	**0.750**	**0.950**
Sentencing Base							
Statutory Maximum	0.721	0.572	0.325	0.355	0.390	0.439	0.518
Offense Factors							
Use of Weapon	0.613	0.307	0.097	0.122	0.152	0.194	0.260
Physical Injury	0.625	0.378	0.164	0.190	0.220	0.263	0.331
Intent to Kill		1.208	1.208	1.208	1.208	1.208	1.208
Exploitation of Victim	0.291	0.406	0.307	0.319	0.333	0.352	0.384
Leader (in multiple offender)	0.041	0.200	0.186	0.188	0.190	0.193	0.197
Continuing Pattern	0.658	0.284	0.059	0.086	0.118	0.163	0.234
Drug Offense	-0.210	-0.251	-0.179	-0.188	-0.198	-0.212	-0.235
Property Offense	-0.219	0.181	0.256	0.247	0.236	0.221	0.197
Prior Record Factors							
High Severity Prior Conviction	0.573	0.163	-0.033	-0.009	0.018	0.057	0.120
Low Severity Prior Conviction	0.494	0.078	-0.091	-0.071	-0.047	-0.014	0.040
Misdemeanor Conviction	0.107	0.167	0.131	0.135	0.140	0.148	0.159
Current Relationship CJ System	0.347	0.068	-0.051	-0.037	-0.020	0.003	0.041
Arrest < 18	0.341	0.165	0.049	0.063	0.079	0.102	0.140
Processing Factors							
Trial	0.686	0.493	0.258	0.286	0.319	0.366	0.441
Attorney	-0.379	0.138	0.268	0.252	0.234	0.208	0.167
Defendant Characteristics							
Gender	0.069	-0.149	-0.173	-0.170	-0.166	-0.162	-0.154
Race	-0.062	0.044	0.065	0.063	0.060	0.055	0.049
Drug Use	0.370	0.083	-0.044	-0.029	-0.011	0.014	0.055
21 <= Age < 30	0.621	0.235	0.023	0.049	0.079	0.121	0.188
30 <= Age < 40	0.364	-0.020	-0.145	-0.130	-0.112	-0.088	-0.048
40 <= Age < 50	0.574	0.176	-0.020	0.003	0.031	0.070	0.132
Age > 50	0.621	0.659	0.446	0.472	0.502	0.544	0.612
Young Black Male	0.860	0.100	-0.195	-0.159	-0.118	-0.059	0.034
Young Drug User	-0.244	-0.394	-0.311	-0.321	-0.333	-0.349	-0.376
Court Context							
County 1	1.064	0.652	0.288	0.332	0.383	0.456	0.572
County 2	-0.061	-0.042	-0.021	-0.024	-0.027	-0.031	-0.037
County 3	0.747	0.552	0.297	0.327	0.364	0.414	0.496
County 4	0.371	0.247	0.121	0.136	0.154	0.179	0.219
County 5	0.535	0.087	-0.096	-0.074	-0.048	-0.012	0.047
County 6	0.638	0.128	-0.091	-0.065	-0.034	0.010	0.079
County 7	0.727	0.454	0.205	0.234	0.270	0.319	0.398
County 8	0.141	0.047	-0.001	0.005	0.012	0.021	0.037
County 9	-0.226	-0.397	-0.320	-0.329	-0.340	-0.356	-0.380
County 10	0.435	0.171	0.022	0.039	0.061	0.090	0.138
County 11	0.137	0.072	0.025	0.031	0.037	0.047	0.062

Looking at the top panel of the Figure 7-8, leads to a number of non-obvious conclusions. From Table 7-5, we see that the PROBIT estimate for High Severity Conviction is .57 while the regression estimate is .16. Taken at face value, it would appear that the offender with a High Severity Prior conviction would receive a sentence that is 16% higher than his counterpart without such a conviction. However, this is not always the case. Since offenders with a High Severity Prior Conviction have a relatively high likelihood of receiving a prison sentence, the variable's impact on the mean sentence will vary considerably over the range of probabilities of prison. For example, if an offender with High Severity Prior Conviction receives a prison sentence even though his estimated probability of prison is .05, the offender will receive a sentence that is 3.3% less than if he did not have such a conviction. If the offender's probability of prison is .50, he will receive a prison sentence that is 1.8% more than if he did not have such a conviction. Only as the probability of prison approaches 1.0, will the variable have its full and positive impact on sentence length. Because of the large impact of the High Severity variable on the prison/no prison decision, the impact of the variable on the severity decision can have the opposite sign depending upon the values of the other sentencing relevant variables.

Turning to the bottom panel of Figure 7-8, we see that the variable Private Attorney has a somewhat different impact over the range of Probability of Prison. The offender with a Private Attorney is less likely to receive a prison sentence than a similarly situated offender without an attorney. However, if the offender receives a prison sentence in spite of this "advantage", the model suggests that there will be a rather substantial increase in the predicted sentence. For example, if the predicted probability of prison is .05, the offender with a Private Attorney will receive a sentence that is 26% higher than a similarly situated counterpart without an attorney. The impact of the variable on sentence severity declines as the probability of prison increases.

As can be seen in Table 7-5, the attenuation/amplification of the severity equation coefficients can be rather substantial. Our results provide a striking example of Greene's (1997, 978) observation that

> the sizes of the various parts depend on the setting. It is quite possible that the magnitude, sign, and statistical significance of the effect might all be different from those of the estimate of $\beta_{k,}$ a point that appears frequently to be overlooked in the empirical studies."

This warning underscores the importance of taking the estimates from both the selection and substantive equations into account when interpreting the effects of any particular variable in the model. When this is coupled with the impact of the hazard rate, the interpretation of the coefficients in the typical two equation model require more than simply reciting the individual coefficients.

INTERPRETATION

Background Information

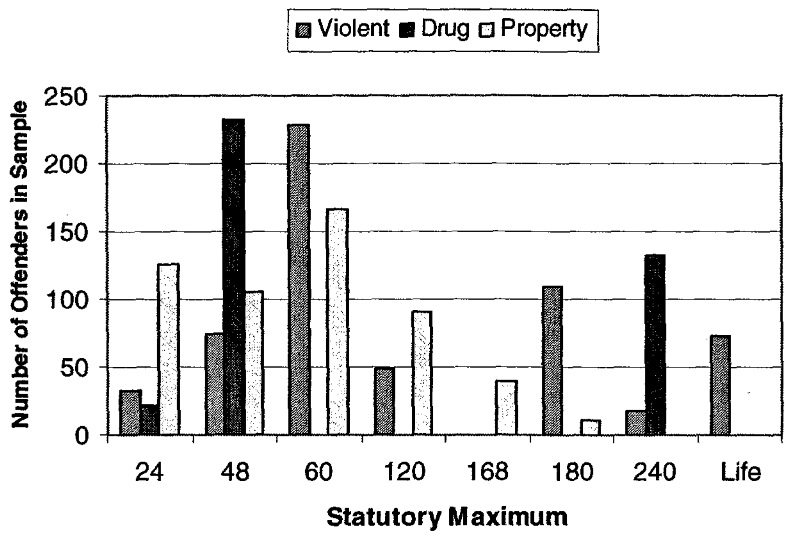
As a prelude to discussing the substantive implications of the parameter estimates, it is necessary to establish a minimal context of what the typical offender looks like. Table 7-6 presents the average values for each of the model's variables broken down by prison/no prison for each of the three primary classes of offenses – Violent/Safety, Property, and Drug. Figure 7-9 presents the distribution of the statutory maxima for each of the three primary classes of offenses. As can be seen in Table 7-6, the only offense factors that apply to Drug or Property offenders are Leader and Continuing Pattern. Figure 7-9 reveals that the drug offenses included in the sample have statutory maxima of 24, 48, and 240 while the property offenses have maxima at 24, 48, 60, 120, 168, and 180.

For comparison purposes, Appendix 7-B provides the estimates and related information for the identical model using actual months of prison as the expected value. We provide this information so that the reader can assess the pluses and minuses of using the logarithmic transformation discussed in Chapter 4.

Table 7-6: Mean Values of Sentencing Relevant Variables by Offense Type

Variable	Violent			Property			Drug			Overall		
	Local	Prison	Total	Local	Prison	Total	Local	Prison	Total	Local	Prison	Total
Prison/No Prison	0.67	0.33	584	0.80	0.20	538	0.87	0.13	387	0.77	0.23	1509
Statutory Maximum	75	231	109	56	77	58	69	142	80	65	165	81
Use of Weapon	0.17	0.41	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.23	0.10
Physical Injury	0.08	0.20	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.11	0.05
Intent to Kill	0.00	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.01
Exploitation	0.11	0.17	0.13	0.01	0.01	0.01	0.00	0.00	0.00	0.04	0.10	0.06
Leader	0.15	0.13	0.15	0.15	0.07	0.14	0.18	0.10	0.17	0.16	0.11	0.15
Continuing Pattern	0.07	0.22	0.12	0.10	0.34	0.13	0.02	0.23	0.06	0.07	0.24	0.11
High Severity Felony	0.04	0.25	0.11	0.06	0.32	0.10	0.13	0.19	0.14	0.07	0.25	0.11
Low Severity Felony	0.22	0.39	0.28	0.24	0.69	0.30	0.28	0.49	0.32	0.24	0.48	0.30
Misdemeanor	0.17	0.26	0.20	0.20	0.38	0.22	0.15	0.21	0.16	0.18	0.27	0.20
Current Relationship	0.17	0.39	0.24	0.16	0.51	0.21	0.20	0.35	0.23	0.18	0.41	0.23
Juvenile Arrest	0.30	0.51	0.37	0.30	0.46	0.33	0.21	0.34	0.23	0.27	0.46	0.32
Trial	0.08	0.23	0.13	0.04	0.03	0.04	0.06	0.09	0.07	0.06	0.15	0.08
Private Attorney	0.31	0.22	0.28	0.16	0.11	0.15	0.20	0.06	0.18	0.22	0.16	0.21
Gender	0.16	0.07	0.13	0.32	0.11	0.29	0.25	0.21	0.24	0.25	0.11	0.21
Race	0.52	0.58	0.54	0.49	0.63	0.51	0.66	0.66	0.66	0.55	0.61	0.56
Drug Use	0.30	0.51	0.37	0.28	0.73	0.34	0.64	0.69	0.65	0.38	0.59	0.43
20<Age<30	0.26	0.33	0.28	0.29	0.39	0.30	0.28	0.44	0.31	0.28	0.37	0.30
29<Age<40	0.24	0.22	0.23	0.20	0.21	0.20	0.26	0.32	0.27	0.23	0.24	0.23
39<Age<50	0.12	0.12	0.12	0.08	0.20	0.09	0.15	0.05	0.13	0.11	0.12	0.11
Age>49	0.16	0.07	0.13	0.18	0.07	0.17	0.18	0.08	0.16	0.17	0.07	0.15
Young Black Male	0.07	0.18	0.11	0.07	0.04	0.07	0.04	0.06	0.05	0.07	0.13	0.08
Young Drug User	0.06	0.11	0.08	0.05	0.06	0.05	0.03	0.00	0.02	0.05	0.08	0.05
County 1	0.13	0.08	0.11	0.04	0.21	0.07	0.04	0.18	0.07	0.05	0.15	0.08
County 2	0.04	0.04	0.04	0.07	0.01	0.06	0.01	0.01	0.01	0.05	0.02	0.05
County 3	0.00	0.03	0.01	0.03	0.01	0.03	0.02	0.08	0.03	0.03	0.03	0.03
County 4	0.05	0.01	0.03	0.04	0.00	0.04	0.07	0.01	0.06	0.05	0.03	0.04
County 5	0.06	0.08	0.07	0.10	0.04	0.10	0.08	0.21	0.11	0.09	0.12	0.10
County 6	0.07	0.07	0.07	0.08	0.06	0.07	0.03	0.04	0.03	0.06	0.06	0.06
County 7	0.01	0.04	0.02	0.03	0.10	0.04	0.04	0.06	0.04	0.03	0.06	0.04
County 8	0.13	0.11	0.12	0.21	0.13	0.20	0.11	0.06	0.10	0.16	0.10	0.15
County 9	0.01	0.02	0.01	0.04	0.01	0.04	0.01	0.00	0.01	0.03	0.01	0.02
County 10	0.01	0.08	0.04	0.07	0.01	0.07	0.02	0.01	0.02	0.04	0.06	0.05
County 11	0.03	0.02	0.03	0.01	0.03	0.01	0.00	0.01	0.01	0.02	0.02	0.02
County 12	0.45	0.41	0.43	0.27	0.38	0.28	0.57	0.31	0.52	0.40	0.33	0.38

Figure 7-9: Statistical Maximum for Offense Types



Sentencing Base

As the hypothesized "base" of the sentencing decision, it is imperative that we assess the role that the statutory maximum plays in the sentencing process. In terms of the sentence severity decision, there are eight statutory maxima included in this data set – 24, 48, 60, 120, 168, 180, 240, and Life.[21] .

Referencing Table 7-2, the coefficient associated with the sentencing base is .57 and it has the highest z-score of any variable in the model. In our earlier discussion of the role of statutory maximum as the sentencing base, we suggested that this factor would serve as a centering tool for judges. As an indirect test of this hypothesis, we ran a simple bivariate regression of the sentence severity on statutory maximum (in logarithm units) and obtained an estimated coefficient of .55 with a t-statistic of 16.40 and an R^2 of .44.

[21] The variable included in the model is the natural log of these values: the eight values of the variable are 3.178, 3.871, 4.094, 4.787, 5.123, 5.193, 5.481, and 7.073 respectively.

Comparing this to the estimated coefficient in the full model suggests that the inclusion of many other variables into the model does little to take away the "centering" power of the statutory maximum.

The coefficient can be interpreted, as noted earlier, as a point estimate of the elasticity between the two variables. In this role, the coefficient estimates the percent change in sentence severity associated with a percent change in the statutory maximum. Specifically, for each one percent change in statutory maximum, there is a half of a percent change in the predicted sentence.

For purposes of illustration, consider the difference between a crime with a statutory maximum of 180 months and one of 60 months. This is a meaningful comparison because if an offender is convicted of an attempt of a crime that carries 120 months or more, the statutory maximum becomes 60 months. This suggests that the movement from a completed offense to an attempt has considerable implications for the "centering" the subsequent sentence. If the statutory maximum of a completed offense is 180 months, the move to a 60-month statutory maximum leads to a reduction of 67% in the statutory maximum that, in turn, leads to a reduction of 38% percent (.57*.67) in the expected sentence length.

Before leaving our discussion of the sentencing base, it is important to consider its role in the two-equation system. The coefficients for this variable are .72 and .57 for the selection and severity equations respectively. As noted earlier, Table 7-5 presents the attenuated values of the estimated coefficients and shows the impact of the Statutory Maximum variable is attenuated for those offenders with a low predicted probability of prison. When the predicted probability of prison is low, say .25, and the offender receives a prison sentence, the estimated elasticity would be in the range of .36. When the predicted probability of prison is .50, the estimated elasticity would be .39. Depending upon the probability of having received a prison sentence leads judges to – in effect – create a sliding scale for the sentencing base. Since the variable plays a major role in the prison/no prison decision, its effects are attenuated for offenders with few additional sentencing relevant factors who nonetheless receive a prison sentence.

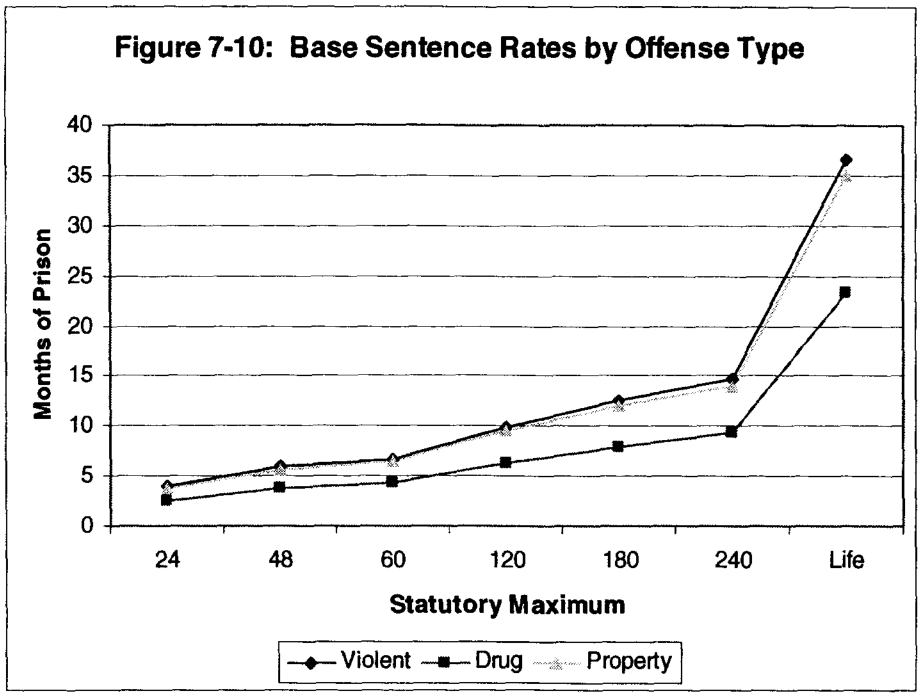
Characteristics of Criminal Event

As discussed earlier, there are seven aspects of the criminal event that we are hypothesizing to have an impact on sentence severity – Use of Weapon, Physical Injury, Intent to Kill, Exploitation of Victim, Leader, Continuing Pattern, and the type of conviction offense (i.e., violent/safety, drug, property). Together these variables have an overall chi-square of 175.04 with fifteen degrees of freedom in the two equations. It is noteworthy that all of the offense-related factors in the severity equation have p-values < .1 while only the Use of Weapon, Physical Injury, and Continuing Pattern play a significant role in the selection equation.

In terms of their impact on the length of sentence, all of the variables have a substantial impact on the sentence as they range in value from .28

(Leader) to 1.21 (Intent to Kill). To ascertain the maximum impact of each variable, Table 7-4 translates each of the coefficients into the percentage change in the sentence severity when each of these factors occurs. Although these offense factors occur in only a small number of cases, the impact when they occur is quite dramatic.

The two variables included in the model that differentiate between the primary classes of offense – violent (base category), property, and drug – likewise have a significant impact on the sentence severity decision. Interestingly, their effects are almost a mirror image of one another. Drug offenses – on average – receive a sentence that is 27% less than a similarly situated violent offender whereas Property offenses – on average – receive a sentence that is 20% higher than violent offenses. While the impact on sentencing drug offenses seems plausible, a question arises as to why property offenders would be treated in a more serious manner than violent offenders. To answer this question one need only look at the offense factors contained in the model – most apply only to violent crimes. Using the mean values for the offense variables in Table 7-6 for Violent, Drug, and Property, Figure 7-10 plots the base sentence for each of these types of offenses.



