JUVENILE CRIME AND PUNISHMENT

Steven D. Levitt

Working Paper **6191**

NBER WORKING PAPER SERIES

JUVENILE CRIME AND PUNISHMENT

Steven D. Levitt

Working Paper 6191
http://www.nber.org/papers/w6191

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 1997

I would like to thank Edward Glaeser, Austan Goolsbee, Lawrence Katz, Daniel Nagin, Peter Siegelman, and seminar participants at the NBER Labor Studies program and Yale for comments and suggestions, and the Office of Juvenile Justice and Delinquency Prevention for providing access to unpublished data. Ellen Shustorovich and Justin Wood provided outstanding research assistance. Research support of the National Science Foundation through a grant to the National Bureau of Economic Research is gratefully acknowledged. This paper is part of NBER's research programs in Law and Economics and Public Economics. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

Juvenile Crime and Punishment
Steven D. Levitt
NBER Working Paper No. 6191
September 1997
JEL No. K42
Law and Economics and Public Economics

ABSTRACT

Over the last two decades the punitiveness of the juvenile justice system has declined substantially relative to the adult courts. During that same time period juvenile violent crime rates have grown almost twice as quickly as adult crime rates. This paper examines the degree to which those two empirical observations are related, finding that changes in relative punishments can account for 60 percent of the differential growth rates in juvenile and adult violent crime between 1978 and 1993. Juvenile offenders appear to be at least as responsive to criminal sanctions as adults. Moreover, sharp changes in criminal involvement with the transition from the juvenile to the adult court suggest that deterrence, rather than simply incapacitation, plays an important role. There does not, however, appear to be a strong relationship between the punitiveness of the juvenile justice system that a cohort faces and the extent of criminal involvement for that cohort later in life.

Steven D. Levitt
Harvard Society of Fellows
78 Mount Auburn Street
Cambridge, MA 02138
and NBER
slevitt@fas.harvard.edu

The divergence of juvenile and adult crime trends in the last decade represents a potentially alarming development in the fight against crime. The most striking example is murder. The rate at which juveniles were arrested for murder rose 177 percent between 1978 and 1993. In contrast, the murder arrest rate for adults *fell* 7 percent over the same period. The same pattern is apparent, but less extreme for violent crime (juvenile arrest rates rose 79 percent, arrests for adults rose 31 percent). For property crime, both juvenile and adult arrests rates have been relatively steady.

These increases in juvenile violent crime, combined with the apparent callousness with which crimes are carried out, have led to the popularization of the "super-predator," as exemplified in the following passage:

> *America is now home to thickening ranks of juvenile "super-predators" -- radically impulsive, brutally remorseless youngsters, including even more preteenage boys, who murder, assault, rape, rob, burglarize, deal deadly drugs, join gun-toting gangs, and create serious communal disorders. They do not fear the stigma of arrest, the pains of imprisonment, or the pangs of conscience. They perceive hardly any relationship between doing right (or wrong) now and being rewarded (punished) for it later. To these mean-street youngsters, the words "right" and "wrong" have no fixed moral meaning.*
>
> --Bennett, DiIulio, and Walters, 1996, p.27

The "super-predator" arguments made above stress the absence of morality and socialization among the current generation of adolescents as an explanation for the increased prevalence of violent crime. There are, however, other potential explanations for the observed patterns in the data. For instance, the divergence of juvenile and adult crime rates may not be the result of teenagers who differ categorically from earlier generations, but rather, a rational response to a change in the relative incentives for juveniles and adults to engage in criminal

activities. With the tripling of adult prison populations over the last two decades, the punitiveness of the adult criminal justice system increased substantially. Between 1978 and 1993, the ratio of adult state and federal prisoners per violent crime committed by adults in that year (a rough proxy for the punitiveness of the criminal justice system) grew from .34 to .55, an increase of over 60 percent. The corresponding ratio for juveniles fell from .36 to .29, a decline of 20 percent. Juvenile punishments, at least by this crude measure, were comparable to adult punishments in 1978, but were only about half as severe by 1993.[1]

This paper explores four related issues that are critical to the development of public policy towards juvenile crime. First, to what extent does juvenile crime appear to respond to changes in the punitiveness of the juvenile justice system? Second, can the divergence in juvenile and adult crime in recent years be explained by changes in the relative punishments for those two groups, or are alternative explanations such as super-predators required? Third, is the response of juvenile crime due simply to incapacitation, or does it reflect deterrence? Finally, is criminal involvement later in life affected by the degree of punishment for juvenile offenses?

In contrast to the well-developed literature on deterrence and incapacitation effects of the adult criminal justice system,[2] there is remarkably little previous academic research on the

---

[1] This simple comparison overstates the leniency of the juvenile courts since juvenile crimes are disproportionately concentrated among the less serious property crimes. On the other hand, the conditions of confinement are far worse for adults, implying that a sentence of a given length is more punitive in an adult prison than in a juvenile facility.

Why it is the case that the adult prison system grew so much more rapidly than the juvenile system is an interesting political-economy puzzle that to the best of my knowledge is not well understood.

[2] See, for instance, Becker 1968, Benson, Kim, and Rasmussen 1997, Blumstein, Nagin, and Cohen 1978, Cameron 1988, DiIulio and Piehl 1991 , Donohue and Siegelman 1995, Ehrlich 1973, Ehrlich 1981, Grogger 1991, Levitt (1996, 1997a), Marvell and Moody (1994, 1996),

response of juvenile crime to sanctions. While there are studies of the relative punitiveness of juvenile and adult criminal sanctions in a particular location at a given point in time (Boland and Wilson 1978, Greenwood 1986, *Los Angeles Times* 1993), no attempt is made in these analyses to estimate whether differences in punishment affect relative crime rates. Some indirect evidence on the subject is provided by Schneider and Ervin (1990), who interview 876 juvenile offenders upon release from custody. While stated intentions about engaging in future crime were negatively related to the perceived certainty and severity of punishment, follow-up analysis of actual criminal involvement carried the opposite sign. An obvious drawback of this type of analysis, however, is the inability to control for individual heterogeneity. Perhaps the most revealing study to date is Glassner et al. (1983) which reports the findings of a series of interviews with adolescents in New York who self-report a dramatic reduction in criminal involvement at the age of majority, i.e. the age at which they become subject to the punishments of the adult court. As one youth who recently turned sixteen (the age of majority in New York) says, "When you are a boy, you can be put into a detention home. But you can go to jail now. Jail ain't no place to go." Another adolescent, interviewed in a juvenile detention facility, saw his one-to-four year sentence as "easy. I'll just do my year and get out, it ain't nothing." But he advised his friend who continued his criminal activity to stop "because he's 16 now; he'll go to jail." To the best of my knowledge, however, there are no previous systematic empirical analyses of the response of juvenile crime to sanctions.

