

An Initial Review of Recommended Sentencing in Missouri

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Executive Summary:

Sentencing reports produced by the Missouri Sentencing Advisory Commission (MOSAC) include information on average recidivism rates by sentencing disposition, recommended sentences, risk assessments and costs of sentencing; in each instance, the information that is provided to judges can be improved.

Recidivism rates by sentencing disposition are at best uninformative, and likely mislead judges about the social costs of different sentencing alternatives. This is because reported recidivism rates are based on re-incarceration, so they understate the number of crimes committed by repeat offenders. Further, recidivism rates ignore the benefits of incapacitation associated with prison sentences. Finally, recidivism rates for alternative sentencing dispositions are generated by non-random assignment; therefore these rates are useless for estimating the treatment effect of alternative sentencing dispositions on recidivism.

Recommended sentences are informed by actual sentencing practice in Missouri, but not necessarily determined by average sentences. The exact manner in which these recommendations are made is not transparent. The Missouri Sentencing Advisory Commission has claimed repeatedly that recommended sentences reduce recidivism and have caused a reduction in prison population; however, these claims are unsupported by scientific evidence.

Risk assessments are generated in a simplistic and convoluted (albeit conventional) manner; risk assessments should be based directly on predicted recidivism rates. The risk assessment model needs to be improved and tested based on out-of-sample predictions.

The costs of sentencing are based strictly on fiscal impact, without regard to the relatively large social costs of crime and recidivism. This may bias judges in favor of probation over prison. Cost information may be improved by estimating victim costs for the original crime, as well as for future victims from recidivism under each sentencing disposition.

The state of Missouri has never conducted a scientific evaluation study of recommended sentencing; the state should conduct an independent evaluation of the effects of recommended sentencing on crime, recidivism, and prison population in order to improve sentencing recommendations. In the meantime, sentencing reports should include caveats or be revised as warranted by the findings of this report.

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At the request of the Missouri Association of State Prosecuting Attorneys, I have conducted an initial review of recommended sentencing in Missouri. In conducting this review, I have limited my attention to the use of statistical and cost data in Sentencing Assessment Reports and on-line Recommended Sentencing Reports. Further, due to limitations on time and budget, I have not conducted any formal evaluations of the effects of recommended sentencing on crime, recidivism, prison populations, or sentencing disparities. As such my report focuses on several conceptual problems with current practice and suggests several improvements.

The report proceeds in several sections: I first provide some background information on measuring recidivism and estimating the treatment effects of alternative sentences on recidivism; I then discuss several ways in which sentencing reports might be improved.

1 Background on Recidivism

Recidivism, or re-offending, is a common measure of the effectiveness of sentencing on the rehabilitation of offenders. However, the purpose of sentencing is not only to reduce recidivism. Sentences are set in accordance with multiple goals, including retribution for harms to victims, incapacitation of persons who pose future risks to society, deterrence of other potential criminals, and rehabilitation of offenders. Focusing on reducing recidivism rates alone therefore elevates one of these goals above others. Nevertheless, knowledge of whether some sentencing alternatives *cause* recidivism rates to be higher or lower is critical to rational sentencing policy.

Identifying the Treatment Effect of Alternative Sentences on Recidivism

The extent to which a sentencing outcome such as prison causes a change in recidivism compared to an alternative sentencing outcome, such as probation, is known as the “treatment effect.” In the ideal, “treatment effects” are measured through experiments. For example, if offenders are randomly assigned to probation or prison, then the differences in recidivism rates among offenders in each group may be interpreted as the causal effect of that sentencing mode.

Of course, in practice, true experiments are rare. However, policy evaluation studies often rely on “quasi-experiments”, or situations that approximate experiments. An example might be the implementation of sentencing guidelines, if such guidelines systematically cause a shift toward one type of sentence (e.g., probation). In effect, the probability of probation versus prison is the treatment, which in this example changes after the implementation of guidelines. Consequently, if recidivism falls for offenders assigned to probation relative to those assigned to prison in the period after the implementation of guidelines, then the magnitude and direction of the treatment effect of probation on recidivism can be estimated (in this example, probation reduces recidivism versus prison). There is more to high quality evaluation studies than this, but the existence of a quasi-experiment (or natural experiment) to identify treatment effects is necessary to identify the treatment effects of alternative sentencing choices.