As can be seen in Figure 7-10, once the average values of the offense factors are combined with the statutory maximum and the constant term, we can see that the base sentence rates for Violent and Property offenses are quite close to one another. Drug offenses are substantially lower.

Prior Criminal History

The model includes five aspects of each offender's prior criminal history – high severity prior conviction, low severity conviction, misdemeanor conviction, whether the offender has a current relationship with the criminal justice system (i.e., in custody, bail, bond, probation, parole), and whether the individual was arrested prior to turning 18. It is noteworthy that four of the five variables have a statistically significant impact on the in/out decision but only two of the variables have a substantial impact on the sentence severity decision.

The coefficients of three of the variables are in the .16 to .17 range suggesting not only that prior record factors plays a modest role in the sentence severity decision but that judges do not discriminate between the various types of prior record when determining the severity of a prison sentence (Table 7-2). It might be expected that high severity prior convictions have a more substantial impact than misdemeanors. While this is true for the prison/no prison decision, judges do not appear to make much of the difference between types of prior record and simply react to the presence of such a record. Any evidence of prior criminal activity leads to a modest increase in sentence severity.

Court Processing Factors

There are two variables included in the court processing subset – convicted at trial and whether the offender has a privately-retained attorney. Conviction by trial has long been recognized as an important determinant of sentence severity. A quick check of the recent research shows that that the trial tax is 16 months (Ulmer and Kramer, 1996), 5.8 months (Engen and Gainey, 2000), 42 months (Nobiliing, Spohn, DeLone, 1998), and 25 months (Wooldredge, 1998). Our findings are consistent with current research – there is a trial tax. Where our results differ, however, is in the magnitude of the tax. Our estimate of the impact is .49; as shown in Table 7-4, this translates into approximately 63% increase in the sentence over those who plead guilty. Therefore, while we are in line with the literature with respect to the fact that trials matter, our results suggest that the actual difference is related to sentence length.

Looking at Figure 7-5, which uses the actual coefficient from Table 7-2, it can be seen that our estimate is quite compatible with previous research. When the predicted sentence (without a trial) is 24 months or less, the trial tax is about one year. At 72 months, it is equal to the estimated coefficient from the model using actual months (see Appendix 7B). It seems likely that the trial tax is best characterized in terms of a percentage increase in the underlying sentence without a trial.

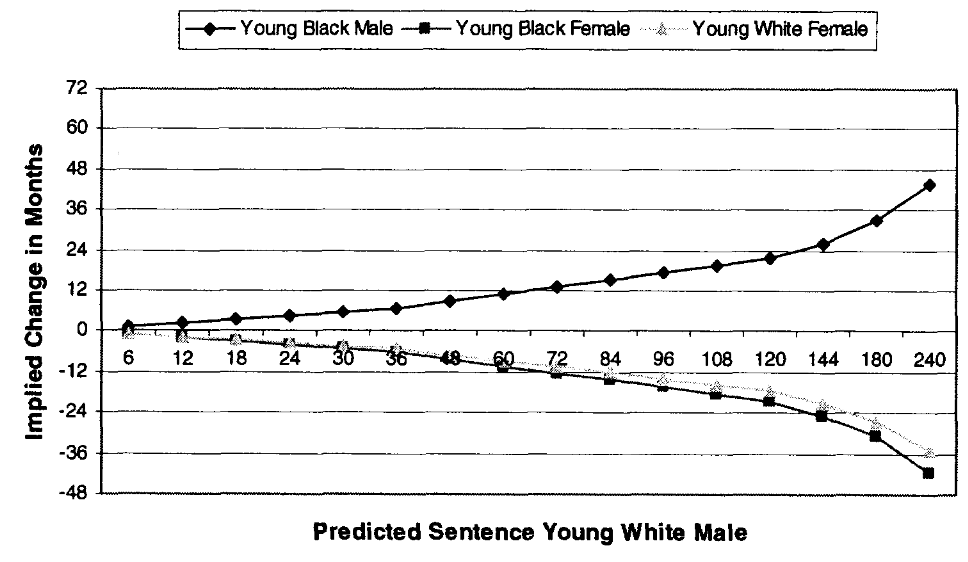
The variable for privately retained attorney plays different roles in the selection and the severity equations. In the selection equation, the presence of a private attorney lessens the probability of a prison sentence. However, if the offender has a private attorney and is sentenced to prison, there is an *increase* of approximately 17% in the expected sentence.

Defendant Characteristics

Following in the tradition of the research literature, we investigate the impact of gender, race, and age along with whether the offender is a known drug user. Taken as whole, these variables have a statistically significant impact on the sentencing decision with a chi square of 67.41 with 18 degrees of freedom. While the defendant characteristics play an important role in the in/out decision (five of nine are significant), it is noteworthy that only two of the variables are significant in the severity equation.

In spite of the low level of statistical significance, the coefficients do play an important substantive role in the model. To illustrate the possible impact, Figure 7-11 presents the marginal change in the expected sentence (using young white males as a reference point represented by the zero line in the figure) for young black males, young black females, and young white females. As can be seen, the differences are substantial especially as the underlying sentence without these factors becomes larger.

Figure 7-11: Marginal Impact of Race, Gender, and Youth



The sentencing differential is quite small until the underlying sentence (for a young white male) approaches five years (Figure 7-11). From that point, the young black male is increasingly penalized while both young female groups receive decrements in their sentences compared to the similarly situated young white male. By the time the expected sentence reaches ten years, the gap between young black males and females approaches four years in spite of a similar underlying conviction offense and fact pattern.

To assess the impact of race and age, Figure 7-12 examines the sentence severity implications of young black and white offenders versus black and white offenders between the ages of 21-29. Again, there is a substantial sentencing differential between young black and white males (the white male is the reference category). Offenders in their twenties are treated substantially more severely than their younger counterparts. The model suggests that there are no substantive racial differences between the older subgroups. Therefore, this figure illustrates the important impact that age plays in the sentencing decision; especially when comparing the younger offenders with those in the crime prone years of 21-29.

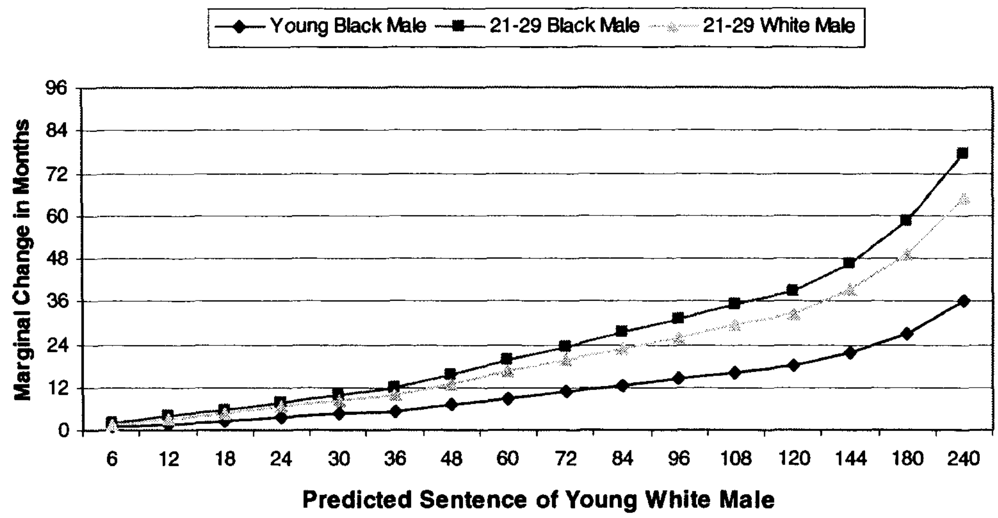


Figure 7-12: Marginal Impact of Age and Race

Defendant characteristics affect sentencing outcomes. Yet, due to the nonlinearity of the model, the differences are negligible for low level offenses and become more substantial as the seriousness of the offense increases. The more severe the offense and fact pattern and the more extensive the prior record, the larger the impact the defendant characteristics will have on the severity of sentence.

Court Context

Court context plays an influential role in both equations of the model (Table 7-2). Despite the inclusion of a large number of legal and extra legal variables in the sentencing model, the individual court dummy variables play a statistically and substantively significant role in the model. To our way of thinking, the estimates from the two equations – selection and severity – provide a glimpse of the variation in "going rates" throughout the courts in our sample.

Sentencing outcomes reflect state law filtered through local practice. The success of sentencing guidelines to reduce unwarranted disparity depends on implementation in many local courts. In Chapter 2 we noted that despite similar rules, there is variation in the way that judges undertake their responsibilities in individual courts. And efforts to change going rates through guidelines may not be consistent with rates that have evolved at the local level.

In our model we have assumed that judges pay attention to the sentencing base and then monitor and "score" a set of sentencing relevant variables. In addition, there are some "constant" individual differences that may be attributable to different "going rates" (both in terms of type and severity). To assess the impact of these court variables, we have placed all of the sentencing relevant variables at their mean values and look at both the probability of prison and the severity of sentence across the range of statutory maximums.

Turning first to the sentence type equation, the results are displayed in Table 7-7. In examining the prison probabilities in this table it is important to remember that all other factors are being held at their statewide mean value. That is, the statistical estimates are based upon the exact same offender – the mean offender. The only factor that varies is the county of conviction. To picture the variation, Figure 7-13 displays the expected probabilities for the two extreme counties. At its widest point (168 month statutory maximum), the difference is

.48. For the typical 60-month offense, the difference is .29. Also note from Table 7-7 that for the Life offenses four courts have probabilities greater than or equal to .90, three have probabilities in the .80-.89 range, four are in the .70-.79 range, and one is at .65. Variation in county-level going rates with respect to the probability of prison exists and is substantial.

Table 7-7: Baseline Probabilities of Prison for Each Court

Court	Statutory Maximum 24	48	60	120	168	180	240	Life
1	0.14	0.28	0.33	0.53	0.64	0.72	0.85	0.96
2	0.01	0.04	0.05	0.13	0.20	0.26	0.43	0.70
3	0.07	0.16	0.20	0.37	0.48	0.56	0.73	0.91
4	0.04	0.10	0.13	0.27	0.37	0.45	0.63	0.85
5	0.05	0.12	0.15	0.30	0.41	0.49	0.67	0.87
6	0.06	0.15	0.19	0.35	0.47	0.55	0.72	0.90
7	0.08	0.19	0.23	0.41	0.53	0.61	0.77	0.92
8	0.02	0.06	0.08	0.19	0.28	0.35	0.53	0.78
9	0.01	0.03	0.04	0.10	0.16	0.22	0.38	0.65
10	0.04	0.10	0.13	0.27	0.37	0.45	0.63	0.85
11	0.02	0.05	0.07	0.16	0.24	0.31	0.49	0.75
12	0.01	0.04	0.06	0.14	0.22	0.28	0.45	0.72

Figure 7-13: Baseline Probability of Prison for Courts 1 and 9

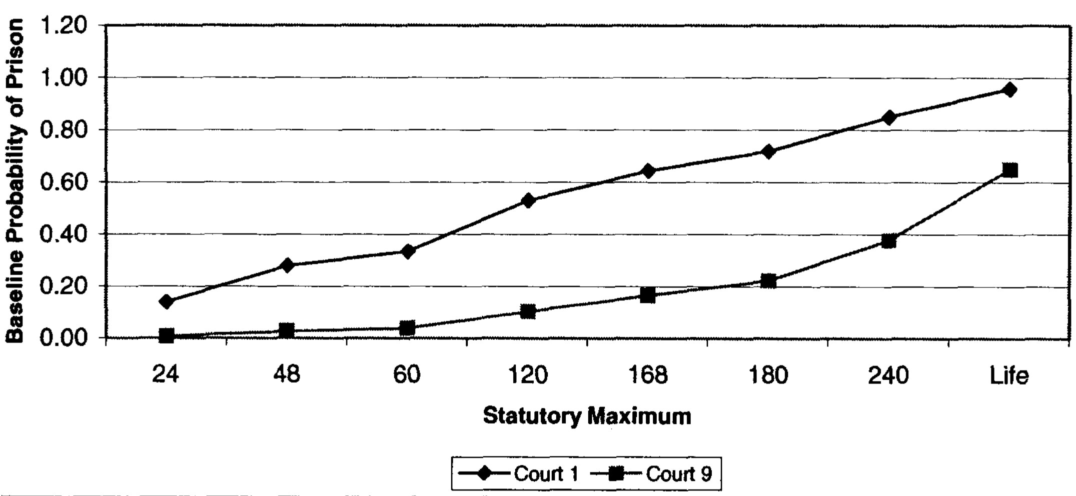
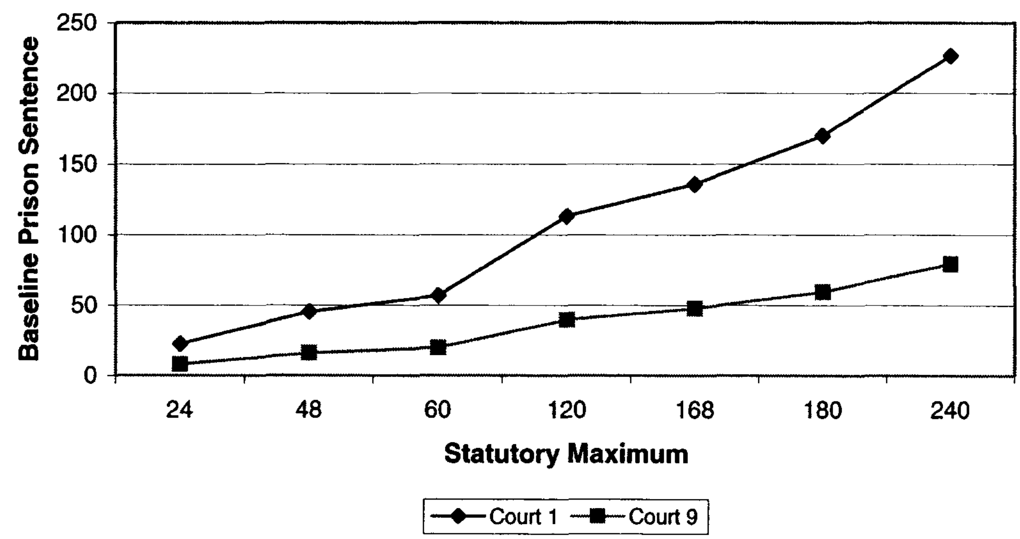


Table 7-8 presents a comparable set of results for the sentence severity decision. Again, all sentencing relevant variables are being held at their mean values. At the 60-month statutory maximum the predicted severity ranges from 20 months to 57 months. At the 180-month statutory maximum the predicted sentences range from 48 months to 136 months – a difference of 7 years. Figure 7-14 presents the two extreme courts – again Courts 1 and 9 – in terms of their baseline prison sentences. As with the sentence type results, it is clear that local sentencing practices vary considerably around the state – even after taking the usual sentencing factors into account.

Table 7-8: Baseline Severity of Prison Sentences for Each Court

	Statutory Maximum						
Court	**24**	**48**	**60**	**120**	**168**	**180**	**240**
1	23	45	57	113	136	170	227
2	11	23	28	57	68	85	113
3	21	41	51	103	123	154	205
4	15	30	38	76	91	113	151
5	13	26	32	64	77	97	129
6	13	27	34	67	80	101	134
7	19	37	46	93	111	139	186
8	12	25	31	62	74	93	124
9	8	16	20	40	48	59	79
10	14	28	35	70	84	105	140
11	13	25	32	63	76	95	127
12	12	24	29	59	71	88	118

Figure 7-14: Baseline Prison Sentence for Courts 1 and 9



Taken together, the results from these two decisions provide evidence in support of Ulmer (1997, 29) – sentencing outcomes are "influenced by the organizational and political features of particular court communities." Local going rates have a major influence on sentencing outcomes. These results suggest that future studies of sentencing should focus on both aggregate and local analyses.

DISPARITY AND DISCRIMINATION IN SENTENCING

Developing the two stage model of the sentencing process has required extensive discussions of measurement and the appropriate methodology necessary to assess the empirical foundations of criminal sentencing. As Spohn (2000) noted – in her discussion of racial discrimination in sentencing – there is a quest to assess the presence/absence of disparity and discrimination as well as to determine if the sentencing reforms promulgated in the past twenty years have created a "neutral" sentencing process. While our analysis is not definitive, given that our data is taken from a single state, our approach offers a systematic methodology for assessing the presence/absence of disparity and discrimination as well as its magnitude if present.

Assessing Consistency

The primary focus in this assessment is to determine if our model of the sentencing process "fits" the data to the extent that we can conclude that like offenders are treated in a like fashion. While there are other facets of consistency, we are primarily concerned with whether the model fits the data with a set of theoretically plausible coefficients without any obvious violations of the underlying statistical assumptions.

In the previous section of this chapter, we examined the estimated parameters and concluded that they appear to be plausible. What remains is to determine whether the overall fit of the model is sufficient to conclude that sentencing is consistent. Michigan is our test case. We examine data coming from twelve geographically, racially, and economically diverse counties that together account for ¾ of the criminal sentences in Michigan. Despite diversity in context, three factors lead us to expect consistency in sentencing. First, there was a set of sentencing guidelines for use in an advisory manner. Second, our theory of human decision making leads us to expect judges will employ a host of strategies to reduce the complexity associated with the potentially complicated task of sentencing. The third factor is the sentencing base that we have argued "centers" the severity decision. Overall statistical performance suggests consistency: our model of the sentence severity decision accounts for approximately 50% of total variance. This result compares favorably to other research endeavors conducted over the past twenty years.

Assessing Discrimination

To this point there is evidence that black males are treated more severely than their white counterparts even though the coefficients for Race and Young Black Male are not statistically significant in the severity equation. Rather than investigate discrimination with individual variables, it is time to consider the hypothesis that judges place different weights on the variables for the two racial groups. To assess this hypothesis, we will look at both the Sentence Type and Sentence Severity equations.

To test the hypothesis of discrimination, we adopt the approach suggested by Albonetti (1997) and Wooldredge (1998) of estimating separate equations for all potentially relevant groups.[22] Implicitly, this insures that each of the two racial groups in our data set has a separate coefficient for each of the sentencing relevant variables. Rather than give two sets of estimates, we provide an estimate for the white subpopulation and an estimate of the difference for the black population. The t-test on the difference for the black population tests the hypothesis that a particular variable has a different impact for the two subgroups.

Sentence Type Decision. The coefficients for the white offenders represent the weight given to that variable for the white subpopulation (Table 7-9). The coefficients for the Black offenders represent the change in the weight given to white offenders for the Black subpopulation. The overall chi-square test for the model is 91.19 with 35 degrees of freedom which is significant at the .001 level. This suggests that the two subpopulations are treated differently based upon their race. As such, we find that there is evidence of discrimination in the Sentence Type decision. Testing for the significance of blocks of coefficients for the Black offenders, results at the bottom of the Table show Offense Factors, Prior Record Factors, Defendant Characteristics, and Court

[22] For a thorough discussion of the statistical foundations of this test, see Wooldridge (2002 237-240.