A number of key results emerge from the analysis of this paper. First, using state-level panel data for the period 1978-1993, harsher punishments for juveniles are strongly associated

---

Myers 1983, Spelman 1994, Stigler 1970, Tauchen, Witte, and Griesinger 1996, Witte 1980.

with lower rates of juvenile offending. The relationship between juvenile punishment and crime appears to be at least as strong as the corresponding relationship for adults. There does not, however, seem to be a strong relationship between the punitiveness of the juvenile justice system that a cohort faces and the extent of criminal involvement for that cohort later in life.

Evidence that a substantial fraction of the crime reduction results from deterrence comes from analysis of changes in crime rates around the age of majority. States where juvenile punishments are lenient relative to adult punishments see much greater declines (or smaller increases) in crime as a cohort passes to the adult court. For example, in states where the juvenile courts are most lenient vis-a-vis the adult courts, violent crimes committed by a cohort fall by 3.8 percent on average when the age of majority is reached. In contrast, violent crimes *rise* 23.1 percent with passage to the adult criminal justice system in those states where the juvenile courts are relatively harsh compared to the adult court. Similar but less extreme patterns are observed for property crimes. The immediacy with which criminal behavior responds to this transition suggests that deterrence is the operative force.

The remainder of the paper is organized as follows. Section II provides a brief history of the juvenile justice system, highlights important differences between juvenile and adult corrections, and discusses the available data sources and their important limitations. The third section presents results from state-level panel data regressions of the relationship between criminal justice punitiveness and crime rates for both juveniles and adults over the period 1978-1993. Section IV looks at changes in crime in the years immediately surrounding the transition from the juvenile to adult court. The fifth section examines the question of whether early institutionalization of juveniles has a longer-term deterrent or criminogenic effect on a cohort's

behavior later in life. Section VI considers the public policy implications of the paper's results.

Section II: Background on the Juvenile Justice System

The juvenile justice system began to emerge as an entity separate from the adult criminal justice system as early as 1825 in the United States with the opening of the New York house of Refuge.[3] The purposes of early juvenile facilities were to protect juveniles from the harsh conditions of adult jails, to isolate them from the corrupting influence of hardened criminals, and to save at-risk youths by providing needed guidance and discipline. Related to that mission, juvenile institutions accepted not only delinquents (juveniles accused of adult crimes), but also status offenders (those accused of crimes that apply only to juveniles such as truancy or running away from home), and dependent and neglected children. Juvenile courts today maintain jurisdiction over all three types of cases. Although the earliest juvenile homes were privately run, by the late 1800s, publicly run reform schools came to predominate. It was not until 1899, however, that Illinois established the first children's court with jurisdiction over juveniles. By 1925, all but two states had instituted children's courts.

Today, all states continue to have separate juvenile courts.[4] There are a number of distinctive features of juvenile courts. First, proceedings are generally closed to the public and juvenile criminal histories are at least partially, and often fully, sealed from adult courts. This

---

[3] The discussion of this section historical account presented here draws heavily on Krisberg and Austin (1993) and Greenwood (1995).

[4] In less than one percent of cases, typically for serious offenses such as homicide or for juveniles very close to the age of majority, the juvenile court judge waives jurisdiction over the case, transferring authority to the adult court.

practice is built upon the idea that there is no legal guilt in juvenile courts, but rather, only a finding of delinquency. Second, those sentenced by juvenile courts are sent to correctional facilities separate from adult offenders. Finally, in juvenile court there is no right to trial by jury or bail, and the right to counsel is often waived. The lack of procedural protections for juveniles arose out of the informal nature of the original children's courts, the focus of which was the "best interests" of the child rather than the determination of guilt or innocence. While there has been some movement towards strengthening the degree of due process afforded juveniles in recent years, for the most part the Supreme Court has upheld the traditional procedures of the juvenile court (Krisberg and Austin 1993).

There is a wide range of placement options for juveniles if it is determined by the court that a juvenile should be put under custody of the state. These include, in declining order of severity, training schools, ranches and camps, halfway houses, and shelters. In addition, a small number of juveniles are placed in adult jails or prisons. Training schools typically place residents under strict supervision with substantial restraints on movements and limited access to the broader community. Such facilities most closely approximate adult prisons and jails, and consequently, are much more likely to hold delinquents than status offenders or dependent children. Training schools are generally publicly operated: in 1989, 79 percent of juveniles held in training schools were in public facilities (OJJDP 1992, p.8). The other types of facilities tend to impose fewer restrictions on occupants, typically do not use locks or fences to restrain the movements of residents, and are more likely than not to be privately run. In 1989, 77 percent of the juvenile residents of ranches, halfway houses, and shelters were in privately operated facilities (OJJDP 1992, p.8).

Data Sources

The primary source of data on juvenile corrections comes from censuses of public and private juvenile facilities performed roughly every two years between 1977 and 1993.[5] For the purposes of comparison to the adult criminal justice system, delinquents (as opposed to status offenders or neglected children) are of foremost interest. Delinquents are separately identified in all years except 1983 and 1985. In those two years, however, state-level data on the number of juveniles in public versus private facilities are available. In 1991, for the nation as a whole, 95 percent of juveniles held in public facilities were delinquents (OJJDP 1995). By comparison, only 11 percent of non-delinquents in custody were held in public facilities in 1991. Interpolating the fraction of juveniles that are delinquent in public and private facilities by state from the 1979 and 1987 juvenile censuses, it is possible to approximate the number of delinquents in 1983 and 1985.[6]

Corresponding data on adult imprisonment rates are available on an annual basis from the Bureau of Justice Statistics. Jail populations (for adults not yet convicted or sentenced to terms of less than one year) are not available annually at the state level. For that reason, jail

---

[5] These data are published by the Office for Juvenile Justice and Delinquency Prevention (OJJDP), with the exception of the 1993 data, which are not yet published but were provided by OJJDP. A 1995 census has also been conducted, but no data has yet been made available.