Correlation is not Causation

Unfortunately, the difference between correlation and causation is not always appreciated when evaluating policy options. In general, simply comparing average recidivism rates across different types of sentencing alternatives will not identify the treatment effect of sentencing options. This is because offenders are not randomly assigned to alternative sentencing “treatments.” In fact, decades of research demonstrates that courts systematically assign high risk offenders to prison and lower risk offenders to probation. Consequently, the average recidivism rate of offenders that receive lesser punishments is expected to be lower than for those that receive greater punishments, albeit for reasons unrelated to the choice of sentence itself.

The non-random assignment of offenders to alternative sentences creates a bias in average recidivism rates. In general, this “sample selection bias” means that the observed difference in recidivism for probation versus prison greatly exaggerates the treatment effect of probation versus punishment. Further, because judges and courts base this sorting on more detailed observation than can ever be measured and quantified by a researcher, even attempts to control for differences in offender characteristics through regression analysis will not eliminate concerns about selection bias. Consequently, the correlation between average recidivism rates and alternative sentences --- even when adjusted for other factors that affect recidivism--- is uninformative about the true treatment effect of sentencing on recidivism. In fact, it is quite possible for the correlations between sentencing alternatives and recidivism to be the opposite of the true causal effects.

Recidivism Rates Understate the Social Costs of Re-Offending

Recidivism rates are typically calculated based on re-arrest rates, re-conviction rates, or re-incarceration rates. In general, recidivism rates are highest when based upon arrests and

lowest when based upon incarceration; however, to the extent the aim is to measure criminal offenses, it is well-understood that all of these measures of recidivism understate actual recidivism. This is because not all crimes are reported and not all criminals are arrested, convicted and incarcerated; further, recidivism is typically measured as either occurring or not, without regard to the number of crimes committed or their severity.

For example, Levitt (1996) estimates the change in the number and type of crimes committed in the wake of a prison-overcrowding suits; this is an example of a quasi-experiment, since the reduction in prison population that results from such legal actions is akin to lowering the probability that an offender is assigned to prison, as well as reducing the expected length of the prison sentence. Levitt finds that each offender not incapacitated in prison causes 15 additional crimes;¹ yet in practice, by most measures of recidivism employed, this would count only as a single incident of recidivism. The magnitude of this difference between measured recidivism and crimes committed by re-offenders is consistent with other studies.² Consequently, it should be kept in mind that measured recidivism rates likely understate expected criminal victimization.

2 MOSAC Recidivism Rates Are Not Informative about the Treatment Effect of Alternative Sentencing Options

Recommended Sentencing Reports (RSRs) available on-line from the MOSAC website list the average recidivism rate for similar offenders broken down by each of three sentencing outcomes: i) probation or community structured sentencing, ii) shock treatment or institutional drug treatment, and iii) or prison. Similar offenders are defined as those with the same criminal history level and offense charge (or offense group for charges with few observations). The rationale for including these recidivism rates in RSRs is to better inform judges about the costs and benefits of alternative sentences; however, as I demonstrate below, current practice provides no useful information about recidivism and may even mislead some judges to assign sentences that are too lenient.

¹ Levitt, Steven D, 1996. "The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation," *The Quarterly Journal of Economics*, 111(2): 319-351.

² For example, Petersilia, Joan, Susan Turner and Joyce Peterson, 1986. *Prison versus Probation in California: Implications for Crime and Offender Recidivism*. Rand Corporation: Santa Monica, CA.

Re-Offending Versus Re-Incarceration

First, the recidivism rates in RSRs are based on re-incarceration; therefore, these rates likely understate the average number of criminal offenses by recidivists. However, to the extent that one is only interested in whether a particular offender has been rehabilitated, it is reasonable to look at whether that individual has re-offended or not. But if one is interested in public safety or the social costs of alternative sentencing options, then it is more appropriate to consider the number of crimes caused by recidivists.

Selection Bias in Observed Recidivism Rates

Second, the average recidivism rates in RSRs are calculated from offender data pooled over the period FY1996 to the latest year available (i.e., FY2009 in 2010). But these averages are not predictions of how likely the offender in question is to re-offend if sentenced to probation, shock treatment or prison. This is because the courts do not randomly assign convicted criminals to these different sentences; offenders that are determined to be a greater risk to society are more likely to be sentenced to prison versus probation. For this reason, offenders that are released from prison should be expected to have higher rates of recidivism than those that receive probation or shock treatment. It is well-understood that this sample selection bias renders average recidivism rates completely uninformative about the treatment effect of prison versus probation on the probability that a particular offender will re-offend.³

Comparing “Apples and Oranges”

Third, the Missouri Sentencing Advisory Commission calculates recidivism rates starting from the release date from prison or the start date for non-prison sentences. For example, consider an individual who serves a 5 year prison term beginning in 2011; the two year recidivism rate is calculated based on re-incarcerations in 2016 and 2017. In contrast, for an individual sentenced to 5 years of probation with the same starting date, the two-year recidivism rates is calculated based on re-incarceration in 2011 and 2012. This violates the basic principle of comparing like to like.