Characteristics all significantly improve the fit. It is worth noting that the sentencing base is not statistically different for the two groups.

Table 7-9: Chi Square Test for Differences Between Black and White Offenders (PROBIT Estimates of Sentence Type Decision)

	White Offenders			Black Offenders (Δβ)			
Variables	**β**	**s.e.**	**z**	**β**	**s.e.**	**z**	**Pr(|z>0|)**
Statutory Maximum	0.88	0.12	7.08	-0.13	0.15	-0.89	0.37
Use of Weapon	1.31	0.38	3.43	-0.95	0.45	-2.10	0.04
Physical Injury	0.30	0.47	0.65	0.55	0.56	0.99	0.32
Intent to Kill							
Exploitation	0.07	0.29	0.25	0.48	0.48	1.00	0.32
Leader	-0.09	0.30	-0.30	0.34	0.41	0.84	0.40
Continuing Pattern	1.33	0.25	5.35	-0.64	0.34	-1.90	0.06
Drug Offense	0.40	0.25	1.58	-0.76	0.31	-2.47	0.01
Property Offense	-0.78	0.23	-3.31	0.89	0.30	3.01	0.00
High Severity Felony	0.99	0.28	3.54	-0.44	0.34	-1.30	0.19
Low Severity Felony	1.42	0.23	6.30	-1.37	0.28	-4.94	0.00
Misdemeanor	-0.15	0.21	-0.72	0.26	0.28	0.95	0.34
Current Relationship	0.43	0.22	1.95	0.02	0.27	0.08	0.94
Juvenile Arrest	0.25	0.21	1.19	0.28	0.26	1.09	0.28
Trial	0.87	0.35	2.50	-0.26	0.41	-0.63	0.53
Private Attorney	-0.71	0.21	-3.33	0.39	0.31	1.29	0.20
Gender	0.20	0.28	0.71	-0.22	0.36	-0.61	0.54
Drug Use	0.04	0.21	0.20	0.46	0.27	1.74	0.08
20<Age<30	0.77	0.32	2.42	-0.70	0.43	-1.63	0.10
29<Age<40	0.54	0.34	1.60	-0.71	0.46	-1.56	0.12
39<Age<50	0.58	0.39	1.47	-0.32	0.51	-0.62	0.54
Age>49	1.22	0.38	3.20	-1.42	0.54	-2.63	0.01
Young Black Male				0.16	0.37	0.44	0.66
Young Drug User	0.22	0.51	0.43	-0.56	0.64	-0.87	0.38
County 1	0.79	0.34	2.36	0.47	0.40	1.16	0.25
County 2	-0.12	0.43	-0.28	0.14	0.57	0.25	0.80
County 3	0.39	0.42	0.93	-0.03	0.68	-0.05	0.96
County 4	-0.67	0.61	-1.10	1.51	0.70	2.14	0.03
County 5	0.32	0.32	0.99	0.32	0.39	0.82	0.41
County 6	0.72	0.33	2.20	-0.37	0.56	-0.66	0.51
County 7	1.05	0.40	2.60	0.07	0.52	0.13	0.90
County 8	0.47	0.28	1.68	-0.68	0.37	-1.81	0.07
County 9	0.63	0.63	1.01	-1.73	0.99	-1.75	0.08
County 10	-0.15	0.52	-0.29	0.99	0.62	1.59	0.11
County 11	0.41	0.51	0.81	-0.58	0.68	-0.86	0.39
Constant	-6.64	0.74	-8.95	1.35	0.92	1.48	0.14

Chow-type X^2 = 91.19 (35 df)

Variable Block	x^2	**p-value**
Sentencing Base	0.80	0.37
Offense Factors	34.76	0.00
Prior Record	28.53	0.00
Court Processing	1.84	0.40
Defendant Characteristics	16.66	0.05
Court Characteristics	21.68	0.03

As can be seen, there are a number of variables for which there is a significant difference between the two groups. On the positive side, Blacks receive higher weights for Property Offenses, Drug Use, and in County 4. On the negative side, blacks receive lower weights for Use of Weapon, Drug Offense, Low Severity Felony, and Age>49. While it is not possible to say that one group of offenders is being treated more harshly than another, it is clear that they are being treated in a different fashion.

Sentence Severity Equation. Table 7-10 presents the Chow Test for the severity equation. The overall F-test for a significant difference in the severity equation is 1.61 which is statistically significant at the .017 level. Thus, like the Type equation, there is evidence that the two groups of offenders are being treated in a different fashion. At the bottom of Table 7-10 we present block F-tests for each type of sentencing relevant variables. Unlike the Sentence Type results, the only block that reaches statistical significance is the Court Characteristics block. This suggests that there are significant differences in the way the two groups are being treated – after controlling for all other variables – in the individual local legal cultures.

Table 7-10: Chow Test for Differences Between Black and White Offenders (Regression Estimates of Sentence Severity Equation)

	White Offenders			Black Offenders (change)			
Variables	β	s.e.	z	β	s.e.	z	Pr(|z>0|)
Statutory Maximum	0.43	0.06	7.53	0.02	0.07	0.23	0.82
Use of Weapon	-0.03	0.17	-0.16	-0.01	0.23	-0.05	0.96
Physical Injury	0.10	0.17	0.58	-0.40	0.27	-1.49	0.14
Intent to Kill	0.27	0.18	1.49	0.85	0.34	2.48	0.01
Exploitation	0.74	0.22	3.35	0.40	0.24	1.65	0.10
Leader	0.79	0.27	2.88	0.03	0.28	0.11	0.92
Continuing Pattern	0.12	0.17	0.68	-0.28	0.19	-1.49	0.14
Drug Offense	0.30	0.21	1.42	-0.09	0.22	-0.43	0.67
Property Offense	0.41	0.15	2.74	0.26	0.22	1.18	0.24
High Severity Felony	0.37	0.16	2.32	-0.29	0.20	-1.42	0.16
Low Severity Felony	-0.16	0.15	-1.11	0.34	0.18	1.82	0.07
Misdemeanor	0.16	0.12	1.31	-0.04	0.17	-0.25	0.80
Current Relationship	-0.24	0.16	-1.53	0.29	0.19	1.54	0.13
Juvenile Arrest	0.18	0.14	1.25	-0.14	0.18	-0.80	0.42
Trial	0.35	0.20	1.79	0.08	0.23	0.33	0.74
Private Attorney	0.35	0.16	2.26	-0.32	0.20	-1.57	0.12
Gender	-0.04	0.23	-0.17	-0.06	0.29	-0.20	0.84
Drug Use	-0.25	0.14	-1.74	0.49	0.18	2.72	0.01
20<Age<30	0.23	0.25	0.91	0.09	0.35	0.24	0.81
29<Age<40	0.02	0.29	0.08	-0.01	0.39	-0.03	0.98
39<Age<50	0.02	0.29	0.07	0.03	0.40	0.08	0.93
Age>49	0.53	0.29	1.83	0.25	0.42	0.59	0.55
Young Black Male				0.38	0.29	1.32	
Young Drug User	0.00	0.40	0.00	-0.61	0.45	-1.34	0.18
County 1	0.40	0.26	1.56	0.07	0.29	0.25	0.80
County 2	-0.20	0.35	-0.56	0.42	0.47	0.89	0.38
County 3	0.07	0.26	0.27	0.98	0.49	1.99	0.05
County 4	-1.03	0.38	-2.71	2.22	0.51	4.38	0.00
County 5	-0.12	0.20	-0.58	0.11	0.25	0.44	0.66
County 6	-0.16	0.21	-0.77	-0.02	0.47	-0.03	0.97
County 7	0.07	0.24	0.28	0.27	0.33	0.80	0.42
County 8	-0.12	0.19	-0.64	0.06	0.26	0.24	0.81
County 9	-0.44	0.36	-1.21	-0.36	0.70	-0.51	0.61
County 10	-0.29	0.42	-0.69	0.42	0.45	0.93	0.35
County 11	0.52	0.60	0.87	-0.32	0.66	-0.48	0.63
Constant	0.82	0.43	1.93	-0.67	0.56	-1.20	0.32

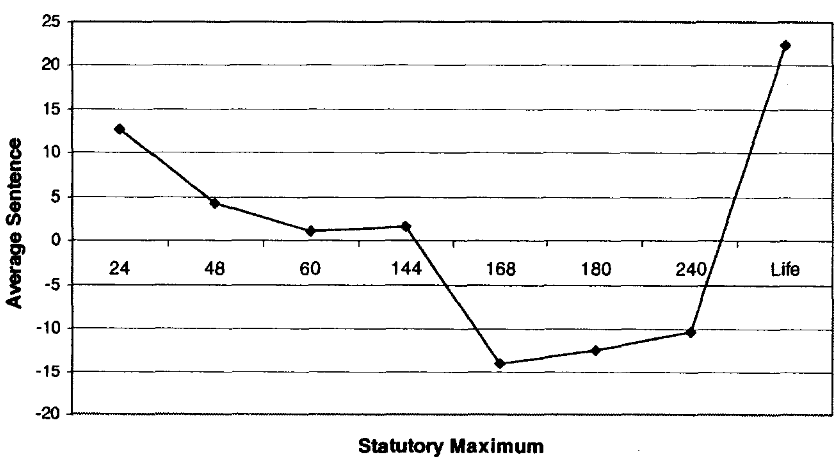
Chow's F=1.61 p=.017

Variable Block	F	p-value
Sentencing Base	0.05	0.82
Offense Factors	1.75	0.09
Prior Record	1.65	0.15
Court Processing	1.23	0.29
Defendant Characteristics	1.16	0.32
Court Characteristics	2.28	0.01

Based upon the results of the overall test, there are indications of statistically significant racial discrimination in the sentence severity decision. While the overall test is positive, it is wise to look at the individual coefficient differences as well. As can be seen in Table 7-11, the coefficients that have a p-value less than .10 suggesting a different impact upon the racial groups are: Intent to Kill or Injure, Low Severity Felony, Drug Use, and Counties 3 and 4. Black offenders receive greater punishment for each of these variables.

To assess the practical consequences of these differences, we have taken the mean values for each of the racial groups along with the coefficients for each group and created the average difference between Black and White sentence severity for each statutory maximum. The results are displayed in Figure 7-15. As can be seen, Black offenders receive higher sentences for the lower and higher statutory maximums while the White offenders receive higher sentences for crimes with statutory maximums in the 168-240 range.

Figure 7-15 Expected Sentence Difference for Black Offenders



Based upon our results, it is clear that there is a statistically significant race effect – in both the Sentence Type and Sentence Severity decisions – in the sentencing practices in Michigan. When these differences are coupled with those related to age, gender, and individual court, it is also clear that the consistency in sentencing captured by the model is achieved, in part, through practices that are discriminatory. In the next chapter we will explore the consequences of possible race, age, and court interactions.

CONCLUSIONS

Our goal has been to provide a comprehensive analysis of the methodology of estimating and evaluating two equation models of the sentencing process. While often technical, we believe the pay-offs are commensurate with the detail. The model formulated in this chapter is statistically sound and consequently serves as a meaningful demonstration of the techniques and tests reviewed. But most importantly, the interpretation of the model – both verbally and graphically – has provided important insights into the sentence severity decision. The primary findings are as follows:

- The sentence type and sentence severity equations are related to one another via the hazard rate.
- The use of the logarithm of prison months provides a better characterization of the sentence severity decision than does the actual months.

- The sentencing base – as measured by statutory severity – plays an important role in sentencing as it anchors the decision in the vicinity of the appropriate sentence.
- The coefficients of the log-log portion of the model provide a plausible non-linear interpretation for the impact of the sentencing relevant variables.
- The specific offense factors for which we have data play an important role in the severity decision.
- Prior record factors do not play a significant role in the sentence severity decision.
- Court processing variables have a substantial impact on the sentence severity decision.
- Defendant characteristics play an important role in sentence severity especially as the severity of the conviction offense increases.
- There are substantial differences in court-level "going rates" in our model after controlling for a wide range of other factors. Our results suggest that it will be beneficial to complement any aggregate study of sentencing with some case study investigations of sample courts.
- The overall results suggest that there is a great deal of consistency in the sentence severity decision.
- There are statistically significant indications of racial discrimination in both of the sentencing decisions. Taking the model as a whole,

estimating a separate set of coefficients for whites and blacks suggest that there are systematic and statistically significant differences between racial groups. We have also found evidence that there are age and gender effects as well.

Given both the importance and conflicting indications of the latter conclusion, we turn in Chapter 8 to an analysis that takes both equations and all of the variables into account in assessing the extent of racial discrimination. We do this through an extensive examination of the "comparative statics" of the sentencing model.

Appendix 7-A: PROBIT and MNL Probability Change

In Chapter 6 we developed and estimated a model of sentence type using MNL. Our goal was to compare and contrast the probability of five different sentencing options across a number of sentencing relevant variables. In this chapter we are looking closely at the severity of one of the five options – prison sentences. As noted early in this chapter, estimation of a sentence severity model requires knowledge of the probability of being placed into the specific category. We could get that from the MNL model or from the PROBIT model. Because we have chosen a ML estimator for the two stage model, we have opted for the PROBIT estimation of the sentence type equation. For the interested reader, this appendix compares the probabilities from PROBIT with those from MNL.

Table 7-A1 presents a comparison of the derivative at mean for the probability of prison based upon the PROBIT and MNLM models respectively. The derivative at mean is the amount of change in the probability of prison when all variables, except the variable in question, are held at their mean values. The difference between the probability of prison when the variable equals 0 and 1 is the derivative at mean. As can be seen in Table 7-3, most of the estimated derivatives are quite close. As can be seen, the derivatives associates with the Use of Weapon, Physical Injury, High Severity Felony, and Young Black Male are much larger for the MNLM estimates as opposed to those from the PROBIT model. At the moment, we will operate upon the conclusion that the two

selection equations are sufficiently similar to continue with our investigation of the ML estimates.

Table 7-A1: Derivative at Mean for PROBIT and MNLM Estimates

Variable		Derivative (Prob of Prison) at Mean		
Sentencing Base	**Type of Change**	**Probit**	**MNLM**	**Difference**
Statutory Maximum (logarithm)	*24-->48*	0.048	0.087	0.039
	48-->60	0.025	0.039	0.014
	60-->120	0.119	0.156	0.037
	120-->180	0.094	0.108	0.014
	180-->240	0.078	0.078	0.000
	240-->Life	0.180	0.318	0.138
Offense Factors				
Use of Weapon	*0-->1*	0.183	0.311	0.128
Physical Injury	*0-->1*	0.128	0.229	0.101
Exploitation of Victim	*0-->1*	0.066	0.145	0.079
Leader (in multiple offender)	*0-->1*	0.012	-0.044	-0.055
Continuing Pattern	*0-->1*	0.208	0.289	0.081
Drug Offense	*0-->1*	-0.048	-0.026	0.022
Property Offense	*0-->1*	-0.053	-0.052	-0.004
Prior Record Factors				
High Severity Prior Conviction	*0-->1*	0.171	0.278	0.107
Low Severity Prior Conviction	*0-->1*	0.125	0.094	-0.031
Misdemeanor Conviction	*0-->1*	0.029	0.038	0.009
Current Relationship CJ System	*0-->1*	0.094	0.086	-0.008
Arrest < 18	*0-->1*	0.084	0.070	-0.014
Processing Factors				
Trial	*0-->1*	0.208	0.191	-0.017
Attorney	*0-->1*	-0.078	-0.109	-0.031
Defendant Characteristics				
Gender	*0-->1*	0.023	0.078	0.055
Race	*0-->1*	-0.015	-0.017	-0.002
Drug Use	*0-->1*	0.082	0.102	0.020
21 <= Age < 30	*0-->1*	0.163	0.247	0.084
30 <= Age < 40	*0-->1*	0.094	0.080	-0.015
40 <= Age < 50	*0-->1*	0.177	0.240	0.063
Age > 50	*0-->1*	0.157	0.150	-0.007
Young Black Male	*0-->1*	0.246	0.355	0.109
Young Drug User	*0-->1*	-0.038	-0.066	-0.029
Court Context				
County 1	*0-->1*	0.375	0.483	0.108
County 2	*0-->1*	-0.012	0.162	0.174
County 3	*0-->1*	0.225	0.183	-0.042
County 4	*0-->1*	0.124	-0.001	-0.125
County 5	*0-->1*	0.155	0.162	0.006
County 6	*0-->1*	0.207	0.193	-0.014
County 7	*0-->1*	0.265	0.170	-0.096
County 8	*0-->1*	0.046	-0.002	-0.048
County 9	*0-->1*	-0.039	-0.108	-0.069
County 10	*0-->1*	0.126	0.071	-0.054
County 11	*0-->1*	0.021	-0.092	-0.113

Appendix 7-B – Using Actual Months of Prison as Dependent Variable

All of the results discussed in this Chapter have been based on the model using the logarithm of prison months. This choice is based upon the theoretical argument presented in Chapter 4. As a point of comparison, we have also constructed a similar set of tables utilizing the actual months of sentence as the dependent variable in the second equation. When making the change, we also changed the way we measure the statutory maximum of the instant offense – changing from its log to the actual value of the maximum in months.

Table 7-B1 presents the Heckman Two-Step estimates for the two equations making up the sentencing model.[23] This model utilizes probit estimates of the prison/no prison decision rather than the MNL estimates presented earlier. The far right-hand columns of Table 7-B1 provide a joint significance test for each variable in the entire model (including both equations). As can be seen, all but eight of the variables are significant at the .05 level or higher.[24] The overall chi-square statistic for the model is 496 with 51 degrees of freedom. Taken as a whole, the model provides a good fit to the data.[25]

[23] It is noteworthy that the Heckman ML approach would not converge when using the actual prison months as the dependent variable. This provides at least one other rationale for preferring the logarithm.
[24] The variables that do not reach conventional levels of statistical significance are Exploitation of Victim, Leader, Misdemeanor Conviction, Gender, Race, Age 30-39, Age 40-49, and Young Drug User.
[25] The model using actual prison months has 20% of its predicted values for those who actually receive a prison sentence in the negative range. The model using the natural log has no negative predictions.