[6] Given that there was little change between 1979 and 1987 in these fractions, the estimates are likely to be relatively accurate. One indication of the accuracy of the procedure is that the estimated number of delinquents for all states together is within one percent of the actual national totals (which, unlike state-level breakdowns, are reported) in both 1983 and 1985.

populations are omitted from the analysis, as is standard in the literature.[7] Data is also unavailable for delinquent juveniles held in adult jails and prisons, although they represent a small fraction of delinquents in custody: the number of people under age 18 in jails is about 3 percent of the total number of delinquents in juvenile facilities. That number, however, overstates the true number of legal juveniles in jails since in some states individuals as young as sixteen are under the jurisdiction of the adult court

An important data limitation when evaluating juvenile and adult crime rates is that there is no direct measure of the number of crimes committed by age group. Only when a crime is cleared by an arrest is it possible to attach an age to the criminal. For the purposes of this paper, the number of crimes committed by juveniles (adults) in a state and year is calculated as the fraction of juvenile (adult) arrests for that crime in the particular state and year multiplied by the number of reported crimes:[8]

$$CRIME_{cst} = \frac{ARRESTS_{cst}}{ARRESTS_{st}} * CRIME_{st} \qquad \textbf{(1)}$$

where c indexes cohorts, s corresponds to states, and t represents time. Where the cohort index is

---

[7]Jail inmates represent about one-third of the adult incarcerated population. That share has been fairly constant over time.

[8] This measure of age-specific crime is preferable to simply using the juvenile and adult arrest rates, both because it is theoretically closer to the concept of interest (the number of juvenile or adult crimes), and because there is clear evidence of systematic under reporting of age-specific arrest rates in some states in particular years. In some instances, large fluctuations in both juvenile and adult arrest rates are observed, although the ratio of those two variables is stable. These fluctuations do not appear to correspond to any real change in the intensity of enforcement in these states, but rather to missing data for some municipalities within the state.

omitted, the variable reflects arrests or crime among all age groups in that state and year. Potential shortcomings of this measure include the possibility that juveniles and adults are arrested at differential rates for a given crime, or that within broad crime classifications, juvenile tend to commit less severe offenses (Greenwood 1995).[9]

Section III: Panel-Data Results

This section presents state-level panel-data estimates of the response of juvenile crime to criminal justice sanctions, controlling for other factors. For purposes of comparison, parallel specifications are estimated for adult crime. The impact of a range of alternative specifications and assumptions on the estimates are also examined. The formal theory underlying the empirical specifications follows directly from Becker (1968) and thus is omitted.

The basic empirical specification is as follows:

$$\ln(JuvCrime_{st}) = \beta JuvCustody_{st-1} + X_{st}'\Gamma + \lambda_t + \theta_s + \epsilon_{st} \qquad (2)$$

where s indexes states and t corresponds to time. *JuvCrime* is the estimated number of juvenile crimes per juvenile aged 15 to 17.[10] Separate regressions are estimated for violent and property

---

[9] For instance, in 1994 juveniles represented 16.8 percent of all homicide arrests, 16.3 percent of all rape arrests, 32.0 percent of all robbery arrests, and 15.6 percent of all aggravated assault arrests. The pattern is less clear for property crimes, where juveniles were 36.2 percent of burglary arrests, 44.1 percent of auto theft arrests, and 33.3 percent of larceny (the least serious offense) arrests.

[10] Denominating the crime rates by an at-risk population is a matter of convenience for interpreting the resulting coefficients. Choosing a different reference group in the denominator does not materially affect the results. In theory, as discussed later, choosing the wrong denominator may lead to underestimates of the impact of custody rates in some specifications.

crime. *JuvCustody* is a (once-lagged) measure of the punitiveness of the juvenile criminal justice system. The two alternative choices for constructing this custody measure are described in the following paragraph. X is a vector of institutional, demographic, and economic control variables including the percent black, the percent residing in metropolitan areas, the state unemployment rate, the legal drinking age, and the fraction of the state population in the following age groups: under age 15, 15-17, 18-24, 25-44, 45-64, and 65 and over.[11] λ represents year dummies, and θ denotes state-fixed effects. In some specifications, state-level trend variables are also included. With the exception of the percent black and the percent residing in metropolitan areas, which are linearly interpolated between decennial censuses, all data is available annually.

As noted above, two different measures of custody rates are used in the analysis. The first, corresponding to a traditional deterrence view of punitiveness, is calculated as the number of juveniles in custody per reported juvenile violent crime in the year.[12] To minimize simultaneity and ratio-bias concerns, this variable enters the regression once-lagged. Ratio bias arises because the denominator of the custody variable appears in the numerator of the left-hand-side variable, the juvenile crime rate. If there is measurement error in *JuvCrime*, then ratio bias induces a negative bias on the *JuvCustody* coefficient. That negative bias will exaggerate the estimated impact of custody rates on crime.[13]

---

[11]No states changed the age of majority during the sample period. Thus, any impact of the age of majority is indistinguishable from the state-fixed effects.

[12] Violent crime is used as a denominator rather than all index crimes because the likelihood of being incarcerated for property crimes is very low. As discussed later in this section, including property crimes in the denominator yields even stronger results.

[13] The results that follow reveal little evidence of ratio bias when the *once-lagged* custody measures are utilized. It is worth noting that when *contemporaneous* custody measures

An alternative measure of custody rates is the number of individuals in custody as a fraction of the at-risk population rather than as a fraction of the crime rate, where at-risk is defined as those aged 15-17. This measure corresponds more closely to the theoretical notion of incapacitation and mirrors the specification employed in previous studies of adult incarceration (Marvell and Moody 1994, Levitt 1996). In contrast to the first measure of custody rates, this variable is likely to systematically *understate* the true relationship between custody and crime for two reasons. First, to the extent that the at-risk population (which appears in the denominator of both the left-hand-side variable and the custody rate) is misdefined, a spurious positive correlation between the two variables is induced. Second, if there are omitted variables in the specification that are positively (or negatively) correlated with both custody and crime rates , e.g. the level of gang involvement, unmeasured economic factors, unmeasured peer/social interaction effects (Glaeser, Sacerdote, and Scheinkman 1996), or the degree of parental/community punishment of juvenile crime (Sampson 1995), then the custody coefficient will understate the true relationship to crime.[14] Levitt (1996), examining the impact of adult prison populations on crime rates, obtains coefficients two to three times greater in magnitude when using instrumental variable techniques to eliminate the bias induced by such omitted variables.