Again, if one is only interested in the question of rehabilitation, then it might make sense to compare recidivism after the “treatment” of prison versus probation. However, if one is interested in public safety, then it becomes relevant to consider the expected number of crimes committed as the result of sentencing an offender to prison versus probation.

³ E.g., Green, Donald and Daniel Wink. 2010. “Using Random Judge Assignments to Estimate the Effects of Incarceration and Probation on Recidivism Among Drug Offenders,” *Criminology*, 48(2): 357-387.

An Illustrative Example:

To better understand why the average recidivism rates employed by the Missouri Sentencing Commission are potentially misleading, consider the following example:

Assume there are two criminal offenders, Able and Baker. Assume that there is a 1% probability that Able re-offends and is re-incarcerated in any given year. Further, assume there is a 20% probability that Baker commits a crime in a given year, and a 10% probability that Baker is incarcerated in a given year. Finally assume that judges assign offenders like Able to probation and assign offenders like Baker to prison, since Baker is a greater threat to public safety.

For the sake of this example, let the probation and prison terms for offenders like Able and Baker each be one year. Given this, the Missouri Sentencing Commission would collect data for several thousand cases, then calculate recidivism rates and report the following:

2-Year Recidivism Rates Based on Re-Incarceration (Example One)

Probation: 2%

Prison: 20%

Notice that in this example, recidivism is not caused by sentencing disposition; these differences arise entirely because judges sort low risk offenders to probation and high risk offenders to prison. In other words, should a particular judge look at these data and decide to sentence Baker to probation instead of prison, the two year recidivism rate for Baker would be 20%, not 2%. Further, the probability that Baker commits a criminal offense in the two-years after starting probation is actually 40%, since the measured recidivism rate based on re-incarceration understates the true re-offense rate. Consequently, these recidivism rates are extremely misleading regarding the probability that a particular offender will re-offend if sentenced to probation versus prison.

A Second Illustrative Example:

Now suppose that all offenders are like Baker in their probability of re-offending and re-incarceration, but that some individuals are sentenced to one year of prison and some to one year of probation for reasons unrelated to recidivism. In this case, the RSR would report the following:

2-Year Recidivism Rates Based on Re-Incarceration (Example Two)

Probation: 20%

Prison: 20%

Notice that this data makes it appear as though probation and prison have similar consequences for recidivism. Given this, a judge may decide to assign more offenders to probation, since this is presumably also a cheaper alternative than prison. But consider the probability that a *crime* is committed over a 3-year period starting at the time that either offender is sentenced:

Probability that A Crime is Committed in Each Year (Example Two)

	Year 1	Year 2	Year 3
Probation	20%	20%	20%
Prison	0%	20%	20%

In this example, it is clear that sentencing an offender to prison versus probation actually reduces the probability that a crime occurs (due to incapacitation). However, this fact is completely obscured by the manner in which recidivism rates are defined and presented in RSRs.

These examples provide a simple demonstration that average recidivism rates are uninformative; further, the presentation of such rates may even lead to erroneous sentencing decisions. But could anyone mistake these average rates for an estimate of the likelihood or risk of recidivism? The answer is yes, as even the Missouri Sentencing Advisory Commission makes this error in its own bulletin, *Smart Sentencing*:

To enhance the availability of objective information for use in sentencing decisions, the Missouri Sentencing Advisory Commission has added data about the risk of being reincarcerated and the costs of sentences to its [online application](#) designed to help users determine inquiry-specific sentence recommendations.

This information is available to help Missouri judges, attorneys and probation officers identify sentences that have the best chances for **reducing recidivism and are most cost-effective** (*emphasis added*).