Table 7-B1: Heckman Two Step Estimates
– Dependent Variables – Prison/No Prison & Actual Months

	Selection Equation			Severity Equation		
	γ	s.e.	z	β	s.e.	z
Sentencing Base						
Statutory Maximum	0.002	0.00	9.51	0.16	0.02	6.60
Offense Factors						
Use of Weapon	0.409	0.18	2.23	9.29	19.92	0.47
Physical Injury	0.452	0.23	2.00	88.39	21.68	4.08
Intent to Kill				229.37	29.84	7.69
Exploitation of Victim	0.309	0.1977	1.56	5.90	21.73	0.27
Leader (in multiple offender)	0.167	0.1916	0.87	-13.10	23.43	-0.56
Continuing Pattern	0.833	0.1381	6.03	30.72	16.74	1.84
Drug Offense	-0.170	0.13	-1.32	9.31	17.84	0.52
Property Offense	-0.367	0.12	-2.98	13.23	19.15	0.69
Prior Record Factors						
High Severity Prior Conviction	0.592	0.13	4.39	7.77	17.32	0.45
Low Severity Prior Conviction	0.454	0.11	4.06	5.60	15.12	0.37
Misdemeanor Conviction	0.111	0.12	0.95	-0.54	14.21	-0.04
Current Relationship CJ System	0.357	0.11	3.21	16.00	14.94	1.07
Arrest < 18	0.258	0.1056	2.44	15.43	14.17	1.09
Processing Factors						
Trial	0.753	0.16	4.59	53.91	19.35	2.79
Attorney	-0.466	0.13	-3.55	-10.26	17.94	-0.57
Defendant Characteristics						
Gender	-0.008	0.15	-0.05	-21.75	22.76	-0.96
Race	-0.018	0.11	-0.16	-2.86	14.52	-0.20
Drug Use	0.326	0.11	2.92	27.65	15.54	1.78
21 <= Age < 30	0.595	0.18	3.28	33.40	27.10	1.23
30 <= Age < 40	0.252	0.19	1.32	-2.12	27.20	-0.08
40 <= Age < 50	0.438	0.21	2.04	15.42	30.21	0.51
Age > 50	0.412	0.23	1.77	108.07	34.61	3.12
Young Black Male	0.707	0.24	2.96	56.34	33.42	1.69
Young Drug User	-0.194	0.27	-0.72	-69.97	31.58	-2.22
Court Context						
County 1	1.093	0.16	6.65	36.40	21.72	1.68
County 2	-0.099	0.26	-0.38	40.17	42.42	0.95
County 3	0.603	0.28	2.14	20.69	36.61	0.57
County 4	0.341	0.25	1.39	5.30	41.71	0.13
County 5	0.493	0.16	3.05	10.21	21.66	0.47
County 6	0.663	0.21	3.16	39.26	29.44	1.33
County 7	0.846	0.22	3.77	18.48	28.75	0.64
County 8	0.165	0.15	1.08	-8.41	22.64	-0.37
County 9	-0.216	0.39	-0.56	-14.88	54.91	-0.27
County 10	0.455	0.24	1.86	3.95	28.41	0.14
County 11	-0.038	0.32	-0.12	129.75	43.51	2.98
Constant	-2.498	0.2265	-11.03	-134.41	54.07	-2.49
Hazard Rate						
λ				44.90	22.69	1.98

Utilizing the estimates of both equations, it is possible to determine the marginal effect of all variables that appear in both the sentence type and sentence severity equations for those offenders who actually receive a prison sentence. These calculations are presented in Table 7-B2.

Table 7-B2: Marginal Effect of Variables Appearing in Both Selection and Substantive Equations Given z > 0 – Actual Months

	Dependent Variable = Actual Months of Prison						
	Heckman Two Step		Variable Impact When Prison = 1				
			Estimated Prob(Prison) from Selection Equation				
Variable	**Probit Coefficient**	**Regression Coefficient**	**0.050**	**0.250**	**0.500**	**0.750**	**0.950**
Sentencing Base							
Statutory Maximum (logarithm)	0.002	0.16	0.062	0.074	0.087	0.106	0.137
Offense Factors							
Use of Weapon	0.409	9.29	-6.557	-4.654	-2.408	0.736	5.779
Physical Injury	0.452	88.39	70.893	72.994	75.473	78.945	84.512
Intent to Kill		229.37	229.372	229.372	229.372	229.372	229.372
Exploitation of Victim	0.309	5.90	-6.079	-4.641	-2.944	-0.569	3.242
Leader (in multiple offender)	0.167	-13.10	-19.556	-18.780	-17.866	-16.585	-14.531
Continuing Pattern	0.833	30.72	-1.554	2.321	6.893	13.294	23.561
Drug Offense	-0.170	9.31	15.895	15.104	14.171	12.865	10.770
Property Offense	-0.367	13.23	27.436	25.730	23.718	20.900	16.381
Prior Record Factors							
High Severity Prior Conviction	0.592	7.77	-15.144	-12.393	-9.146	-4.601	2.690
Low Severity Prior Conviction	0.454	5.60	-11.972	-9.862	-7.373	-3.887	1.703
Misdemeanor Conviction	0.111	-0.54	-4.851	-4.334	-3.723	-2.868	-1.497
Current Relationship CJ System	0.357	16.00	2.198	3.855	5.811	8.550	12.943
Arrest < 18	0.258	15.43	5.449	6.647	8.061	10.040	13.215
Processing Factors							
Trial	0.753	53.91	24.770	28.269	32.398	38.180	47.452
Attorney	-0.466	-10.26	7.772	5.608	3.053	-0.523	-6.259
Defendant Characteristics							
Gender	-0.008	-21.75	-21.439	-21.477	-21.522	-21.585	-21.685
Race	-0.018	-2.86	-2.173	-2.255	-2.352	-2.487	-2.705
Drug Use	0.326	27.65	15.043	16.557	18.343	20.845	24.857
21 <= Age < 30	0.595	33.40	10.366	13.132	16.395	20.965	28.294
30 <= Age < 40	0.252	-2.12	-11.881	-10.709	-9.326	-7.389	-4.283
40 <= Age < 50	0.438	15.42	-1.540	0.497	2.901	6.266	11.663
Age > 50	0.412	108.07	92.116	94.032	96.293	99.459	104.537
Young Black Male	0.707	56.34	28.975	32.261	36.139	41.568	50.275
Young Drug User	-0.194	-69.97	-62.475	-63.376	-64.438	-65.925	-68.311
Court Context							
County 1	1.093	36.40	-5.895	-0.816	5.176	13.567	27.025
County 2	-0.099	40.17	44.011	43.550	43.006	42.245	41.023
County 3	0.603	20.69	-2.669	0.135	3.444	8.078	15.509
County 4	0.341	5.30	-7.918	-6.331	-4.459	-1.837	2.369
County 5	0.493	10.21	-8.894	-6.600	-3.894	-0.104	5.974
County 6	0.663	39.26	13.593	16.675	20.312	25.404	33.570
County 7	0.846	18.48	-14.291	-10.356	-5.714	0.787	11.213
County 8	0.165	-8.41	-14.808	-14.040	-13.132	-11.862	-9.825
County 9	-0.216	-14.88	-6.531	-7.534	-8.717	-10.374	-13.032
County 10	0.455	3.95	-13.669	-11.554	-9.058	-5.562	0.043
County 11	-0.038	129.75	131.207	131.033	130.826	130.538	130.075
Constant	-2.498	-134.41	-37.692	-49.306	-63.008	-82.195	-112.967

Table 7-B3 presents a comparison between the two sets of estimates of the sentence severity decision in terms of the statistical significance of the individual factors. In addition, the table presents the explained variance and overall significance for the sentence severity equation. In terms of explained variance, both models explain a similar amount of variance. In spite of the fact that there is no improvement in explained variance, the estimated parameters and their interpretation make more sense when using the log of the sentence.

Figure 7-B3: Individual Variable Significance – Comparing Results from Log Months and Actual Months Estimates From Sentence Severity Equation

	Log Months		Actual Months	
	z	Pr(|z>0|)	z	Pr(|z>0|)
Sentencing Base				
Statutory Maximum (logarithm)	11.75	0.00	6.60	0.00
Offense Factors				
Use of Weapon	2.91	0.00	0.47	0.64
Physical Injury	3.27	0.00	4.08	0.00
Intent to Kill	7.57	0.00	7.69	0.00
Exploitation of Victim	3.47	0.00	0.27	0.79
Leader (in multiple offender)	1.62	0.11	-0.56	0.58
Continuing Pattern	3.28	0.00	1.84	0.07
Drug Offense	-2.67	0.01	0.52	0.60
Property Offense	1.82	0.07	0.69	0.49
Prior Record Factors				
High Severity Prior Conviction	1.76	0.08	0.45	0.65
Low Severity Prior Conviction	0.93	0.35	0.37	0.71
Misdemeanor Conviction	2.20	0.03	-0.04	0.97
Current Relationship CJ System	0.84	0.40	1.07	0.29
Arrest < 18	2.20	0.03	1.09	0.28
Processing Factors				
Trial	4.76	0.00	2.79	0.01
Attorney	1.47	0.14	-0.57	0.57
Defendant Characteristics				
Gender	-1.26	0.21	-0.96	0.34
Race	0.57	0.57	-0.20	0.84
Drug Use	1.02	0.31	1.78	0.08
21 <= Age < 30	1.70	0.09	1.23	0.22
30 <= Age < 40	-0.14	0.89	-0.08	0.94
40 <= Age < 50	1.11	0.27	0.51	0.61
Age > 50	3.71	0.00	3.12	0.00
Young Black Male	0.59	0.56	1.69	0.09
Young Drug User	-2.34	0.02	-2.22	0.03
Court Context				
County 1	5.30	0.00	1.68	0.10
County 2	-0.19	0.85	0.95	0.34
County 3	2.80	0.01	0.57	0.57
County 4	1.15	0.25	0.13	0.90
County 5	0.74	0.46	0.47	0.64
County 6	0.82	0.41	1.33	0.18
County 7	2.84	0.00	0.64	0.52
County 8	0.39	0.70	-0.37	0.71
County 9	-1.37	0.17	-0.27	0.79
County 10	1.11	0.27	0.14	0.89
County 11	0.32	0.75	2.98	0.00
Constant	-1.63	0.10	-2.49	0.01
N	342		342	
Comparable R^2	0.46		0.48	

As can be seen, there are seven variables that are statistically significant in the log months equation that are not significant in the actual months equation –Use of Weapon, Exploitation of Victim, Leader, Drug Offense, Property Offense, Misdemeanor Conviction, and Arrest < 18. There are three variables that are significant in the actual months equation that are not significant in the log month equation – Current Relation to CJ System, Drug Use, and Young Black Male.

A second difference between the two models lies in their interpretation of the impact of the variables on the actual sentence. To illustrate this difference, we will focus our attention on the impact of the convicted at trial variable. The coefficient for this variable is 53.9 in the actual months model and .49 in the log months model. Figure 7-6 (displayed earlier) presents the implied impact of a conviction at trial (assuming full impact). As can be seen, the two models tell substantially different stories. The model estimated with actual prison months suggests that all offenders convicted at trial have six and one third years added to their sentence no matter what else they have done. The model estimated with the log of prison months suggests that those convicted at trial have their sentence increased by 63% (after expanding the exponential) over what they otherwise would have gotten. Figure 7-6 shows that the trial tax is quite small when the predicted sentence is less than 5 years. The two models imply the same tax at approximately eight years. If the model estimated with the log of actual months is correct, the use of actual months of prison overestimates the tax for lower level offenders and underestimates it for higher-level offenders. As such it represents an average over the entire range of offenders. We find the implied impact of the log of months equation to be much more plausible.

Finally, the model with actual months generates one in four predictions – for those who actually receive a prison sentence – that are negative. When this is coupled with the increased number of statistically significant variables, the increase in plausibility, and the lack of negative prison predictions, it seems clear that the best model to use in our study of sentencing severity is the one with the logarithm of months as the dependent variable.

CHAPTER 8: THE COMPARATIVE STATICS OF SENTENCING

INTRODUCTION

Chapters 6 and 7 present estimated versions of the sentence type and sentence severity models. In each case, we find both considerable empirical support for the model specification and interesting implications about the sentencing process. One important finding is the different ways in which judges use the sentencing relevant variables at different stages in the sentencing process. For example, an offender's prior record plays a major role in the sentence type decision while it has little impact on the sentence severity decision. In addition, the significance of the "hazard rate" clearly implies that the "errors" in the two equations are highly correlated. To this point, the two models have been analyzed separately. In this chapter, we examine the joint consequences of the type and severity decisions with particular emphasis on assessing the nature and extent of racial discrimination in the sentencing process.

Comparative statics, used primarily in economics, is the name given to the analytic technique of examining the change in outcome resulting from a change in select variables of interest holding all other variables constant. For example, within the context of our two-equation model of sentencing and holding all other sentencing relevant factors constant, how does predicted sentencing severity change when offender race changes from white to black? For this study, we use this approach to gauge and contextualize the impact of key demographic factors (extralegal variables) on sentencing outcomes. The prospect of discrimination is investigated through interaction terms comprised of various combinations of race, age, and court location.

THE CONTEXT OF SENTENCING

Steffensmeier et al. (1998) begin their influential study of interaction effects with the following admonition:

> Race, gender, and age are important social statuses by which American society is stratified and differentiated. An abundance of studies examine the independent effects of race and gender on sentencing outcomes, a growing number of studies look at their joint effects, and a few studies examine age effects. However, prior research has ignored the ways in which the three social statuses together – race, gender, and age – might interrelate to influence the sentencing of criminal defendants. Most noteworthy, <u>prior sentencing research fails to contextualize</u> race effects by age and gender. This may undermine an understanding of the importance of race in sentencing decisions and, more broadly, the significance of race in American society. (Emphasis added)

We agree that prior research has, in the main, failed to adequately contextualize the study of discrimination. We extend the earlier work of Steffensmeier et al. (1998), to incorporate the entire sentencing system – both the sentence type and sentence severity decisions – into the search for potentially discriminatory factors. Moreover, our analysis allows for variation in the type of offense and other sentencing relevant facts. Accommodating such variation is critically important given the nonlinear nature of the relationship between the sentencing relevant variables and the two sentencing outcomes.

Our approach makes use of four alternative scenarios – a typical example of a drug, violent, property, and very serious violent offense. The factors associated with each of the four scenarios are held constant through the analysis.

- **Scenario #1** – Drug Offense with 240-month statutory maximum, Juvenile Arrest, Current Drug Use
- **Scenario #2** – Violent Offense with 180 month statutory maximum, Use of Weapon, Low Severity Prior Felony, Current Relationship, and Juvenile Arrest
- **Scenario #3** – Property Offense with 120 month statutory maximum, Continuing Pattern, Low Severity Prior Felony, Misdemeanor
- **Scenario #4** – Violent offense with Life statutory maximum involving Use of Weapon and Physical Injury, High Severity Prior Felony, Low Severity Prior Felony, Juvenile Arrest < 18, and Current Relationship with Criminal Justice System

For each scenario, we look at combinations of race, age, and sentencing court.[1] The two extreme courts identified in Chapter 7 (Courts 1 and 9) are used to make plain differences in the affect of court location. Interaction terms draw on the following three dichotomies:

- *Race* – White versus Black
- *Age* – Age < 21 versus 20 < Age < 30
- *Court Location* – Court 1 versus Court 9

producing eight combinations of estimates within each of the four scenarios.

The elements of each scenario are held constant while we explore the impact of the eight combinations (or interactions). Using the Sentence Type parameters from Table 7-2 to generate the predicted probability of prison, we

[1] We do not include gender because we do not have a sufficient number of females in the sample to have a reliable measure.

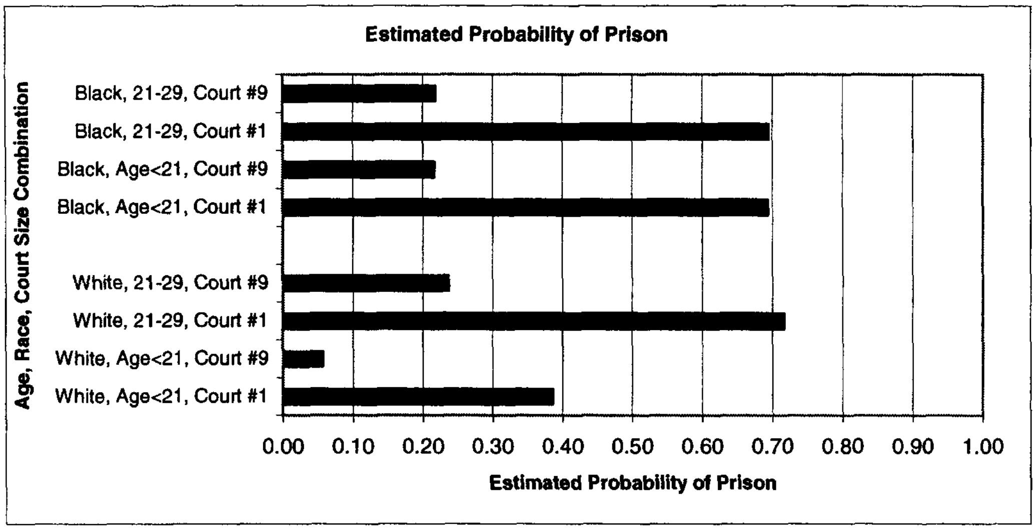
produce and compare eight separate estimates of the probability of prison. Then, for each scenario, we use the probability of prison, in conjunction with Table 7-5, to determine the degree of attenuation/amplification of each of the relevant parameters. Finally, using the parameters from the previous step, in conjunction with the estimated hazard rate, we determine the predicted prison sentence for each of the eight combinations within each of the four scenarios.

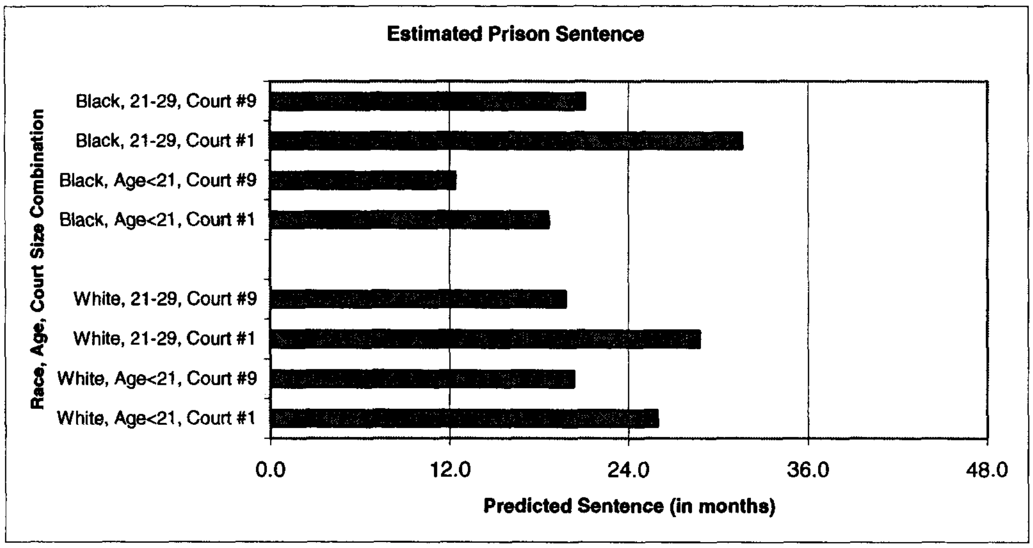
While our earlier analyses have looked at the separate effects of race, age, and sentencing location, they have not taken the entire sentencing calculus (i.e., the seemingly unrelated equations) into consideration. For each scenario, we will explore how scenario facts interact with race, age, and sentencing location to produce an expected sentence.