Equation 2 is estimated using state-level panel data at roughly two-year intervals over the

---

are used, there are clear signs of ratio bias, i.e. the coefficients from specifications where ratio bias might theoretically be present are much more negative than in specifications (described in the following paragraph of the text) that cannot be affected by ratio bias.

[14] Similarly, if the primary constraint on the number of juveniles in custody is the supply of juvenile facilities, and that supply is fixed in the short run, then rising juvenile crime rates will necessitate lesser punishments, leading the regression coefficients to understate the true relationship between custody rates and crime. This effect has been called the "resource saturation" model (Nagin 1996).

period 1978 to 1993. Summary statistics for the data are presented in Table 1. Two different standard deviations are presented for each variable, corresponding to the overall sample variation and only the variation within a state over time. Although removing fixed effects decreases the variation in the crime and criminal justice variables, substantial variability remains. In contrast, almost all of the variation in the demographic variables such as the age distribution and the percent black disappears. Because state fixed-effects (and sometimes state-specific trends) are included in the regressions, the demographic variables are unlikely to provide substantial explanatory power in the regressions. Furthermore, because identification of the coefficients on the demographic variables comes from such small fluctuations, great caution is warranted in interpreting the parameter estimates on these variables.

Results from the estimation of equation 2 are presented in Table 2. Separate estimates are provided for violent and property crime, for each of the two custody proxies, and both with and without state-specific trends. The coefficients on the delinquency custody rates are presented in the top two rows. In all eight columns, the delinquents-in-custody variable is negatively related to juvenile crime rates. In six of eight instances, this relationship is statistically significant at the .05 level. To aid in interpretation of the magnitude of these coefficients, the bottom row of the table presents the annual crime reduction, evaluated at the sample means, associated with increasing the number of delinquents in custody by one. The four specifications for violent crime yield an estimated reduction of between -.37 and -.66 violent crimes for each delinquent-year of custody. For property crime, the estimates range roughly from two to four. Taking into account that these changes correspond only to the number of *reported* crimes rather than actual victimizations, the magnitude of the estimates are consistent with previous estimates of crimes

eliminated per incarcerated adult both from prisoner surveys (Visher 1986, DiIulio and Piehl 1991) and from aggregate panel-data studies (Marvell and Moody 1994, Levitt 1996).

Comparing the implied impacts of the alternative delinquent custody variables in the bottom row of the table, it does not appear that ratio bias in the second custody measure (delinquents per violent crime) is playing an important role empirically. The estimated impact per delinquent in custody for the second measure is similar to or smaller than those for the first custody measure, which is not affected by ratio-bias.[15]

An increased fraction of the population that is black is associated with lower juvenile crime rates across most specifications, as are lower legal drinking ages. Great caution is warranted in interpreting these parameters due to the limited available variation for identifying these parameters once fixed-effects and state-specific trends have been removed. This is especially true for the variable percent black, which is linearly interpolated between decennial census years. A one-percentage point increase in the unemployment rate is associated with roughly a one to two percent increase in the number of juvenile property crimes committed, but does not appear to systematically affect violent crime.

In order to better interpret the strength and magnitude of the estimates in Table 2, parallel estimates using adult crime rates as the dependent variable are presented in Table 3.[16] The

---

[15] Further evidence against ratio-bias comes from estimation of a model using long differences rather than city-fixed effects. Following Griliches and Hausman (1986), Levitt (1997) demonstrates that ratio-bias is lessened in the former specification. Long-differenced specifications (i.e. regressions where variables are the difference between the 1993 and 1978 observations) yield *larger* coefficients on the juvenile custody measure that is affected by ratio bias, but similar estimates on the other juvenile custody variable.

[16] *AdultCrime* is calculated in the same manner as *JuvCrime*, except using adult arrests and defining the at-risk population as those aged 18 to 44.

corresponding adult custody variables replace the juvenile custody measures. As was the case with juveniles, the custody variables are negatively related to adult crime rates in all specifications. The coefficients are statistically significant at the .05 level in all but one instance. The magnitudes of the impact of adding an additional prisoner, presented in the bottom row of the table, are remarkably similar to the results for juveniles in Table 2. Each additional adult prisoner in custody is associated with a .12 - .71 reduction in violent crime annually (versus .37 - .66 for juveniles. The adult property crime coefficient ranges from -1.26 to -3.62, compared to -1.97 to -2.96 for juveniles. The unemployment rate has a slightly greater impact on adult property crime compared to juveniles, but once again is not a statistically significant predictor of violent crime.

Extensions

In the second custody rate (i.e. the one defined on a per crime basis), it is unclear whether the denominator should be violent crime, the sum of violent and property crime, or some weighted average of the two. While it is true that a much higher fraction of convicted violent offenders are incarcerated, there are, in fact, more delinquents in custody for property crimes than for violent crimes. In light of this ambiguity, it is interesting to note that defining the custody rate in terms of the sum of violent and property crime actually strengthens the results substantially for juveniles. Re-estimating columns 3 and 7 of Table 2 yields an estimated crime reduction per delinquent in custody of 0.75 violent crimes and 11.79 property crimes (compared to .57 and 2.68 in Table 2). For adults, the alternative custody variable yields per prisoner reductions of .37 violent crimes and 3.84 property crimes (compared to .69 and 2.48 in Table 3).

This alternative definition of the custody rate suggests that incarcerating an additional juvenile provides a greater decline in crime than adding one more adult, in contrast to the apparent equality of effects in Tables 2 and 3.

Empirically movements in juvenile and adult crime rates are positively correlated, suggesting the presence of omitted third factors affecting both juveniles and adult crime and punishment. One means of addressing this issue is to include the other age group's crime rate as a covariate in the regressions. If the severity of adult punishments affect the attractiveness of juvenile crime, either because of decreased competition from adult criminals or by changing the future expected returns from criminal involvement, including the other age group's punishment severity as a regressor is also warranted. To test these two hypotheses, the adult crime rate and custody measures were added to the specifications of Table 2. The inclusion of the adult custody measures and the logged adult crime rate has little effect on the estimated impact per additional juvenile in custody, which now range from .38 to .50 for violent crime and 2.15 to 4.29 for property crime. Adult crime rates are good predictors of juvenile crime rates. The adult custody rate does not have a consistent impact on juvenile crime rates, carrying a negative coefficient for violent crime and a positive coefficient on property crime. Likewise, adding juvenile crime and custody rates to the specifications in Table 3 has little impact on the adult-custody variables.