The two new information features use data about Missouri offenders to help answer these questions:

- What is the **likelihood** – under different sentencing options – that an offender with a specific prior criminal history who commits a specific offense **will be** reincarcerated (*emphasis added*)?
- How much would each sentence option cost the state?⁴

The quoted passage clearly suggests that causal inferences can (and should) be made from the recidivism rates provided in sentencing reports. However, the simple examples above demonstrate why such inferences are likely to be misleading.

Improving Recidivism Information in Sentencing Reports

The discussion above underscores the critical need for a high quality evaluation study that identifies the treatment effect of alternative sentencing options in Missouri on recidivism. Because the Department of Correction has excellent data on offenders and recidivism over several years, such a study is quite feasible.

I recommend replicating and extending the methods in Green et al. (2010); they exploit different sentencing patterns of individual judges as a quasi-experiment to identify the true treatment effect of probation versus prison for drug offenders in Connecticut (they find no difference in recidivism for drug offenders).⁵ This study could be replicated in Missouri for essentially all offense charges or groups. Further, the implementation of recommended sentences in SARs is another potential experiment, making a study based on Missouri data all the more feasible. In fact, the differential use of SARs across courts and judges provides yet another potential experiment for identifying the true treatment effect of probation, shock treatment or prison on recidivism.

⁴ “Sentencing Information on www.mosac.mo.gov Now Includes Costs of Recommended Sentences and Risks of Reincarceration,” *Smart Sentencing*, 2(5): 1-3 (August 17, 2010; Missouri Sentencing Advisory Commission).

⁵ Green, Donald and Daniel Wink. 2010. “Using Random Judge Assignments to Estimate the Effects of Incarceration and Probation on Recidivism Among Drug Offenders,” *Criminology*, 48(2): 357-387.

3. Recommended Sentences in SARs

SAR reports include recommended sentences from the Missouri Sentencing Advisory Commission. These recommended sentences are informed by average sentencing practice in Missouri, but not solely determined by a mathematical formula based on actual sentencing patterns. The Sentencing Advisory Commission provides detailed information on the recommended sentence by offense charge, criminal history level, and aggravating or mitigating circumstances; however, there is very little systematic or detailed information in SAC reports on how exactly these recommended sentences are determined and how they differ from actual practice.

How are Recommended Sentences Determined?

Consider the table of recommended sentences below taken from the most recent biennial report of the Missouri Sentencing Advisory Commission:

Charge code 12020: Robbery 2nd Degree:

Circumstance	Level I	Level II	Level III	Level IV	Level V
Mitigating	Probation	CSS	Shk/Trt	7	9
Presumptive	CSS	Shk/Trt	7	9	11
Aggravating	5	7	9	11	12

Notes: CSS is Community Structured Supervision; Shk/Trt is 120 day shock incarceration or mandatory treatment program.

First, notice the symmetry in the recommended sentences across criminal history levels and circumstances; this symmetry is typical of all recommended sentences for a given offense charge. Of course, actual average sentences would not produce such a consistent symmetric pattern for all offense charges, so by construction, not all recommended sentences are equally informed by actual average sentencing practices.

As noted above, there is no explicit formula for determining each recommended sentence; however, my understanding from conversations with David Oldfield, Research Manager for the Missouri Department of Corrections, is that in general the middle value of this table is most closely related to actual average sentences. However, this average prison sentence is adjusted downward to reflect the fact that not all sentences are prison terms. The Sentencing Advisory Commission then adjusts the “middle” recommended sentence up or down to fill out the

remaining 14 cells to produce the pattern observed; this subjective exercise is also informed by average sentencing patterns, but necessarily less so than for the middle cell.

In addition, mitigating and aggravating sentences are based on the tails of the distribution of actual sentences. Mitigating sentences are based on the average sentence observed among those cases with sentence severity at least one standard deviation below the mean. Similarly, aggravating sentences are based on the average sentence among those sentences that are at least one standard deviation above the mean sentence. Finally, in general the recommendation of a non-prison sentence occurs when the most common sentence observed in actual Missouri data is not prison. Again, some subjective adjustments are made to produce the consistent pattern of sentences observed in the recommendations.

Improving the Transparency of Recommended Sentencing

The process by which each recommended sentence is determined is subjective and somewhat ad hoc, so it would be difficult for the Sentencing Advisory Commission to describe in detail how each recommended sentence was derived. However, it would be fairly easy to provide additional information by comparing the recommended sentences to the percent of prison sentences and average prison term (or even the range of prison sentences) in each cell. This would allow judges to compare the recommended sentence to actual practice and consider all of this information in their sentencing decisions.