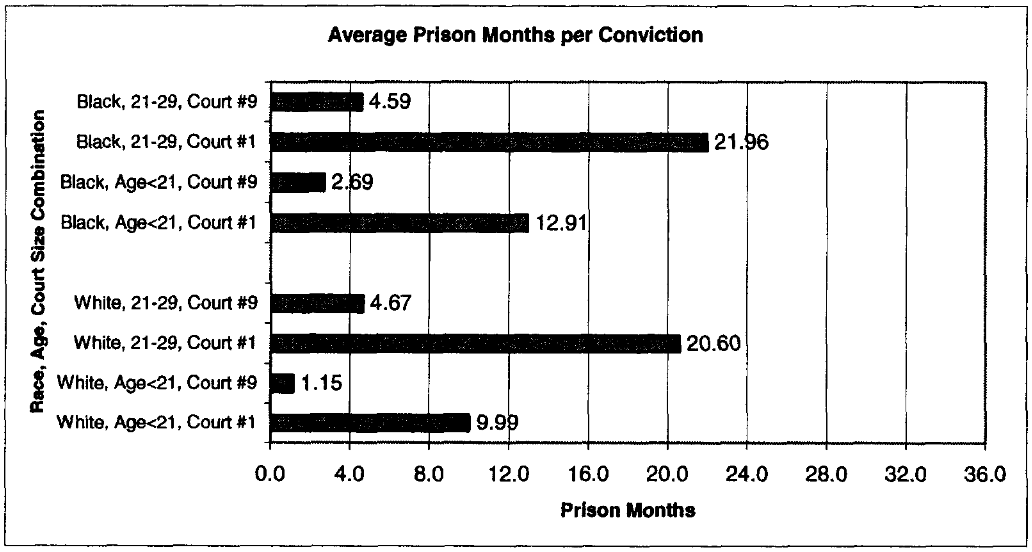
Scenario #1 – Drug Offense

In the first scenario (a Drug offense with a twenty-year statutory maximum), the offender is hypothesized to have a history of personal drug use and a juvenile arrest. Figure 8-1 presents both the probability of prison along with the estimated severity of the prison sentence given a prison type sentence for the 240-month statutory maximum. When race, age, and court location are varied (top panel), there is considerable variation in the probability of receiving a prison sentence--although the underlying fact pattern is held constant. The probabilities range from a low of .07 for White, Age<21, Court 9 to a high of .72 for White, 20<Age<30, Court 1. Clearly, age and specific court location can have a large impact on sentencing even within the same racial group. For offenders between the ages of 21 and 29, there is little difference between black and white offenders regardless of court size. Dramatic racial differences show up, however, for young black males versus young white males. The probabilities of prison for the black offenders are almost twice as high as those for the white offenders in both our courts. Being black, young, and male has serious consequences on sentence severity for Drug offenses with the given fact pattern.

Figure 8-1: Scenario #1 -- Drug Offense, Juvenile Arrest, Drug Use, Young Drug User, Male 240 Month Offense (*e.g., Possession of 50+ Grams of Controlled Substance*)







The middle panel of Figure 8-1 shows the estimated length of the prison sentence for those offenders who actually receive a prison type sentence. The analysis shows that young offenders can expect to receive lower sentences than those in their 20's. In addition, young, black, male offenders can expect to receive shorter prison sentences than their white counterparts although as we see in the top panel, they are coming to prison at a higher rate.

The lower panel of Figure 8-2 combines the information from the top two panels. Specifically, we multiply the probability of prison by the estimated length of the prison sentence to produce an expected value of the number of months served for every drug conviction. The result: offenders sentenced in Court 1 are treated much more severely than those in Court 9. Furthermore, offenders aged 21-29 are treated more severely than younger offenders. Finally, the only dramatic race differences are between young black males and young white males. A young, black male convicted of a Drug offense in Court 1 (with the Scenario 1 fact pattern), can expect a more severe sentence than a similarly situated white offender. Young, black males are treated more severely than their white counterparts—even in cases of an identical fact pattern.

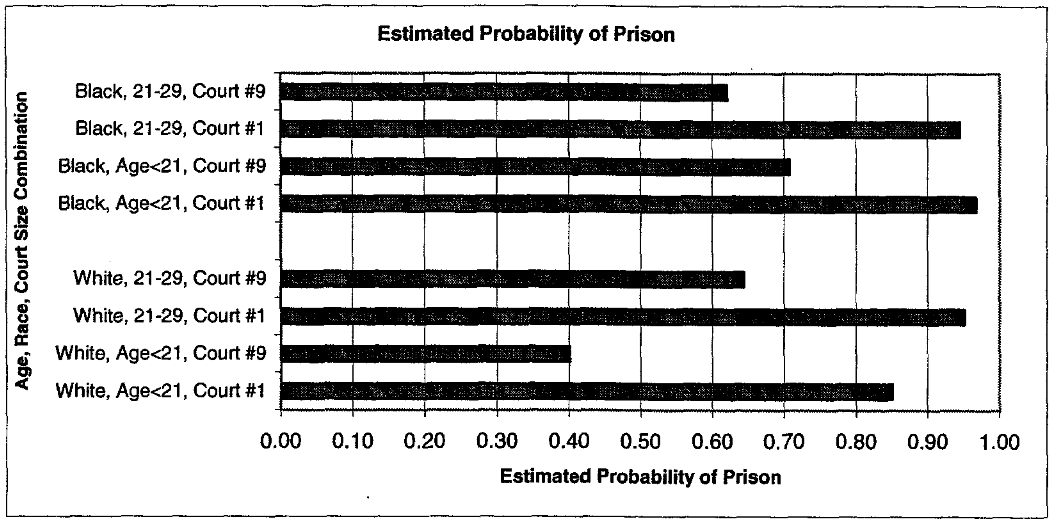
Taking the panels of Figures 8-1 together, in the context of our comparative statics analysis, illustrates that varying age, race, and specific court has significant implications for the sentence type and sentence severity decisions. As all of the factors of the model come together, we find evidence of across-the-board discrimination. In the comparative statics we see that these effects are both more nuanced and situational than suggested in Table 7-2. For offenders in their 20's, the only real differences occur between specific court; there are no race effects. For young offenders, there are some dramatic differences. Regardless of court size, young black male offenders are much more likely to receive a prison sentence. Those white offenders that do receive a prison sentence are likely to have a longer prison term. When considered together, the expected value is much higher for the young, black male offender than his white counterpart.

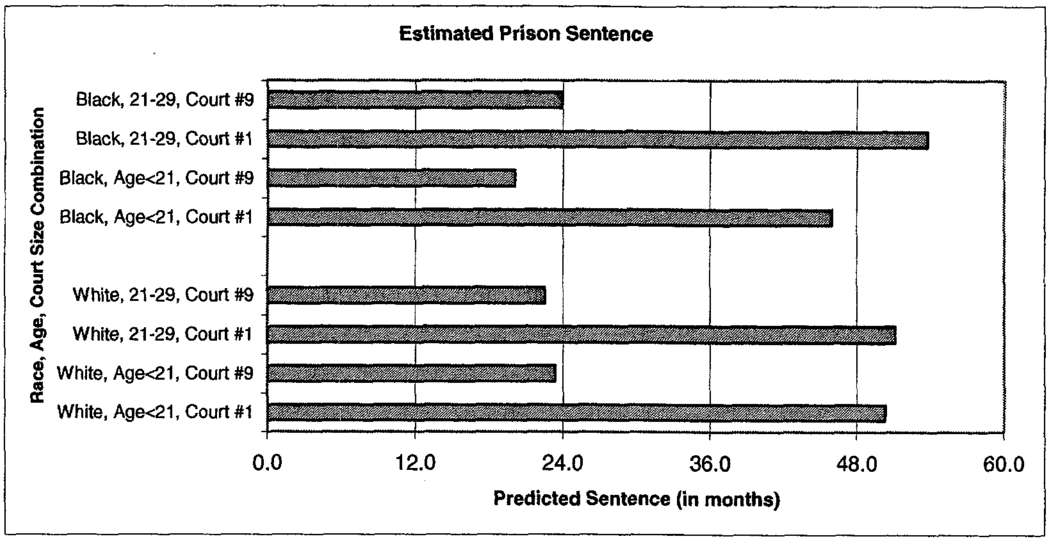
Scenario #2 – Violent Offense

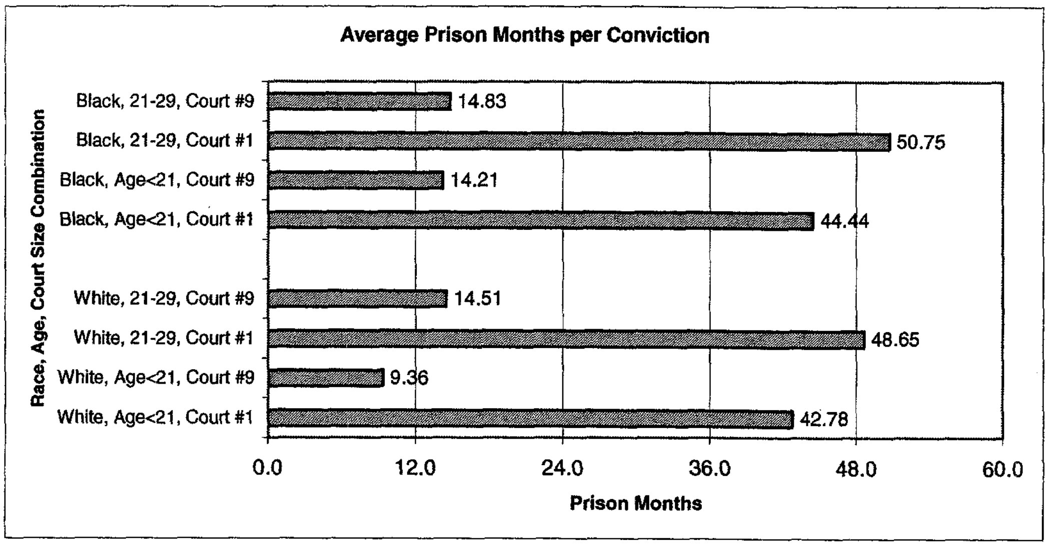
The second scenario focuses on a violent offense with a 15-year statutory maximum involving the use of a weapon. The standard fact pattern involves a male offender with a prior nonviolent felony, a juvenile arrest, and a current relationship with the criminal justice system (e.g., out on bail, on probation). Varying age, race, and specific court, we have eight separate outcomes within the context of this single offense.

To begin, Figure 8-2 presents both the probability of prison along with the estimated severity of the prison sentence given a prison type sentence for the 180-month statutory maximum. The top panel of Figure 8-2 shows the estimated probability of prison for the 180-month statutory maximum. The vast majority of offenders who fit this profile can expect to serve time in prison, although the probability of prison is always higher in Court 1. We also find that young black males are more likely to go to prison than their white counterparts regardless of the specific court. Finally, there is substantial variation between the eight subsets in terms of the probability of receiving a prison type sentence (.40 for White, Age<21, Court 9 to .94 for Black, Age<21, Court 1).

Figure 8-2: Scenario #2 -- Violent Offense, Weapon, Low Severity Felony, Current Relationship, Juv Arrest, Male, 180 Month Offense (e.g., Manslaughter, Criminal Sexual Conduct 3rd)







Offenders aged 21-29 sentenced in Court 1 are likely to receive the longest sentences for the crime described by scenario #2 regardless of their race (middle panel). The analysis also shows that the lowest expected sentence is for Black, Age<21, Court 9. In this scenario, it appears that the primary determinant of differences in sentencing are age and specific court – race seems to play a small role.

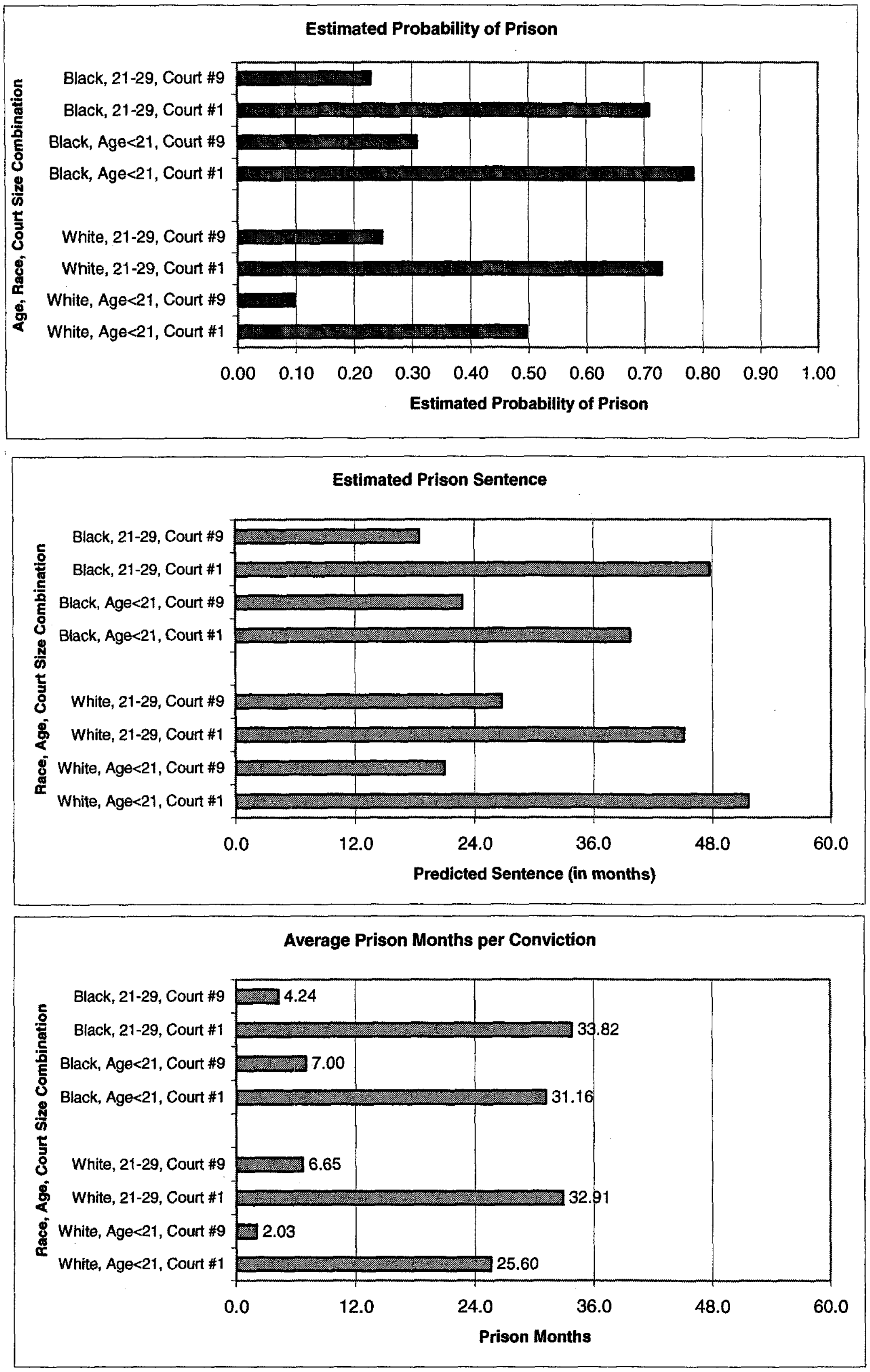
In every instance the black offender has a higher "expected sentence" than his white counterpart (lower panel in Figure 8-2). The differences are most noticeable for the youngest offenders with blacks receiving expected sentences that are 25%-33% higher than similarly situated whites. Another pattern worth noting is that there is a wide range in the expected months of prison per conviction ranging from 9.36 months for White, Age<21, Court 9 to 50.75 for Black, 21-29, Court 1. Depending upon matters of race, age, and sentencing location, it is possible to receive a sentence that is 100% larger for the identical offense.

Scenario #3 – Property Offense

The third scenario focuses on a property-type offense with a 10-year statutory maximum and an offender who has a continuing pattern of 3 or more such prior offenses. In this instance, the standard fact pattern involves a male offender with a prior nonviolent felony, and a misdemeanor conviction.

Figure 8-3 provides specific information about a 10-year property offense such as Breaking and Entering. As with the previous two scenarios, there is considerable variation with offenders sentenced in Court 1 much more likely to receive a prison sentence (top panel). Again we see evidence that young black males have a substantially higher probability of being sent to prison than do their white counterparts. Overall, the probability of receiving a prison-type sentence for this type of Property offense is quite varied – ranging from .10 for White, <21, Court 9 to .78 for Black, <21, Court 1.

Figure 8-3: Scenario 3 -- Property Offense, Continuing Pattern, Low Severity Felony, Misdemeanor, Male, 120 Month Offense (e.g. Breaking and Entering)



The first impression of the middle panel of Figure 8-3 is that the sentences for property offenses are substantially higher than those for Drug (Figure 8-1) and approximately the same as for Violent offenses (Figure 8-2) despite the fact that the other two have higher statutory maximums. This is due to the relatively high value of the coefficient for Drug Offense. Again the driving force is the specific court location.

The bottom panel of Figure 8-3 shows the expected number of months of prison associated with each conviction of the type in Scenario #3. Variation in sentence attributable to demographic factors remains the norm. In this scenario, we find substantially higher sentences for young black males.