The basic analysis focuses exclusively on the delinquent juvenile population, excluding status offenders, dependent and neglected children, and the emotionally disturbed. While these latter categories of juveniles have not been convicted of a violent or property offense, they may be at high-risk for doing so, suggesting possible preventative benefits of holding them in custody. When non-delinquent juveniles in custody is added as a regressor in the violent crime

regressions, it carries a negative, statistically significant coefficient that is almost identical in magnitude to that of delinquents in custody. The number of non-delinquents held does not, however, appear to have a systematic impact on property crime.

The degree to which states rely on private versus public facilities to care for delinquents varies dramatically. In 1991, thirteen states held more than 90 percent of delinquents in public facilities. In contrast, Massachusetts and Pennsylvania each housed less than 30 percent of delinquents in public facilities. The distinction between public and private is a matter not only of ownership, but generally of philosophy as well. Private facilities tend to be smaller and place fewer restrictions on the movement of residents through the use of locks or fences. In 1985, for instance, 86 percent of public training schools were designed to house more than 100 juveniles, compared to only 23 percent of private training schools (DOJ 1989). 83 percent of juveniles in public training schools were in facilities described as "secure" versus 28 percent in private training schools (DOJ 1989).

There is a voluminous literature addressing the strengths and weaknesses of these two alternative philosophies (Altschuler and Armstrong 1984, Coates, Miller, and Ohlin 1982, Greenwood and Zimring 1985, Krisberg and Austin 1993). Although this debate focuses primarily on the longer-term consequences of the terms of confinement, it is also reasonable to look for differential short-term impacts on crime reduction. Allowing the coefficient on delinquents in custody to vary according to placement into public or private facilities in Table 2 yields a striking result: for both violent and property crime, the coefficient on juveniles in public facilities is negative, statistically significant, and larger than the corresponding coefficients in Table 2. The impact per delinquent held in private facilities, while negative, is an order of

magnitude smaller and is in no case statistically distinguishable from zero. The null hypothesis of equal coefficients on public and private can be rejected at or near the .05 level in all specifications. There are a number of possible explanations for this result. First, this difference may be attributable to the fact that more serious offenders are generally held in public facilities. Second, since public facilities allow less access to the community at large, they may provide more effective incapacitation if juveniles in private facilities continue to offend. Finally, the less pleasant conditions in public facilities may yield greater deterrence. Further analysis of this important question, while beyond the scope of this paper, appears warranted.

Section IV: Changes in Crime with Passage from the Juvenile to the Adult Court

The results of Section III provide evidence that juvenile crime responds to punishment in a manner similar to adult crime. Another strategy for identifying the effectiveness of criminal justice sanctions is to examine changes in behavior immediately following the transition from the juvenile to the adult court. This shift represents an abrupt change in punishments; if juveniles and young adults respond to the incentives of the criminal justice system, then one would also expect to observe abrupt changes in behavior associated with passage to adult status.[17] In contrast to Section III, where it is difficult to differentiate between incapacitation and deterrence effects, the present analysis is focused on deterrence. If incapacitation is the primary channel, then one would expect longer delays in the transition from the juvenile equilibrium to the adult equilibrium due to lags in the timing of arrest and sentencing. Therefore, it seems likely that

[17] To the extent that juveniles very close to the age of majority are more likely to have jurisdiction transferred to the adult court, some of the behavioral changes may actually occur in advance of the formal age at which the adult court takes over.

large immediate changes in behavior associated with the age of majority are likely to primarily reflect deterrence.[18]

Detecting behavioral shifts caused by the switch from juvenile to adult justice systems is complicated by a number of factors. First, there is strong evidence that criminal involvement varies markedly over the age distribution (Blumstein, Cohen, and Roth 1986). Crime rates typically rise through the teenage years, with property crime tailing off in the late teens and violent crime declining somewhat later. Second, it is difficult to evaluate the exact punitiveness of juvenile versus adult justice systems for a number of reasons. In addition to the lack of availability of state-level jail populations, there may also important qualitative differences in the circumstances of custody (e.g. a juvenile ranch versus a state prison). To the extent that within crime categories juvenile offenses are, on average, less severe, the task is further complicated. The sealing of juvenile crime records may reduce the long-term financial impact of adult convictions (Lott 1992, Waldfogel 1994). On the other hand, being institutionalized may simply involve a higher psychic cost for a 14 year-old than a 24 year-old.

In spite of such complications, it is nonetheless possible to examine behavioral shifts associated with the transition from the juvenile to adult court. Although it is difficult to compare juvenile systems to adult systems explicitly, it is possible to make reasonable comparisons of the *relative punitiveness* of a state's juvenile and adult systems compared to other states. Having done that, one can compare the time-path of criminal involvement before and after the age of majority in states with relatively lenient juvenile systems and relatively strict adult systems to the

---

[18] Alternatively, apparent changes in criminal involvement may reflect increased efforts to avoid detection by the authorities, rather than an actual decline in crime, although I am unaware of any existing evidence on this topic.

time-path of crime in states with strict juvenile punishments and lenient adult punishments. If juveniles and young adults respond to the incentives they face, then relative declines in crime with passage to adulthood should be observed in the latter set of states compared to the former. Note that the validity of this exercise does not depend on the ability to make absolute comparisons between juvenile and adult systems. Furthermore, as long as the age of majority is the same across the states being compared, the problems associated with the age-profile of criminal involvement disappear from the analysis.[19] This approach has the further advantage that it allows for comparisons of crime rates in different years for the same cohort of individuals, rather than relying on cross-sectional variation in the age distribution at a particular point in time.

Table 4 presents comparisons of time-paths of criminal involvement by age. For each state in each year for which data is available a measure of punitiveness is computed as follows:

$$RelativePunitiveness_{st} = \frac{AdultPrisoners_{st} / AdultViolentCrime_{st}}{JuvenileDelinquents_{st} / JuvenileViolentCrime_{st}} \qquad (3)$$

The harsher are adult punishments relative to juvenile punishments, the greater is the measure of relative punitiveness, and consequently, the greater is the predicted decrease in criminal involvement associated with the transition to adult court. To the extent that this measure of punitiveness is not perfectly capturing true differences across states, there will be misclassification errors which should attenuate any measured differences between the different groups, making it more difficult to find significant results.

---

[19]This last argument implicitly assumes that the underlying (i.e. aside from any influence of criminal justice policies) age-crime profile is similar across states, or alternatively, is uncorrelated with the criminal justice regime adopted in a state.