This adjustment is trivial to implement as the requisite data is already collected and provided to the Sentencing Advisory Commission to inform their recommendations. Providing more data on actual sentencing practices in SARs would also permit judges to see when recommended sentences deviate from actual practice (and by how much).

Do Recommended Sentences Minimize Recidivism?

In its most recent biennial report, the Missouri Sentencing Advisory Commission notes that on average recidivism is higher when offender's sentences deviate upward from recommended sentences (p. 45). Specifically, when the recommended sentence is probation, but the actual sentence is prison, recidivism is 48%; in contrast when both the recommended and actual sentence is probation, recidivism is 28%. This might suggest that offenders that are sent to prison contrary to the sentencing recommendation receive a negative treatment effect from prison and re-offend at higher rates as a result. Indeed, Wolff (2008) has argued on the basis of

this observation that recidivism is minimized when judges follow recommended sentences.⁶ However, there are multiple problems with this logic.

First, the magnitude in this differential recidivism rate for prison versus probation is dramatically larger than what researchers typically estimate in quasi-experimental studies; the estimated treatment effects of prison versus probation\parole on recidivism are often statistically indistinguishable from zero, and typically much smaller in magnitude.⁷ Thus it strains credulity to attribute a 20 percentage point increase in recidivism to failure to abide by sentencing recommendations.

Second, this average difference in recidivism does not reflect a treatment effect of prison versus probation for reasons of sample selection discussed above. That is, because judges have more information about offenders, the decision to deviate upward from the recommended sentence may reflect the fact that the offender in question poses a greater risk to society if placed on probation. This is consistent with the observation that such offenders do re-offend at a higher than expected rate.

Third, the 2009 Biennial Report also indicates that recidivism is about 4 percentage points lower when judges deviate downward from a recommended prison sentence (p.45); this is likewise consistent with the notion that judges successfully sort offenders into sentences based on offender characteristics that are unobservable to researchers. However, this fact is inconsistent with Wolff's claim that recommended sentences minimize recidivism, since some deviations reduce average recidivism.

Fourth, minimizing criminal recidivism is not the same as lowering average recidivism measured by 3-year re-incarceration rates (as is done in the biennial report). This is because measured recidivism understates the number of crimes committed by re-offenders, thus it is possible for the average re-incarceration rate to fall at the same time that crimes committed by recidivists are rising.

Finally, the concern about comparing like-to-like applies here. The lower recidivism rate for probation is based on shorter time period than is the recidivism rate for prison, since time spent incapacitated in prison (when recidivism is presumably close to zero) does not count

⁶ Wolff, Michael A. 2008. "Evidence-Based Judicial Discretion: Promoting Public Safety through State Sentencing Reform," *New York University Law Review*, 83(5): 1389-1419.

⁷ Nagin, D., F. Cullen, and C. Jonson. 2009. "Imprisonment and Re-Offending." In *Crime and Justice: A Review of Research*, vol. 38, M. Tonry, ed. Chicago: University of Chicago Press, forthcoming.

under the current method by which recidivism is calculated by the Sentencing Advisory Commission.

Thus Wolff's assertion that recommended sentences minimize recidivism is not well supported.⁸ However, the desire for an evaluation of the effectiveness of recommended sentences is entirely appropriate.

Evaluating the Effects of Recommended Sentences

The state of Missouri has not conducted any scientific evaluation study of the effects of recommended sentences; this despite claims about the causal effects of recommended sentences on recidivism and prison populations.⁹ The claim that recommended sentences reduce recidivism is based in part on the logical fallacy noted above and in part on the claim that prison populations fell because of recommended sentencing.

It is true that prison population growth fell sharply in the immediate wake of the implementation of SARs in November 2005; however, this should be compared to trends in other states or nationally, as well as to the magnitude of short term variations before concluding that "smart sentencing" in Missouri *caused* a reduction in prison populations. Further, since not all judges request SARs, it would be necessary to show that there were very large changes in the sentencing behavior of judges using SARs versus those not using SARs in order to attribute the drop in prison population to the implementation of recommended sentences.

Even so, if we assume that the implementation of SARs did indeed lead to reduced reliance on prison sentences and lower prison populations, this is not the only outcome, nor even the most relevant outcome, for evaluating the effectiveness of recommended sentences. For example, it is well known from high quality quasi-experimental studies that more severe expected punishments deter some criminals;¹⁰ therefore, if recommended sentences lead to lower

⁸ I have cited the most recent data available from the 2009 Biennial report in countering the claims made by Wolff (2008); however, similar patterns are observed in the 2007 Biennial report (p. 46), as well.