Scenario #4 – Violent Offense with Life Statutory Maximum

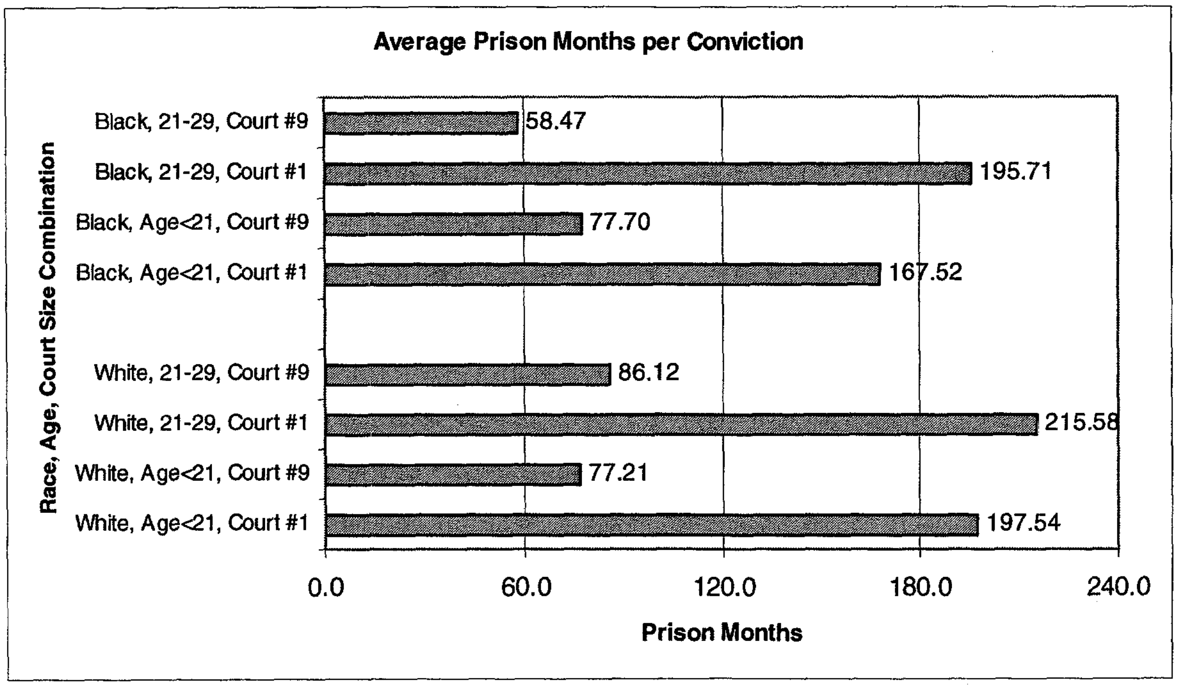
The fourth scenario focuses attention on a very serious crime that carries a Life statutory maximum. We have included this scenario to highlight the important role of the statutory maximum as sentencing base. As discussed in Chapter 7, the nonlinear nature of the relationship between the sentence severity measure – in logarithm units – and the independent variables measured as 0,1 variables (with one exception) suggests that the statutory seriousness of the offense plays an important role in determining the actual impact of race, age, gender, and court size. The coefficients of each of these variables – and any interaction terms – will express a percentage change in the underlying sentence. The sentencing base – expressed in logarithm units of the statutory maximum –

will place the offender in the vicinity of an appropriate sentence; the location is based upon the point estimate of the elasticity. The larger the statutory maximum, the greater impact a given percentage change will have on the time served. In general, the more severe the conviction offense, the more dramatic will be the discrimination (if it exists).

The fourth scenario focuses on a violent offense with a Life Statutory maximum involving the use of a weapon and physical injury to the victim. The offender has an extensive prior record including both High and Low Severity prior convictions, an arrest prior to age 18, and a current relationship with the criminal justice system. Such a scenario fits the typical fact pattern of Robbery Armed. Taken together these factors imply the probability of receiving a prison-type sentence is in excess of .95 for all eight groups.

The expected sentences for black offenders convicted of Scenario #4 are somewhat lower than those for their white counterparts in every instance (Figure 8-4). The sentences received in Court 1 are predicted higher than in Court 9. Finally, the sentences for the offenders in the 21-29 age group are higher than those for the under 21 group. Looking at the range of expected sentences we find a low of 58 months (Black, Age 21-29, Court 9) and a high of 215 months (White, 21-29, Court 1). In other words, the same fact pattern can lead to sentences that are thirteen years different in length from one another. These findings point to the tremendous impact that the individual variables can have as the statutory maximum rises. Because judicial sentencing is best characterized as "non-linear", an offense with a large statutory maximum lead to the independent variables having a much larger impact – when calibrated in months – than for offenses with smaller statutory maximums.

Figure 8.4: Average Prison Months per Conviction: Scenario 4 -- Violent Offense, Weapon, Phys Injury, High Severity Felony, Low Severity Felony, Juv Arrest, Current Relationship, Life



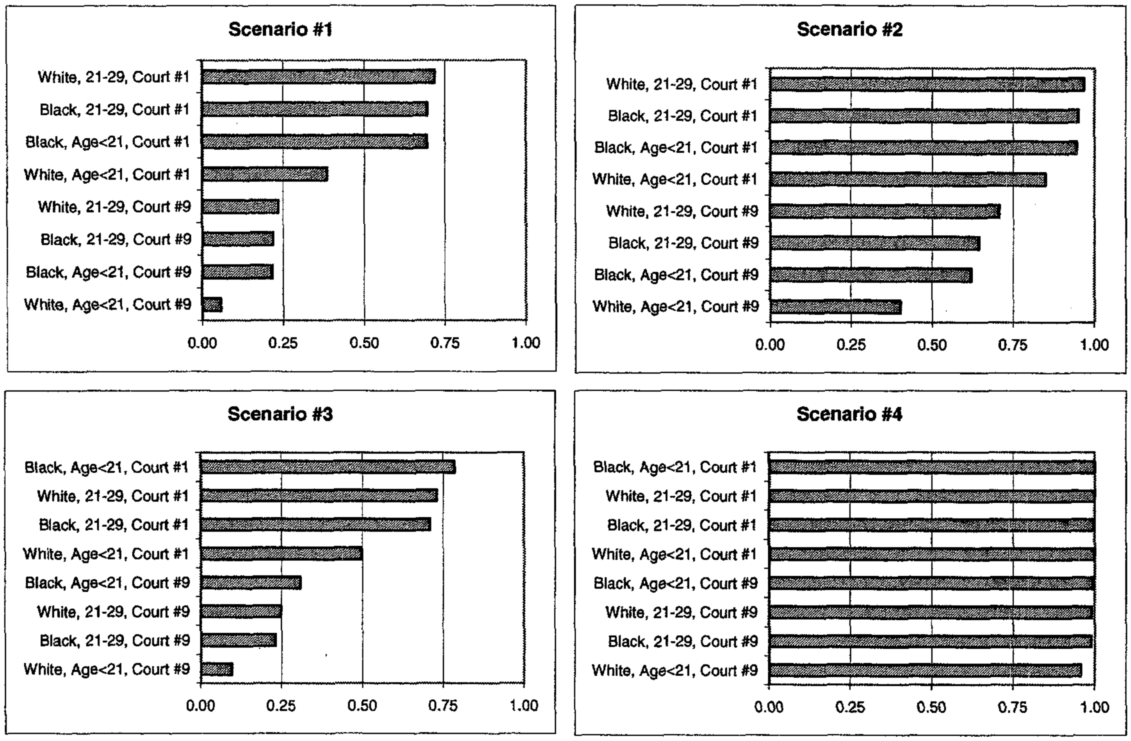
Conclusions

Steffensmeier et al (1998, 788) conclude the presentation of their research with the observation that there are "important independent and interactive effects of race, gender, and age in the sentencing of criminal defendants." To their findings, we would add that the specific court seems to make a significant difference with some courts sentencing more harshly than others. It is important to remember that within each scenario, we are assuming that the facts of the crime and the criminal history are identical across all eight groups. Our comparative statics analysis yields numerous insights into what drives variation in local going rates.

Probability of Prison

Figure 8-5 compares the probability of Prison for each of the eight groupings across the four scenarios sorted from low to high. First, the lowest probability of prison – across all four scenarios – are young white offenders in both courts. The prison rate for young white offenders in Court 9 is substantially lower than any other probability in Scenarios 1 and 3. Second, the highest probability of prison – across all scenarios – emanates from Court 1. Third, two of the top three prison probabilities in each scenario involve black offenders. In particular, young blacks are much more likely to receive a prison sentence than are young whites. In fact, in Scenarios 3 and 4, young black males are the most likely to go to prison in each of the two courts.

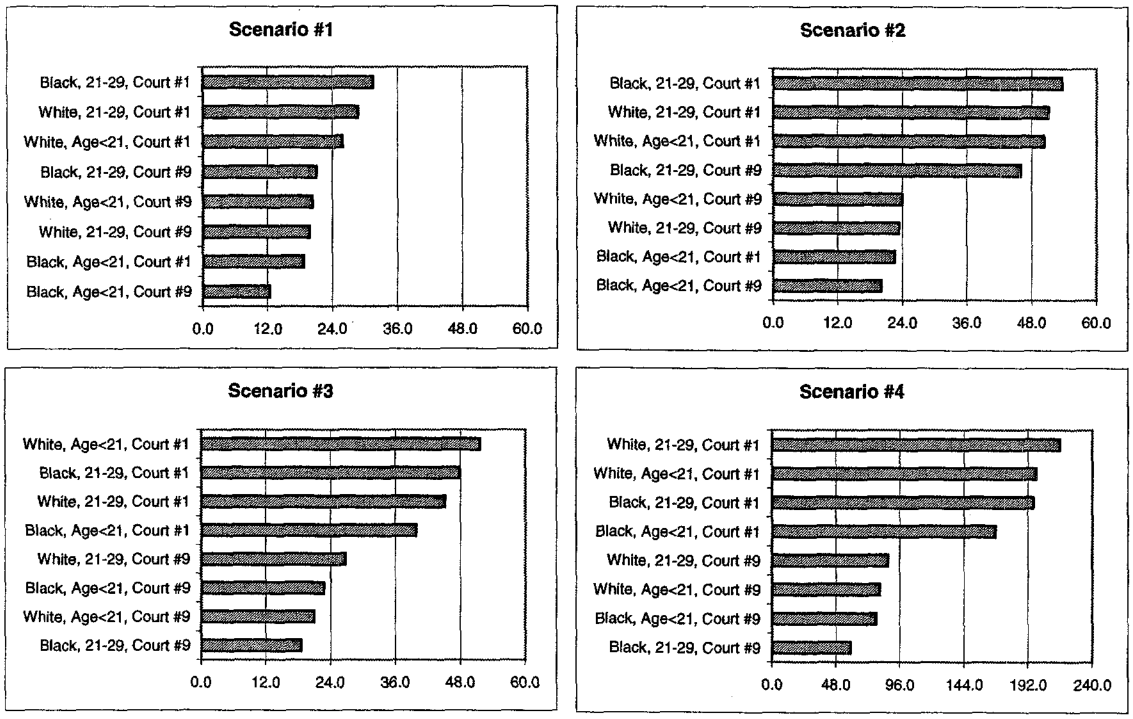
Figure 8.5: A Comparison of the Probability of Prison Between the Four Scenarios



Expected Severity Given A Prison Sentence

A surprising feature of the expected severity comparison in Figure 8-6 is that young black offenders receive the shortest sentences across all four scenarios. This suggests that judges are more likely to send young blacks to prison but do so for a shorter period of time. In scenarios 1 and 2 the largest sentences go to black men in the 20-29 cohort while in Scenarios 3 and 4, white offenders receive the longest prison sentences.

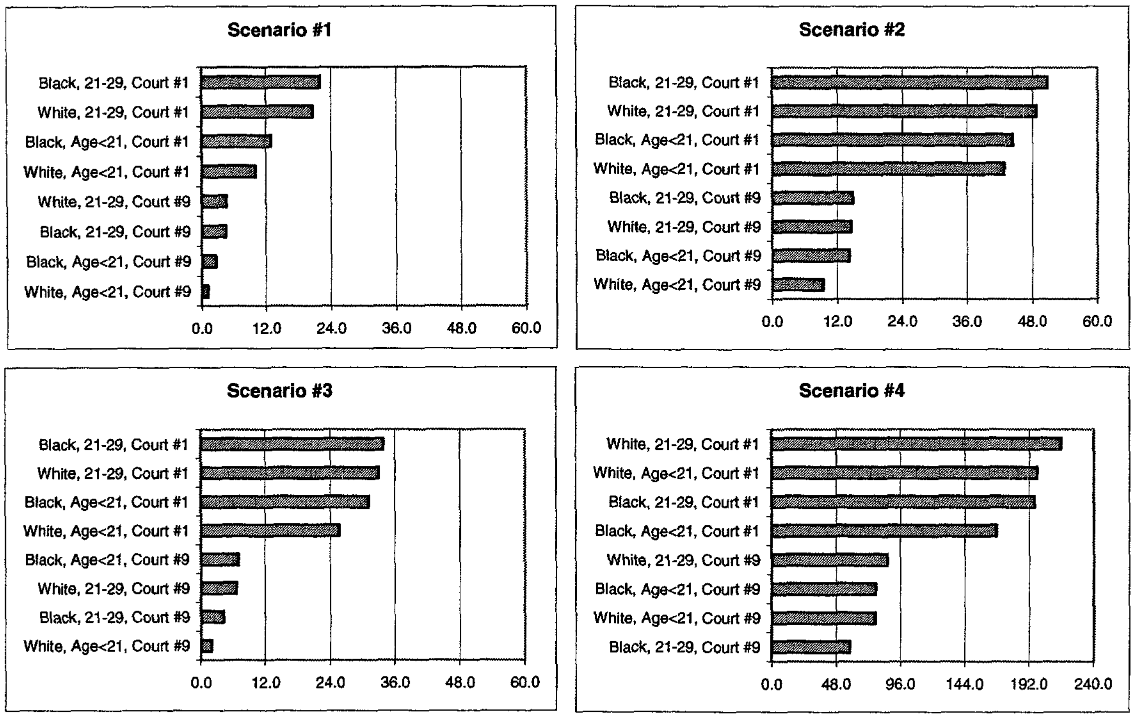
Figure 8.6: A Comparison of the Expected Sentence Severity Between the Four Scenarios



Expected Prison Months per Conviction

Across the board, the expected number of prison months per conviction is greatest in Court 1 (Figure 8-7). In this court, the highest sentences tend to be reserved for both whites and blacks aged 21-29. Offenders in Court 9 are treated more leniently when the prison probability and sentence severity are combined. Taken as a whole, these results also show that an important consideration is age of the offender. In almost every instance the lowest expected prison months per conviction fall to young offenders.

Figure 8.7: A Comparison of the Expected Prison Months per Conviction Between the Four Scenarios

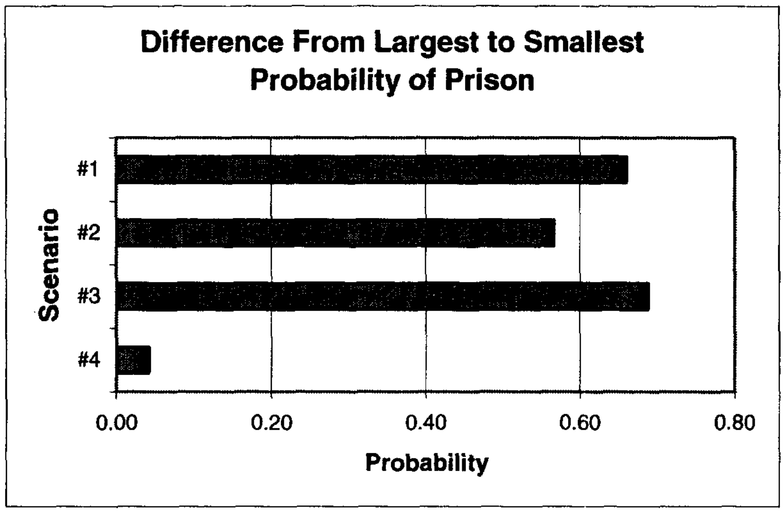


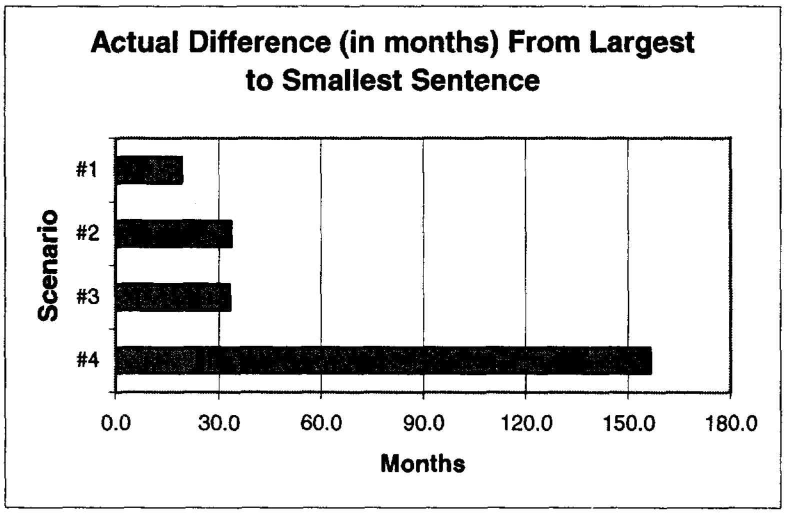
Overall

Offenders are treated differently based upon age, race, and the location of the sentencing court. Rather than rely on interaction-type variables alone (e.g., Wooldredge, 1998), this approach takes full advantage of the two-stage sentencing model. Using both equations with some interaction variables in each equation, plausible scenarios can be designed. Variation in the scenarios is important because of the dramatic impact that the sentencing base has on the marginal effects of the sentencing relevant variables (when expressed in actual months of prison). Based upon our theoretical specification and measurement model for the two dependent variables, the interpretation of the model focuses on a large number of non-linear (and often non-obvious) effects. In order to determine whether factors such as race makes a difference requires more than simply looking at the statistical significance of a coefficient (especially for those analyses using large data sets). The real question is: are the differences due to race, age, and court substantively significant?

Our answer to the question is overwhelmingly positive. Figure 8-8 presents a way to view the magnitude of the differences. The top panel shows the variation in the probability of prison within each of the four scenarios. In Scenarios #1 and #3, there is an increase of .65 from the lowest to the highest prison probability. Scenarios # 2 shows an increase in excess of .55 while there is little change in Scenario #4. The bottom panel shows the absolute difference in prison months from the top to the bottom sentence. As can be seen in Scenario #4, the difference is approximately thirteen years. The three other scenarios have differences that range from 1 to 2 ½ years. As the statutory maximum of the underlying offense increases, the effects on sentence length become quite dramatic.

Figure 8-8: A Comparison of the Magnitude of Differences of the Probability of Prison and Months of Prison Between the Four Scenarios





Even in the context of structured sentencing, the comparative statics analysis shows evidence of discrimination. Similarly situated offenders – with respect to conviction offense, aggravating offense factors, and prior record – can and do receive substantially different treatment. While some of the variation is race based, age and court location play larger roles. The fact that such differences can be accommodated within the context of apparent consistency suggests the need for further structuring of discretion. Not all offenders should be treated alike. Rather offenders who are alike in terms of offense, offense factors, and prior record should receive similar punishments. The challenge is to control the variation in sentencing without removing the ability of judges to treat different offenders differently.