Columns 1-3 of Table 4 divide observations for states where the adult court gains jurisdiction at age 18 into three groups according to the relative punitiveness of the adult and juvenile courts, Column 1 contains those state-year pairs where the transition to adult court is associated with the greatest increase in punishment (a ratio greater than 2). Column 2 captures state-year pairs with moderate increases in punitiveness with the onset of adult status; column 3 reflects those cases with apparent decreases (or possibly, the smallest increases) in the severity of punishment.[20] The mean percentage change in crimes committed annually by cohort from age 15 to 19 is presented for both violent crime and property crime. The boxed observations represent the age at which an individual passes from the juvenile court to the adult court.[21]

The top row of the first column in Table 4 shows that in those states where the transition to the adult court is the harshest, 16 year-olds commit 40.6 percent more violent crime than that same cohort of adolescents committed as 15 year-olds. This large increase -- mirrored in columns 2 and 3 -- reflects the natural age profile of violent crime. Comparing columns 1-3 more generally, year-to-year changes in crime rates match closely across all three columns in every instance except for those turning 18, which is the age at which the adult court gains jurisdiction in these states. In the states where punishments increase the most with the adult court (column 1), violent crime rates fall by 3.8 percent for 18 year-olds. In contrast, where the transition to the adult court is most lenient, violent crime done by 18 year-olds increases 23.1

---

[20] Although the observations in column 3 have relative punitiveness ratios less than one, this does not necessarily imply that actual punishment is lower in the adult court for the reasons discussed earlier in this section.

[21] For conciseness, Table 4 includes observations from all state-year pairs together. Limiting the analysis only to within-year comparisons marginally increases the observed differences between the most punitive and least punitive states.

percent. Where the rise in sanctions with adult court is intermediate, the rise in violent crime is also intermediate: 10.2 percent. A similar, but less extreme pattern also emerges in property crime, where the states with the harshest transition see 20.5 percent decreases in crime at age 18, compared to 12.8 and 9.2 percent decreases in the moderate and most lenient states respectively.

Column 4 of Table 4 calculates mean differences between the values in columns 1 and 3, along with standard errors on these differences. For violent crime, the differences are small before the transition to the adult court. For 18 year-olds, who have just come under the jurisdiction of the adult court, the 27 percent difference in violent crime rates in column 4 is highly statistically significant. Crime continues to fall faster in the most punitive states for 19 year-olds. The identical pattern is also observed for property crime.[22]

Columns 5 and 6 present parallel estimates for states where the age of majority is 17. Due to the smaller number of states falling into this classification, observations are assigned to two groups rather than three, with a punitiveness ratio of 1.5 as the dividing line. Column 7 presents the difference between columns 5 and 6. Once again, the percent changes in both violent and property crime rates are slightly higher prior to the transition, dramatically lower in the year of transition, and slightly lower in the ensuing years. The magnitude of the differences across columns, displayed in column 7, is very similar to the results for states with an age of majority equal to 18.

---

[22] Bearing in mind that the estimated crime rate by cohort is not a direct measure of crime involvement, but rather derived from the number of arrests by cohort, an alternative explanation for the patterns observed would be that police are more hesitant to arrest those who have passed the age of majority because the sanctions they will face are to severe. Anecdotal evidence, however, suggests just the opposite: police are less likely to arrest juveniles because punishments are so small that it is not worth the policeman's effort.

It is also interesting to compare the patterns observed in states where the age of majority is 18 to those where it is 17. For both crime categories, the change in crime is smaller for 18 year-olds becoming adults (columns 1-3) than for 18 year-olds who were previously treated as adults (columns 5 and 6). This suggests that even in states where the relative punitiveness of the adult court is lowest, the adult court is more severe than the juvenile court. Looking at 17 year-olds, however, yields a somewhat different result. In states where 17 year-olds are treated as adults and adults are punished severely (column 5), crime growth rates for 17 year-olds are lower than in states where 17 year-olds remain juveniles (columns 1-3). On the other hand, when 17 year-olds are treated leniently as adults (column 6), crime increases are even greater than in states where 17 year-olds are juveniles.

It is possible to formalize the analysis of Table 5 by including covariates. The equation estimated is as follows:

$$\%\Delta Crime_{cst} = \beta_1 Majority_{cst} * RelPun_{st} + \beta_2 Majority_{cst} + \beta_3 RelPun_{st} + X_{st}\theta + \lambda_c + \phi_t + \mu_{c-t} + \epsilon_{cst} \quad (4)$$

where c indexes cohorts, s corresponds to states, and t captures time. The dependent variable is the percent change in crime for a state-cohort from that same cohort's level of crime activity in the preceding year. *Majority* is an indicator variable equal to one if a cohort reaches the age of majority in the year in question and thus becomes subject to the adult court. *RelPun* is the relative punitiveness ratio defined in equation 2; the larger is this value, the harsher the adult court relative to the juvenile court. Note that *RelPun* does not vary by cohort within a state and year. *X* is a vector of state-year covariates that are constant across cohorts within a state and

year, e.g. percent black. λ, ϕ, and μ are indicator variables controlling for cohort, year, and age. In some specifications, state-cohort interaction terms are also included. The key variable is the interaction term between *Majority* and *RelPun*, which captures any differential changes in crime rates in the year in which the age of majority is reached, as a function of the relative punitiveness of the adult and juvenile courts.

Equation 4 is estimated using state-level data by age group for the ages 15-21 over the period 1978-1993. Thus, for each state-year pair, there are 7 observations corresponding to each of the different age groups. The results are presented in Table 5. Columns 1-3 correspond to violent crime, columns 4-6 reflect property crime. The first and fourth columns include only the age of majority indicator, relative punitiveness, and their interaction. A range of controls are added in columns 2 and 5. Finally, state-cohort interactions are added in columns 3 and 6, eliminating any systematic differences across state-cohort pairs in crime growth rates over the period. The coefficient on the key interaction term, presented in the top row of the table, is remarkably stable across specifications in spite of the fact that many of the control variables added to the specification are statistically significant, and the amount of variation explained changes dramatically across specifications. In all cases the interaction is negative and highly statistically significant. A one standard-deviation increase in relative punitiveness (0.88) is associated with roughly a 10 percent decline in violent crime in the age at which the adult court gains jurisdiction and a 4-5 percent decline in property crime. These results corroborate the simple differences-in-differences estimates presented in Table 4.