⁹ "Report Shows Missouri's Use of Recommended Sentences Reduces Recidivism Rates, Prison Populations," Missouri Sentencing Advisory Commission press release from October 15, 2007.

¹⁰ E.g., Helland, Eric and Alexander Tabarrok. 2007. "Does Three Strikes Deter? A Nonparametric Estimation," *Journal of Human Resources*, 42(2): 309-330; also see, Lee, David S. and Justin McCrary. 2010. "The Deterrence Effect of Prison: Dynamic Theory and Evidence," Princeton University and NBER Working Papers.

expected punishments for crimes in Missouri, it is possible that the overall crime rate (and costs of crime control) increased as a result of implementing recommended sentences.

For example, at the same time that SARs were first implemented and growth in prison population fell sharply, UCR index crimes rose in 2006 in Missouri by 0.85% despite falling nationally by 1.4%. This alone does not demonstrate that the use of recommended sentences increases crime, but it is consistent with the findings of several quasi-experimental studies.¹¹

This discussion underscores the need for a scientific evaluation study of the effects of the implementation of recommended sentencing in Missouri on crime, sentencing, recidivism and prison population. Once again, the quality of data maintained by the Department of Corrections makes such a study quite feasible. Further, because the utilization rate of SARs varies by courts and judges, there is additional quasi-experimental variation available for such a study to identify the true treatment effects of recommended sentences on these outcomes. Further, the recent addition of data on costs of sentencing to SARs provides another “policy shock” that should be examined.

It merits repeating: to date the state of Missouri has not conducted or commissioned a valid scientific evaluation study of recommended sentencing. Therefore, any claims that smart sentencing in Missouri “works” or “doesn’t work” are baseless.

4. Risk Assessments in SARs

Sentencing Assessment Reports also contain a risk assessment that is intended to inform judges about a particular offender’s risk of recidivism. Offenders with “Good” risk assessment scores (roughly the top quintile of scores) are recommended for a mitigating circumstance sentence in the matrix of recommended sentences (see above). Likewise, offenders with “Poor” or “Below Average” risk assessment scores (also roughly the bottom quintile) are recommended for aggravating circumstance sentences in the matrix of recommended sentences.

How are Risk Assessments Determined?

The Missouri Sentencing Advisory Commission’s Biennial Report describes how risk assessments are developed in some detail, albeit without complete transparency. However, the method employed to develop risk assessments is fairly conventional, if not ideal. Risk assessments are loosely based on a regression where recidivism is the dependent variable and

¹¹ Levitt, Steven D. 2004. “Understanding Why Crime Fell in the 1990s: Four Factors that Explain the Decline and Six That Do Not,” *Journal of Economic Perspectives*, 18(1) 163-190.

various observable characteristics of the offender are the independent variables.¹² This sort of ad hoc data-mining generates a simple prediction based on the estimated regression coefficients. However, rather than use the actual estimated coefficients to generate predicted recidivism rates for offenders, the model is then translated into an ad hoc scoring system that roughly captures the information in the regression model. This exercise is fairly standard in criminal risk assessment, even though it would be more straightforward and sensible to base risk assessments directly on the estimated recidivism rate.

Improving Risk Assessments

The most recent biennial report seeks to “validate” the risk assessment measure by comparing its predictive power to that of a simple index of criminal history. However, this exercise is somewhat pointless, since the risk assessment model is being tested using the same data to which the model was fitted to begin with; by construction then, the model should predict the past very well. A better test of the risk assessment model would examine its predictive ability out of sample.

A frequent method employed to test such ad hoc prediction models is to split the original data, then use half of the data to develop the model and the other half of the data to test the out-of-sample predictive ability of the model. Alternatively, multiple pseudo-datasets can be constructed by drawing observation at random from the actual data; the out-of-sample predictive ability of the model is then tested using these simulated datasets.

More importantly, the risk assessment model is unnecessarily sparse. There is no shortage of either observations or computing power which would warrant ignoring or omitting variables such as race, ethnicity, sex, year, or offense charge from the risk assessment model. Further, there is no reason not to include interactions of these terms, or to use a non-linear estimation technique (e.g., logit or probit). A priori, it is unclear whether such a data mining exercise will improve the risk assessment model, but it is a low cost exercise to explore this possibility.