Unwarranted disparity affects the quality of justice as well as associated public expenditures. Who is incarcerated and for how long is an issue not only of fairness but also of finances. Without appropriate structure and guidance, sentencing decisions are left to individual judges who will decide the terms of punishment and the best use of state and local correctional resources. As we've seen, there can be significant variation in local going rates. A major question is whether sentencing guidelines can be designed to temper local organizational values that may facilitate and protect inequitable sentencing practices.

CHAPTER 9: CONCLUSIONS, CONTRIBUTIONS, AND POLICY IMPLICATIONS

> As we enter the 21st century, researchers should continue to investigate the complex interconnections among offender race/ethnicity, other legally irrelevant offender characteristics, case characteristics, and sentence outcomes. . . . Researchers should build on the foundation established by the methodologically sophisticated and theoretically informed studies conducted during the past 20 years. (Spohn, 2000)

Introduction

The need to systematically and empirically address three challenges drives this inquiry. First, we offer a comprehensive means to determine the extent to which judges are consistent in their sentencing behavior. Second, we provide a theoretical/empirical platform from which to assess the degree to which there is evidence of discrimination in felony sentencing. Third, even though our data are aggregate in nature, we have explored – in an interesting fashion – ways to assess the magnitude of the local variation in sentencing within a given state.

The theoretical and empirical study of the three challenges frame this book. With each chapter we have taken on a distinct issue in the sentencing literature, developed a theoretical approach, and made use of various statistical techniques to provide an answer. This analysis of sentencing outcomes has been detailed and, at times, quite technical. Our approach has been to illustrate each aspect of the analysis through a comprehensive study of sentencing outcomes in Michigan. But more than expounding the methods, the results inform the larger issue of what must be accomplished to achieve the fundamental goals of consistency and the elimination of unwarranted disparity in sentencing.

We believe this project makes four fundamental and important contributions to the study of sentencing in the United States – theoretical, measurement, methodological, and substantive. While results reflect the Michigan experience, the analysis strategy provides a solid foundation from which to conduct a thorough and specific policy analysis and is readily transferable among states. This chapter begins with a review of the findings and implications of this work for the study of sentencing disparity. We conclude by offering a set of recommendations to guide the development of sentencing guideline systems. In an appendix to this chapter, we build on the recommendations to characterize the basic design of a model guideline framework for reducing disparity and controlling prison population.

Summary and Implications

The corpus of sentencing research is substantial. Recent publications by Spohn (2000) and Zatz (2000) provide a clear indication of the breadth and depth of the research to this point. Building on existing research, our goal has been the development of broad-based theoretical and policy implications, while being mindful that drawing far-reaching conclusions must be done with caution. As Sutton (1987, 307) noted several years ago:

One of the most intellectually unsettling lessons of sentencing research is that criminal sentences simply do not admit the kind of parsimonious and uniform predictive models we might prefer to deal with. Yet even in light of this disturbing reality about the difficulties of mapping human deliberations statistically, our understanding of the sentencing decision will be served better by conceptual and methodological strategies that accommodate rather than deny this complexity.

Our hope is that "conceptual and methodological strategies" developed here place us on a firmer foundation for dealing with the complexities of sentence decision-making. Addressing directly issues related to theory, measurement, and statistical methods will help produce a more valid and reliable set of conclusions relevant to the current state of sentencing.

Theoretical Contributions

The empirical study of sentencing is extensive, yet there has been far less attention to developing a theory of judicial decision-making. Many researchers are content to ground their studies with reference to prior research and a list of variables. In fact, what most researchers offer is a "perspective" on theory. Hawkins (1987, 722), in his observations on conflict theory, stresses that the sentencing research community has a number of perspectives but few well-formulated theories with testable hypotheses.

While we find the ideas embedded in attribution theory to be quite powerful, we also contend that there is little in the literature to suggest how the judicial attributions are mapped into a set of sentencing decisions. Our contributions in this area are two-fold. First, we develop an individual-version of structural organization theory based on cybernetic theory. Using the basic premises from this research tradition, we demonstrate that judicial decision rules are likely to be simple, stable, and restricted to a few important critical variables. In addition, this body of research points to the likelihood that there is a "sentencing base" that judges use to make marginal adjustments (i.e., satisfice) to arrive at a final sentence. Second, we introduce Kelly's Personal Construct Theory as a way to organize the cybernetic and attribution theories into a coherent whole. Following upon Kelly's Fundamental Postulate and Construction Corollary, we hypothesize that what judges anticipate is not a fully fleshed-out event, but simply the common intersect of sentencing relevant properties. In the context of sentencing, judges assess each offender by paying attention to a relatively small number of specific attributes of the offense, prior record, and defendant.

Combining cybernetic, attribution, social world, and personal construct theories, we offer a set of hypotheses concerning the way in which judges make sentencing decisions. These hypotheses address the two-stage nature of sentencing (i.e., sentence type and sentence severity); the circumscribed nature of the choice set; the use of a "base" to anchor and establish the underlying seriousness of the offense; the use of offense and offender related factors to make marginal adjustments from the base; and the need to accommodate local legal and political culture in the interpretation of sentencing outcomes. In essence, we argue that judges develop routine and stable decision rules, shaped by local context, that enable them to focus on the "common interest" of properties rather than a fully fleshed out event.

This theoretical perspective provides the means to synthesize a large amount of existing research while also pointing towards the most suitable types of statistical models. Specifically, we have drawn on the theoretical principles in Chapter 2 to formulate measurement models for a two-stage sentencing decision.

Measurement Contributions

A key contribution of the present study is its attention to the measurement of the key sentencing outcomes – sentence type and sentence severity. The primary effort is to conceptualize and integrate the full range of sentencing options, including intermediate sanctions, available to judges when the sentence type decision is made. Most researchers characterize the sentence type decision in prison versus no prison terms thereby ignoring the growing range of alternative punishments. The discussion and analysis in Chapter 3 shows that the range of sentencing options requires two dimensions – treatment and control – and leads to five basic categories of sentences – Prison, Restraint, Rehabilitation, Rebuke, and Restoration. This grouping suggests that judges perceive the sentencing landscape in terms of two dimensions and "see" five possible types. As a consequence, the five types cannot be arrayed on a single dimension. Lacking even an indication of the ordinal relationships between the five options, it is necessary to move to statistical techniques designed for categorical variables. In this instance, we have used multinomial logit.

Chapter 4 provides a theoretically based measurement strategy for the sentence severity decision based upon the following three hypotheses: judges consider and use only a relatively small number of sentencing options, the sentences that come to mind most easily will be the ones most frequently chosen (i.e., there is a set of preferred and prominent sentences), and the interval between the elements in the choice set is non-constant due to psychological discounting.

Prior research has, for the most part, concentrated on using either actual months or some arbitrary scale. Evidence from the literature showing that most sentencing models account for little explained variance suggests the possibility that the dependent variable is mis-specified. Following the lead of our hypotheses, we show that the natural logarithm of the actual months of prison represents a theoretically sound way to capture the choice set being used by judges. This is not to say that the judges calculate a logarithm but instead that the natural log serves as a model for what they are actually doing. The move to using the log transform necessitates a series of steps to aid interpretation of the resulting parameter estimates. The interpretation of each sentencing relevant variable's impact is not straightforward as in the usual regression context.

Methodological Contributions

One hallmark of sentencing research is that it has long served as a testing ground for important methodological innovations, especially in the area of the two-equation Heckman-type models (e.g., Berk, 1982; Wheeler et al, 1982). Given the importance of measurement, we offer a comprehensive assessment of the methodological steps relevant to the analysis of sentencing data.

The statistical/technical discussion in Chapters 2, 3, 6, and 7 is designed to provide clear guidance on statistical issues confronting students of the sentencing process. New models gain relevance to the extent that they yield different conclusions about the overall consistency and presence of discrimination in sentencing. The literature on sentencing in the United States shows mixed results. It is our contention that while consistency and discrimination are certainly contextual, measures of each are affected by the methodological strategies used to model and evaluate sentencing.

In Chapter 3 we develop a multidimensional scaling methodology as a way to conceptualize the many sentencing options available to judges. Building upon an approach developed by Quinn and Rorbaugh (1983), a sample of Michigan judges were asked to compare and contrast twenty distinct types of sentences. Scaling the responses produces a configuration consisting of five basic types of sentence – Prison, Restraint (in the community), Rehabilitation, Rebuke, and Restitution. While our results are bound to disappoint those seeking a single dimension or continuum of sanctions, they do support Morris and Tonry's call for a sentencing structure that incorporates both treatment and control.

In Chapter 6, we use the measure of sentence type developed in Chapter 3 to estimate a model of the type decision. Five categories not comparable on a single dimension lead to the use of methods appropriate for categorical variables. While the estimation of a multinomial logit model is relatively straightforward, the interpretation of the resulting estimates is not. Drawing on the work of Long (1997), we use the four sets of estimates (approximately 100 parameter estimates) to assess the implications for the probability of an offender receiving any of the five sentence types.

The recent trend in sentencing studies is to view sentencing as a multi-stage process. In doing so, a range of rather sophisticated methods have been developed. While the use of the two-stage model is widespread, the results are not always fully (or accurately) interpreted. Estimating the two equations and the hazard rate has important and non-obvious implications for the interpretation of the final model. The inclusion of the hazard rate means that interpretation of the second equation must reference the amplification/attenuation of the second stage estimates. For certain offenders in the sample, the impact of a given variable will be more, less, or even opposite than suggested by the estimated coefficient.

In addition to methods, we have emphasized strategies for teasing implications from the estimated model and finding instructive ways to present them. Building upon work by Long and King, we discuss different ways to look at the results beyond simply reporting them in table form. For example, the multinomial logit estimates presented in Table 6-1 present a formidable barrier to interpretation. The odds ratios in Table 6-6 and the estimates of the discrete change in probability presented in Table 6-7 along with the predicted probabilities for the five outcomes displayed in a number of figures all provide the reader with information necessary to interpret and make sense of the original estimates.

Substantive Contributions

One gauge of significance is whether suggested advances in theory, measurement, and methods affect our understanding of the sentencing process. And in this case they do. Moving from a two category conception of sentence type (i.e., prison/no prison) to one with five categories leads to a more nuanced take on the sentencing of, for example, young black males (Table 6-4). The five-category variable shows that these individuals have a higher probability of prison than suggested by the two-category variable. In addition, Appendix 6-2 highlights the differences between models estimated using actual months versus the log of months. Not only are different variables significant, the interpretation of the sentencing relevant variables is substantially different (e.g., trial tax). Measurement does indeed matter.

Sentence Type Decision

It appears that judges anchor their sentencing decisions using the underlying seriousness of the conviction offense. We also find that the blocks of

Offense and Prior Record variables play important roles in the sentencing decision. It appears that judges make marginal adjustments based upon the presence of key elements of the offense and prior criminal history. If we accept an interpretation that ties the nature of the offense to the degree of blameworthiness and prior criminal history to recidivism, then we find evidence that judges use both of the dimensions hypothesized by attribution theory. Moreover, the strong fit of the model suggests consistency in judicial decisions. Not only do almost all variables in the model play a significant role in the sentencing decision, the nature of their individual effects are by and large consistent with prior expectations. But consistency does not mean the absence of (potential) discrimination. Once the base, offense, and prior record variables are taken into account, defendant characteristics continue to play a prominent role. The age, race, gender, and drug use of the offender affect the type of sentence received.

Sentence Severity Decision

Because the underlying seriousness of the conviction offense is so significant in the sentence type decision means that its magnitude (as indicated by the parameter estimate of .57) is sharply attenuated when the probability of prison is otherwise low. The marginal adjustments that are made in response to the offense factors are quite substantial, increasing the expected sentence from 25% to 235%. The overall impact of the prior record is much lower ranging from 13% to 17%. While the prior record factors play a very important role in the sentence type decision, their role is reduced in the severity decision.

As with the sentence type decision, we find evidence that the court processing, defendant characteristics, and court size variables play a significant role in the sentence decision. We undertook a Chow-type test to see whether estimating a separate model for black and white offenders increased the explanatory power and found that it did not. We did, however, find strong individual effects for court size. On the whole, there is much less evidence of discrimination in the sentence severity decision than in the sentence type decision.

Comparative Statics – The Two Decisions in Tandem

To meld and more fully interpret the results presented in Chapters 6 and 7, an exercise in comparative statics was conducted in Chapter 8. The prospect of discrimination in sentencing outcomes was examined by taking into account both the sentence type and sentence severity decisions simultaneously. To enhance clarity, the presentation focused on four typical scenarios involving different offenses, offense variables, and prior record variables. Within each scenario race, age, and court location were varied to determine the extent of variation attributable to these "extra-legal" factors.

For otherwise similarly situated offenders, the analysis finds evidence of differences in treatment based on age, race, and the sentencing court. For example, while the patterns are not clearly along racial lines, offenders in the 21-29 age group sentenced in Court 1 are treated more harshly than younger offenders in Court 9. We show that these differences make a difference in both the probability of prison and in the severity of prison sentences. A relevant policy implication emerging from this analysis is that even in the context of sentencing guidelines, sufficient "play" remains in the system so as to allow certain personal characteristics and/or court location to affect, sometimes dramatically, an offender's sentencing outcome.

Policy Recommendations

A key argument carried through this book is that effective sentencing reform has a greater likelihood of success if firmly grounded in both the theory and realities of sentencing in the United States. Identifying the existence of unwarranted disparity and proving it empirically begins with a fuller understanding of judicial discretion and decision-making. Based on the research strategies employed and results obtained, we offer the following set of recommendations for development of effective sentencing policy in America.

Working within the theory of judicial decision-making articulated in this book leads to the conclusion that, on the whole, sentencing can be consistent and predictable. This finding rests primarily on two aspects of decision-making under complexity: judges use a reduced choice set with a non-constant interval between options. Taking these features of the decision making process into account leads to the following two recommendations:

Recommendation #1: Make explicit and introduce all possible sentencing options into the judges' choice set.

Recommendation #2: Introduce proportionality, via interval-ness, into the recommended sentence ranges.

The second major finding from the empirical research is that there are three primary influences on sentencing – sentencing base, prior record, and offense seriousness factors. Almost all sentencing guideline systems in the United States employ a two dimensional grid with a proxy for the sentencing base on the vertical dimension and prior record on the horizontal dimension. The typical approach is to view all offenses of a particular severity level as the same so that the recommended sentence only varies with respect to the prior record. Of concern, as seen in Tables 6-1 and 7-2, is that judges use the offense seriousness factors when making sentencing decisions. From a policy point of view, it makes sense to take into explicit account such factors as whether the offender used a weapon, inflicted physical injury, intended to kill or injure, and exhibited a continuing pattern of offenses. To ignore these factors is to ignore relevant defendant characteristics that judges are shown to consider in their deliberations. This leads to the following recommendations for the basic factors to be integrated into a system of structured sentencing:

Recommendation #3: Include a proxy for a sentencing base by, for example, developing separate grids for each level of statutory severity.

Recommendation #4: Differentiate and include key aspects of the offender's prior record.

Recommendation #5: Differentiate and include key aspects of the seriousness of the instant offense.

The third major finding from the empirical research concerns the impact of "secondary" factors on the sentencing decision. Again viewing Tables 6-1 and 7-2, the evidence suggests that Processing Factors, Defendant Characteristics, and Court Size play a statistically significant role in sentencing. Of particular importance, the influence of these factors increases dramatically as the underlying seriousness of the offense increases due to the non-linear nature of the judicial decision rules. It is our contention that sentencing policy should strive to eliminate the influence of these "secondary" factors to avoid discrimination in the sentencing process. This leads directly to the following recommendation:

Recommendation #6: A system of sentencing guidelines should be developed with one explicit goal being to eliminate the unwarranted influence of all factors associated with court processing, defendant characteristics, and court size.

Beyond issues of fairness, disparate sentencing practices carry considerable economic implications. Prison is expensive.[1] A finding that certain groups, based on such characteristics as race, age, or gender, are more likely to receive a prison sentence or be sentenced to longer terms than otherwise similarly situated offenders has direct fiscal consequences. For example, in 2002, approximately 10,000 new prisoners were incarcerated in Michigan prisons

[1] According to BJS estimates (*Stephan 1996*), corrections spending has increased from $6.8 billion in 1984 to $22 billion in 1996.

at an average cost of $77 per day. Reducing all sentences by one month would save the state approximately $24 million. In Michigan, the share of the budget allocated to corrections – which has increased by 800% since 1980 – is now on a par with the level of funding for the state's higher education system. Clearly, as the nation enters a time of budget uncertainty, there are considerable opportunity costs associated with the absence of consistent sentencing practices.

Recommendation #7: Sentencing guidelines should be designed to facilitate accurate forecasts of prison population and as a means to estimate future prison expenses.

Empirically-based sentencing policy is a strategy that will enable states to keep the parts of the sentencing process that work while reining in unwarranted disparity. Similarly situated offenders should receive similar sentences without having race, gender, or location affecting the penalty. They key question is how to punish the blameworthy, control crime, and keep the overall costs under control. We believe the answer lies in a carefully constructed sentencing guideline system.

Design Criteria

We offer four criteria to guide the development of sentencing guidelines. First, as discussed in Recommendations 3-5, we believe that sentencing guidelines should be three-dimensional. In addition to the traditional offense seriousness and prior record, it is necessary to consider the presence of aggravating/mitigating factors in the commission of the instant offense. The

Michigan sentencing guideline system, discussed in Chapter 5, illustrates this approach to structured sentencing.

Second, we contend that three-dimensional sentencing guidelines should structure both the sentencing type and severity decisions. Discrimination can arise in two distinct forms – where the sentence is served and the severity of the sanction. A relevant finding from Chapters 6 and 7 is that the potential for discrimination in sentencing is high during the sentence type decision. Certain subgroups of offenders (e.g., young black males) may have a greater likelihood of receiving a prison sentence than otherwise similarly situated offenders. In addition, such an occurrence of discrimination may go undetected if sentence length is examined in isolation. That is, the discrimination occurs when an offender receives a prison sentence when it is not called for (compared to other offenders committing similar crimes but with different demographic profiles). But because the length of the imposed sentence is comparable to others in prison, an analysis of sentence length alone will uncover no evidence of unwarranted disparity.

Third, to achieve recommendation 6, judicial discretion should be shaped and constrained so that the majority of offenders face certain punishment. With respect to the sentence type decision, the system of structured sentencing should provide clear and unambiguous guidance as to whether the presumptive sentence will be served in prison or the community. With respect to the sentence severity decision, the guideline sentence range should be restricted to the extent that the imposed sentence is determined predominantly by legally-relevant criteria. The goal is to appropriately limit judicial discretion, not eliminate it.

In addition, we suggest that recommended sentence ranges developed as part of a system of structured sentencing reference current sentencing practices. Any policy must have the support of those who are charged with implementing it. But careful consideration should be given to the evidence that judges choose among a limited number of prison length options (e.g., 12, 24, 36 months) and that the choices are of a non-constant interval (e.g., 36, 60, 120, 360 months). While this may be an evolutionary stable decision strategy for judges, it is imperative that policymakers determine explicitly whether recommended ranges be constructed to accommodate these preferred and prominent sentences.