In states with lenient adult courts relative to juvenile courts, passage to the adult court leads to increases in crime relative to states where jurisdiction does not shift. For instance, in

states with a relative punitiveness measure of one (roughly one-half of a standard deviation below the sample mean of 1.42), tne switch to the adult court is associated with a 0-12 percent increase in violent crime and a 2-5 percent increase in property crime. This somewhat surprising result appears to suggest that in some cases adult courts are less stringent than juvenile courts.[23] It is important to bear in mind, however, that this result may be driven by the fact that a large fraction of juveniles are released from custody just prior to attainment of the age of majority[24]. As a consequence, there is a particularly big pool of potential criminals on the street in that age group relative to states with a different age of majority, inflating that cohort's crime increase. Moreover, since juvenile records are sealed from adult courts, initial sentences for those just beyond the age of majority tend to be lenient due to the apparently clean record of the offender.

Section V: Identifying Impacts of Juvenile Punishment on Criminal Involvement as an Adult

The results of the preceding two sections focus on the short-run impact of punishment on crime. This section examines the question of whether the severity of juvenile punishment has a lasting impact on later criminal involvement.

Theoretically, the longer-term consequences of harsher juvenile punishment are ambiguous in sign. A deterrence argument is that harsh juvenile punishments send an early

---

[23] Previous studies have also suggested that absolute punishments in some states' juvenile courts may be greater than in the adult court (Greenwood 1986, *Los Angeles Times* 1993).

[24] In Texas, for instance, where the age of majority is 17, over forty percent of all juveniles released in 1992 were 16 years of age (OJJDP 1995, p. 106). In contrast, less than ten percent of juvenile releases in Texas that year were 17 years old or older. Another extreme example of this pattern is in Missouri where only 4.5 percent of juveniles released were held beyond the age of majority.

message that crime does not pay, reducing future criminal involvement. It is also possible that the discipline of custodial environments makes the youth more functional in society and increases educational attainment through mandatory school attendance while in custody. On the other hand, confinement may be stigmatizing, isolating, and facilitate the transmission of crime-specific human capital (Sampson and Laub 1993).

To test these competing hypotheses, the following specification is utilized

$$\ln(CRIME_{ast}) = \beta_1(AduCustody_{s,t-1}) + \beta_2(JuvCustody_{s,t-(a-m)-1} + X_{st}\Gamma + \lambda_t + \theta_s + \psi_a + \epsilon_{ast} \quad (5)$$

where a indexes age, s corresponds to state, and t reflects time, and m represents the age of majority in the state. Equation 5 is run only on the sample of young adults aged 19 to 24, with the unit of observation being a cohort in a state and year. The first term on the right-hand-side reflects the current punitiveness of the adult criminal justice system. The second term is the juvenile custody rate in the last year that a given cohort was subject to the juvenile courts. For instance, for the cohort of 24 year-olds, a seven-year lag on juvenile custody rates is included for a state where the age of majority is 18. An eight-year lag would be included for states where 17 is the age of majority. A negative value for β_2 implies that harsh early punishment reduces future criminal involvement. The other covariates included in the equation are identical to those in Table 3, with the addition of age dummies and the current punitiveness of a state's juvenile justice system. Although the current juvenile punishments should not directly influence crime rates for these young adults, they are likely to be positively correlated with lagged values of juvenile punitiveness and therefore are included as a precaution.

It is important to acknowledge a number of limitations to the analysis. First, most of the right-hand-side variables, including the custody measures, are not age-specific, but rather vary only by state and year. The reported standard errors have been corrected to take account of the grouped nature of the data. Second, to the extent that there is mobility across state lines among young adults, the use of lagged juvenile punishment in the state is an imperfect measure of the actual juvenile justice conditions to which young adults were actually subjected. Finally, because lagged juvenile punishments are included as covariates, the available sample is limited to the period beginning in 1985.

Regression results are reported in Table 6. Violent and property crimes are estimated separately, both with and without state-specific trends.[25] The key coefficients are in the top two rows. The severity of punishment in the last year as a juvenile has little apparent impact on adult criminal behavior. In none of the specifications is the coefficient statistically significant. In terms of magnitude, the coefficient on current adult punishments is over ten times as great in all instances. The current punitiveness of the juvenile justice system -- which should not have a direct effect on the behavior of adults -- yields larger estimated impacts in most columns, although in no case are these coefficients statistically significant at the .05 level.

These results suggest that the punitiveness of juvenile sanctions do not have a first-order impact on later criminal involvement. This finding is consistent with longer-term deterrent effects and stigma effects roughly offsetting one another, or both simply being small in

---

[25] Only specifications using the punishment per crime custody measure are reported in the table. Similar results are obtained for the other measure.

magnitude.[26]

Section V: Conclusions

This paper presents some of the first rigorous empirical estimates of the effect of the criminal justice system on juvenile crime. The evidence suggests that the juvenile crime is responsive to harsher sanctions. The estimated decrease in crime associated with incarcerating an additional juvenile is at least as large as the corresponding crime reduction for adults. In addition, there are sharp changes in crime rates associated with the transition from the juvenile to the adult court. In the year following attainment of the age of majority, states that punish adults particularly harshly relative to juveniles see violent crime rates fall by almost 25 percent and property crime 10-15 percent relative to states where adult punishments are relatively lenient. Much more difficult to estimate are the longer-term consequences of institutionalizing juveniles. While the very preliminary analysis presented here did not uncover any systematic relationship between punitiveness of the juvenile justice system and crime involvement later in life, this is clearly an area in need of greater study.

Using the results of Section III, it is possible to estimate how much of the differential changes in juvenile and violent crime can be attributed to the change in relative punishments of juvenile and adults. Between 1978 and 1993, punishment per crime fell 20 percent for juveniles, but rose 60 percent for adults. Over that same time period, juvenile violent and property crime

[26] As a further check on these results, similar specifications were run using juvenile punishments in the year *after* a cohort reached the age of majority as an instrumental variable for actual lagged juvenile punishment. The results obtained were once again consistent with no apparent long-term effect of juvenile punishment on later crime.

rates rose 107 and 7 percent respectively. For adults, the corresponding increases were 52 and 19 percent. Based on the estimates of Table 2, if juvenile punishment had increased proportionally with those of adults, then the predicted percent changes in juvenile violent and property crime over this period would have been 74 and 2 percent.[27] Stated differently, the change in relative punishments for juveniles and adults can account for roughly 60 percent of the differential rate of change between juvenile and adult violent crime rates.[28] Under this hypothetical scenario, the relative decrease in juvenile property crime rates relative to adult rates would have been almost as great as the relative increase in juvenile violent crime rates relative to adults.