¹² It is unclear from the description in the Biennial Report, but the risk assessment model would also appear to suffer from a failure of comparing like-to-like, since recidivism rates are calculated from the start of probation and from the end of imprisonment.

5. Measuring the Costs of Alternative Sentencing Options

In 2010, SARs also started including information on the expected costs of alternative sentences; this change has been somewhat controversial.¹³ The sentencing costs are limited to the average fiscal impact of sentencing a prisoner to probation, prison, etc. Therefore, the social costs of criminal recidivism are not included, nor are the costs of various sentences to offenders. Such costs are not trivial; criminal victimization costs alone have been estimated to be as large as \$680 billion a year in the U.S (in current dollars).¹⁴ Even at the level of an individual crime, victim costs alone are substantial; for an assault, estimates of victim costs range from \$8,000 to over \$70,000.¹⁵ However, these figures do not include any valuation for the external harm to society when crimes occur, so even these estimates are fairly conservative.

How are the Sentencing Costs in SARs Calculated?

Once again, there is very little transparency regarding the exact manner in which the costs of alternative sentences are calculated. However, my understanding based on conversations with Joe Eddy, the budget director in the Missouri Department of Corrections, is that the estimated costs of sentencing an offender to prison or probation are based solely on the immediate state budget impact of those alternatives.

The DOC estimates that the average per diem cost of a prisoner is about \$45 per day; while the average costs of probation (general community supervision) is about \$3.71 per day.¹⁶ The per diem costs for prison include medical care, which confers a benefit to prisoners that is not received by offenders on probation. Any cost-benefit analysis should therefore also net out the benefits of this medical care for prisoners. The costs of prison also include the direct budgetary costs of building and maintenance; however, one could argue that some portion of these costs should also be applied to non-prisoners, since probation assumes the threat of imprisonment for violating probation. These changes would lower the per diem costs of prison, but by any calculation prison is costly compared to probation.

¹³ Davey, Monica. 2010. "Missouri Tells Judges the Cost of Sentences," New York Times (September 16, 2010).

¹⁴ Cohen, Mark A. 2005. *The Costs of Crime and Justice*. Routledge: New York, NY.

¹⁵ Cohen Mark A. 2010. "Valuing Crime Control Benefits Using Stated Preference Approaches," in *Cost-Benefit Analysis and Crime Control*, Ed. by John K. Roman, Terence Dunworth and Kevin Marsh. The Urban Institute Press: Washington, DC.

¹⁶ Annual Report of the Missouri Department of Corrections, 2009.

Improving Cost Information in SARs

By providing information about some but not all costs, there is a danger that judges will discount the importance of the social costs of crime. This might lead judges to choose more lenient sentences out of concern for the fiscal impact of prison versus probation, when a more complete cost-benefit analysis might have indicated otherwise. One way to address this is to include estimates of victim costs as well as the estimated victim costs associated with recidivism and general criminal deterrence under alternative treatments. However, estimating the victim costs associated with recidivism presupposes good information on the treatment effect of alternative sentences on recidivism and crime, as well as some adjustment to account for the fact that measured recidivism rates under count crimes.

6. Conclusion

Evidence-based sentencing requires that decision-makers possess meaningful evidence. My review of recommended sentences in Missouri has revealed several areas where the evidence provided in sentencing reports can be improved, but the most important by far is the manner in which data on recidivism is collected, and presented. Current practice is not only uninformative, but likely to be misleading regarding the treatment effect of alternative sentences on recidivism. I also recommend that more effort be directed at developing and testing the risk assessment model and accounting in some manner for the victim costs associated with changes in recidivism and deterrence under alternative sentences.

My review also reveals that the Missouri Sentencing Advisory Commission erroneously claims that recommended sentencing has been demonstrated to reduce prison populations and recidivism. The evidence cited by the Sentencing Advisory Commission does not establish this claim. However, this does not mean that the claim is untrue; only that there is no scientific evidence to either support or refute the claim. I strongly recommend that the state conduct an independent scientific evaluation of recommended sentencing as soon as possible.

In the meantime, sentencing reports should be edited to include several caveats, or to omit misleading information; if the Missouri Sentencing Advisory Commission can make dramatic errors in interpreting this data, then so can individual judges or policy makers. Finally, the Biennial Reports of the Sentencing Advisory Commission should be revised with the aim of improving the transparency of all statistical analyses and costs calculations.