Finally, recommendation 7 states policymakers should construct and adopt a system of structured sentencing designed to forecast accurately the types and severity of sentences. A hallmark of effective sentencing policy is the ability to estimate the costs associated with changes to that policy. Prisons are expensive to build and maintain. Early release from prison is controversial and politically risky. Prisons should be reserved for those people that we are afraid of while other options should be developed for those offenders we are mad at. Taxpayers deserve public safety as well as a means to monitor the operation of criminal sentencing.

Appendix 9-1

A Prototype Sentencing Guideline System

A sentencing guidelines worksheet should enable the judge to assess and sentence the offender. Our prototype worksheet (Table 9-1) looks at the three key dimensions: statutory maximum, offense factors, and prior record. An initial policy decision is to determine which aspects of these three dimensions should be highlighted. To illustrate the concept, the choices displayed in Table 9-1 reflect the variables used in our empirical study of Michigan sentencing. In addition, points are assigned to each factor based on severity. The point system employed in the prototype is based upon the empirical results. There are three point totals of interest on the sentencing guidelines worksheet – Offense Score, Prior Record Score, and Overall Score. Finally, the columns labeled "Fact Pattern" refer to the four scenarios developed in Chapter 8. The different fact patterns produce different scores as shown under the columns labeled "Point Total".

Table 9-1: Sentence Type Worksheet

		Fact Pattern Scenarios				Point Total Scenarios			
Statutory Maximum	**Points**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
24	1	0	0	0	0	0	0	0	0
48	5	0	0	0	0	0	0	0	0
60	10	0	0	0	0	0	0	0	0
120	15	0	0	1	0	0	0	15	0
168	20	0	0	0	0	0	0	0	0
180	25	0	1	0	0	0	25	0	0
240	30	1	0	0	0	30	0	0	0
Life	100	0	0	0	1	0	0	0	100
Sentence Base Score						30	25	15	100
Offense Factors									
Weapon	10	0	1	0	1	0	10	0	10
Physical Injury	15	0	0	0	1	0	0	0	15
Intent to Kill or Injure	100								
Exploitation	10	0	0	0	0	0	0	0	0
Leader	5	0	0	0	0	0	0	0	0
Pattern	10	0	0	1	0	0	0	10	0
Violent	10	0	1	0	1	0	10	0	10
Property	0	0	0	1	0	0	0	0	0
Drug	-10	1	0	0	0	-10	0	0	0
Offense Score						-10	20	10	35
Prior Record									
High severity prior	20	0	0	0	1	0	0	0	20
Low severity prior	10	0	1	1	1	0	10	10	10
Misdemeanor conv.	5	0	0	1	0	0	0	5	0
Current relation CJ	10	0	1	0	1	0	10	0	10
1st arrest before 18	5	1	1	0	1	5	5	0	5
Prior Record Score						5	25	15	45
Total Points						25	70	40	180
Sentence Type									
0-25	Community					*x*			
26-50	Straddle							*x*	
51+	Prison						*x*		*x*

Sentence Type

Beginning with the sentence type decision, the results from Table 6-9 are used to set the point totals proportional to the ways in which judges actually sentence. Point totals translate into the type of sentence. At the bottom of the worksheet, we suggest three categories. One group of offenders is targeted to remain in the community (total points less than or equal to 25) while another is targeted to prison (total points greater than 50). The middle category, labeled straddle, enables the judge to choose from the full array of sentence types. A straddle cell offender can receive an intermediate sanction or a prison term without the necessity of a departure.

The four scenarios from Chapter 8 show the outcomes. Scenario #1, the drug offense, leads to a score of 25 that places the offender in the Community-type sentence category. Scenario #2, the first violent offense, has a score of 70 points and hence is targeted for a Prison sentence. Scenario #3, the property-type offense, receives a score of 40 points and hence is in the straddle category from which the judge is able to choose from the full array of sentence types. Scenario #4, the armed robbery, scores out at 180 points and hence is targeted for a prison sentence.

It is also important for any guideline system to create a policy whereby judges are able to depart from the sentence type recommendations. We believe that the policy should be flexible but carefully circumscribed. Reasons should be placed on the record and be available for appellate review.

Sentence Severity

Our model of judicial sentencing suggests using the statutory severity of conviction to establish a "base" for recommended sentence length. Drawing on the Michigan experience, Table 9-2 shows a scale for determining the base sentence. In this example, an offender convicted of a 60-month offense and recommended for a prison-type sentence is presumed to serve a 15-month sentence (before any other criteria are considered).

Table 9-2: The Sentencing Base

Statutory Maximum	Base Sentence
24	9
48	12
60	15
120	24
168	30
180	32
240	36
Life	96

From this base sentence, offense severity and prior record are introduced into the mix. This example, using the Offense Severity and Prior Record point totals from Table 9-1, constructs a two-dimensional matrix that adjusts the base sentence based upon various combinations of offense and prior record (Table 9-

3). Table entries show the number of years that the base sentence is enhanced for various combinations of offense seriousness and prior record.

Table 9-3: The Sentence Enhancement Matrix

Enhancement Matrix

Offense Points	**Prior Record Points** 0-10	11-20	21-30	31-49	50+
0-10	Base	Base	1	2	3
11-20	Base	1	2	3	4
21-30	1	2	3	4	4+
31-49	2	3	4	4+	4+
50+	3	4	4+	4+	4+

Table 9-4 provides sentence length calculations for each of the four scenarios. The drug offender from Scenario #1 is not recommended for prison and would not be sentenced using this grid. An alternative grid designed for community-based sanctions would be used. The sex offender from Scenario #2 would receive a base sentence of 32 months along with a one-year enhancement for a recommended sentence of slightly less than four years. The property offender from Scenario #3 would receive a base sentence of two years with no enhancement. Finally, the offender convicted of armed robbery would receive a base sentence of eight years with a four-year enhancement for a recommended sentence of twelve years.

Scenario	Base	Offense	Prior	Enhancements	Recommended Sentence
1	36	0	5	0	36
2	32	10	25	1	44
3	24	10	15	0	24
4	96	25	45	4	144

Table 9-4: The Recommended Sentence

Forecasting the Demand for Resources

A system of structured sentencing, like the one explored here, can be used to forecast the future impact of sentencing policy on the demand for various criminal justice resources. A basic approach to forecasting prison population is outlined below. The goal is to illustrate general concepts and the linkage between sentencing guidelines and prison beds; not a fully developed system of forecasting.

A first step is to determine the number of offenders that can be expected to receive different types of sentences. Using the 1995 Michigan data along with the assumption that approximately 40,000 offenders will be convicted of felonies during our hypothetical year, it is possible to predict how the offender population will fall into the three categories: community, straddle, and prison. Figure 9-5 presents the anticipated distribution of total scores along with the proportion of offenders falling into each of the three sentencing categories. After assessing the distribution in Figure 9-5, it is possible to adjust the cut-offs in order to influence the overall distribution presented in Figure 9-6.

Figure 9-5: Distribution of Scores from Sentence Guidelines Worksheet

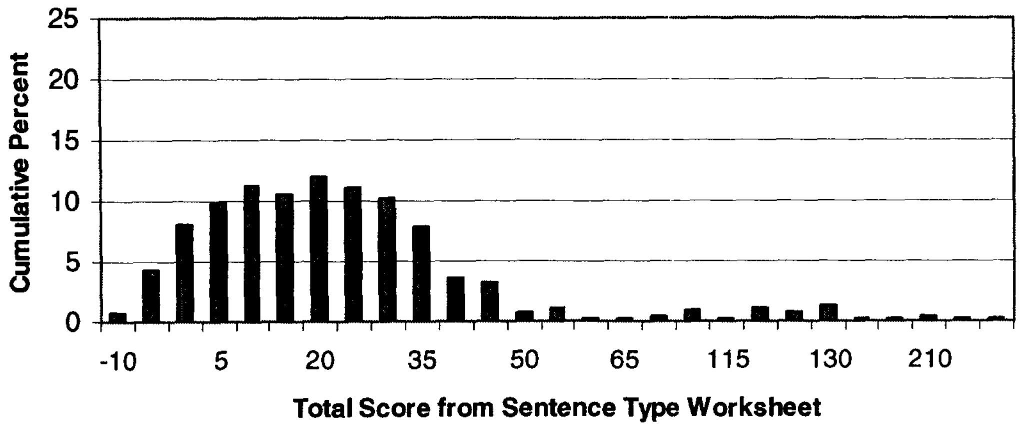
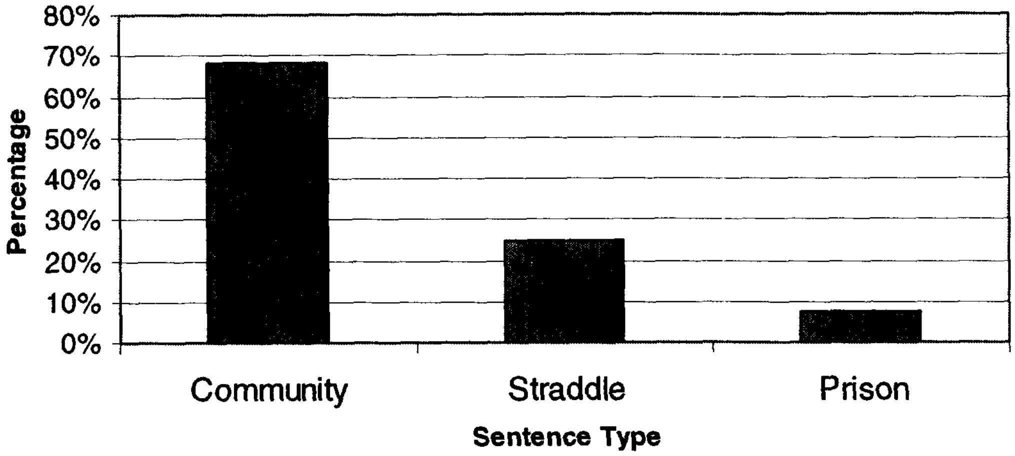


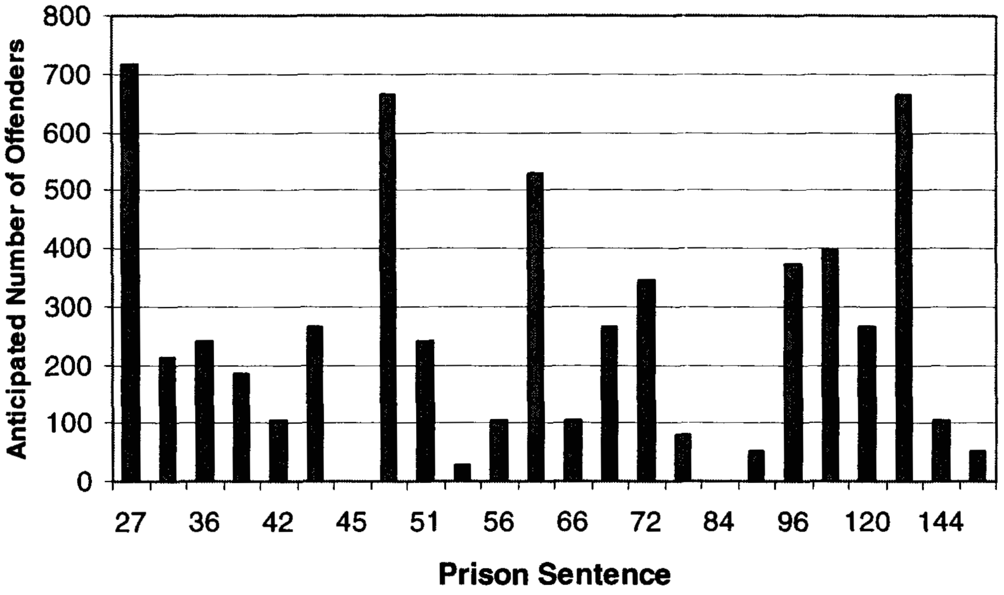
Figure 9-6: Distribution of Recommended Sentence Types



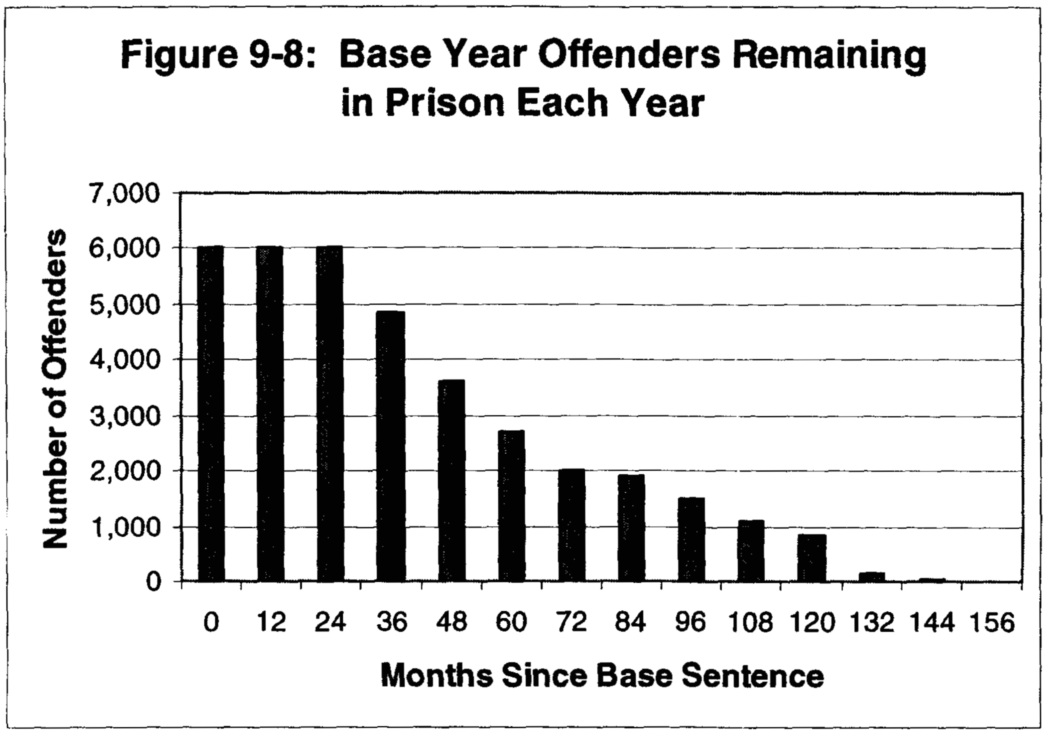
Two thirds of all offenders will receive a recommended sentence in the local community, 7% will receive a recommended prison sentence and about one-in-four offenders will fall into a straddle cell. Again, for offenders in a straddle cell, there is no presumption that they will be sentenced to prison or remain in the community. Judges form an individual assessment for each case. Such a system focuses judicial discretion on the subset of cases with the most problematic circumstances. Of course, it remains a policy decision regarding the number of offenders that fall into the straddle category and adjustments to the Sentence Type worksheet can be made. Indeterminate sentencing can be seen as the special case where virtually all offenders fall into the straddle category and vice versa for strict determinant sentencing.

For those offenders who receive a prison sentence, the next step is to determine the distribution of sentence lengths. Figure 9-7 presents the anticipated distribution of sentences for those offenders who receive prison sentences. The total number is approximately 15% of the total offender population (determined by combining the 7% recommended for prison and an assumption that about 35% of straddle cell offenders receive a prison sentence). Examining the sentence profile in this example shows there are no sentences below 27 months in the sample (suggesting that those deserving shorter sentences will be kept in the community) and that there are no sentences longer than 15 years. The only way to get longer sentences is for a judge to depart from the recommended sentence.

Figure 9-7: Distribution of Prison Sentences

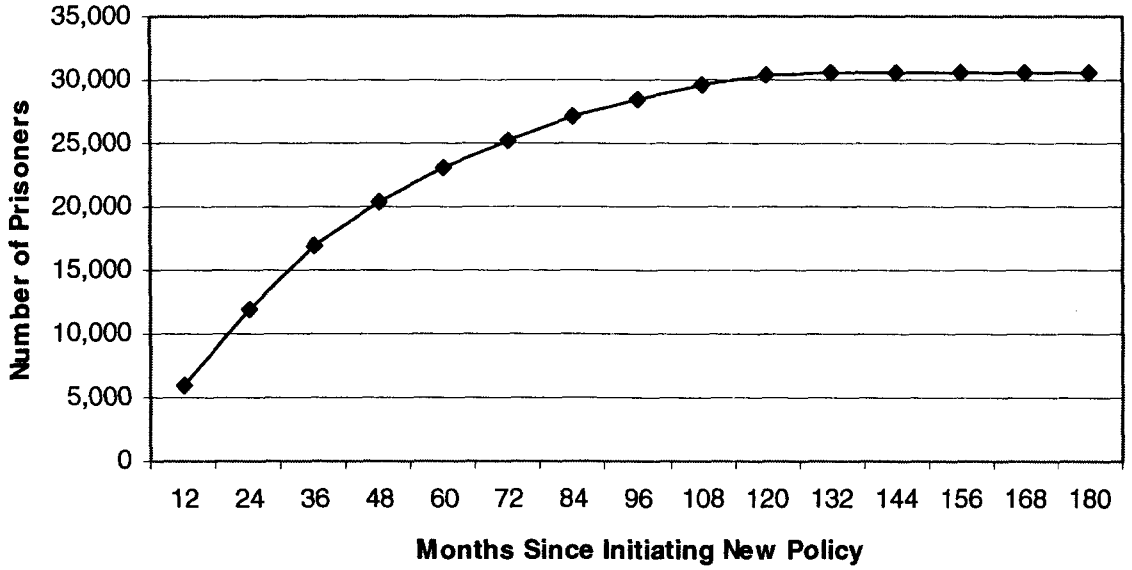


To estimate the number of people who will remain in prison for a given year, we combine the number of people forecasted to receive a prison sentence with their expected sentence length. In this example, approximately 6,000 offenders (out of 40,000) will be given a prison sentence with an average sentence of five years. Figure 9-8 displays an estimate of how this base year cohort changes over time as a larger and larger share complete their sentence and leave prison. It will take about five years for each base year's stock to be cut in half. In total, each year's sentencing will encumber 30,000 person years of prison time.



If the same policy is assumed to stay in place for fifteen years, the change in prison stock (the number of individuals in prison at the end of each year from the beginning of the policy) comes to resemble Figure 9-9. As can be seen, the number of offenders in prison rises for about 12 years and then begins to level off at approximately 30,000. Implementing the policy described herein provides the basis from which to forecast the demand for prison beds into the future. If these implications are not palatable, then it is possible to adjust previously discussed components to insure that sentencing policy is consistent with correctional resources.

Figure 9-9: Prison Stock 15-year Projection



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