Although the estimates of this paper suggest that taking juveniles into custody is an effective means of combating crime, these estimates by themselves are insufficient to suggest the best course for public policy. Any public policy recommendation must balance the benefits of reduced crime against the costs associated with holding juveniles, both in the short-term and in the longer run. While it is difficult to make an absolute cost-benefit comparison, the relative short-run costs and benefits of locking up one juvenile versus one adult may be easier to evaluate. Based on the estimates of this paper, the marginal reduction from incarcerating one additional juvenile delinquent appears to be similar to or slightly higher than for adding one adult prisoner. The average cost per delinquent, however, also appears to be higher that of the typical

---

[27] These estimates are based on columns 3 and 7 of Table 2. Categorically similar results are obtained with the other specifications in either Table 2 and Table 3.

[28] Assuming that murder responds to punishment in the same manner as violent crimes more generally, the shift in relative punishments is able to account for 25 percent of the differential growth in juvenile homicide rates. An important part of the explanation for rising juvenile homicide rates is the increasing access on the part of juveniles to more lethal weapons over the time period examined (Donziger 1996)

adult prisoner: total spending per resident in public juvenile facilities was roughly $33,000 in 1990, the last year for which data is available (OJJDP 1995). In comparison, according to Bureau of Justice Statistics (1995), the average expenditure per state prisoner in fiscal year 1992 was roughly $23,000. Thus, there does not appear to be a clear gain in altering the relative concentration of juvenile and adult inmates at the present time.

Due to data limitations, this paper has focused predominantly on the scale of juvenile punishment rather than on the conditions of confinement and the nature of treatment given to juveniles in custody. While such issues are beyond the scope of this paper, they are obviously of critical importance. A meta-analysis done by Lipsey (1991), for instance, finds a relatively small but statistically significant decline in recidivism associated with particular types of juvenile treatment programs. Given Cohen's (1995) estimate that the value to society of saving a high-risk youth may be as high as $2 million, however, any improvement in the success rate of such programs will pay large dividends.

Table 1: Summary Statistics

Variable	Mean	Standard Deviation		Minimum	Maximum
		Full Sample	Within-state		
Violent crime commission rate (per 1,000 at risk pop.)					
Juvenile	20.6	12.7	6.6	0.9	153.1
Adult	12.3	5.5	2.1	1.0	53.4
Property crime rate commission rate (per 1,000 at risk pop.)					
Juvenile	330.3	133.2	41.7	85.2	706.7
Adult	78.4	21.1	8.7	27.2	160.1
Custody rate (per 1,000 at-risk population):					
Delinquent juveniles	5.5	3.9	1.5	1.1	23.3
Adult prisoners	4.7	2.2	1.6	0.5	26.7
Custody rate (per violent crime in current year):					
Delinquent juveniles	.38	.30	.15	.03	3.75
Adult prisoners	.43	.20	.11	.11	1.57
Ratio of adult:juvenile custody rate (per violent crime)	1.42	.70	.53	.29	7.75
Age of majority	17.5	.70	.00	16	19
Legal drinking age	20.3	1.2	1.0	18	21
State unemployment rate	6.9	2.0	1.7	2.5	18.0
% Metropolitan	76.9	17.2	0.9	15.3	100.0
% Black	11.8	7.9	0.4	0.2	70.3

Notes: Data are state-level observations for roughly every two years over the period 1978-93, corresponding to the years in which juvenile custody data is available. Due to occasional missing data, the number of observations varies between 391 and 395. Reported means and standard errors are population weighted. Crime rates by age group are calculated as reported crimes times the share of arrests in the age group for the crime category in question. At-risk population is defined as age 15-17 for juveniles and 18-34 for adults. % black and % metropolitan are linearly interpolated between decennial census years.

Table 2: The Relationship between Juvenile Crime Rates and Criminal Justice Punitiveness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	ln (juvenile violent crime rate)				ln (Juvenile property crime rate)			
Delinquents in custody / juvenile population	-.032 (.011)	-.018 (.013)	----	----	-.012 (.006)	-.008 (.007)	----	----
Delinquents in custody / juvenile violent rime	----	----	-.574 (.091)	-.382 (.091)	----	----	-.167 (.053)	-.123 (.039)
Unemployment Rate	.007 (.012)	-.011 (.011)	.008 (.010)	-.014 (.010)	.018 (.006)	.007 (.005)	.019 (.006)	.007 (.005)
% Black	-.160 (.039)	.493 (.224)	-.118 (.038)	.602 (.213)	-.081 (.020)	-.078 (.115)	-.067 (.021)	-.042 (.109
% Metro	.040 (.013)	-.018 (.082)	.030 (.013)	-.096 (.081)	.019 (.006)	-.018 (.032)	.016 (.006)	-.041 (.034)
Drinking age=18	-.188 (.050)	-.098 (.064)	-.132 (.050)	-.036 (.063)	-.079 (.026)	-.007 (.030)	-.062 (.026)	.013 (.030)
Drinking age=19	-.226 (.050)	-.175 (.054)	-.179 (.047)	-.131 (.050)	-.044 (.024)	-.032 (.025)	-.028 (.023)	-.018 (.024)
Drinking age=20	.023 (.080)	.054 (.093)	.005 (.072)	.071 (.089)	.021 (.044)	.002 (.028)	.016 (.043)	.008 (.028)
Age distribution, year dummies, and state-fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-level trends included?	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R-squared	.926	.947	.939	.952	.947	.965	.952	.967
Number of observations	395	395	391	391	395	395	391	391
Implied crime reduction per delinquent in custody	-.66	-.37	-.57	-.38	-3.96	-2.64	-2.68	-1.97

Notes: Dependent variable is the natural log of juvenile crime in the named crime category. All regressions are weighted least squares using state populations as weights. White-standard errors in parentheses. Age dummies, year dummies, age of majority dummies, and state-fixed effects are included in all specifications. Values in the bottom row of the table are the implied reductions in crime associated with holding one additional juvenile delinquent in custody for one year, evaluated at the sample means.

Table 3: The Relationship between Adult Crime Rates and Criminal Justice Punitiveness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	ln (adult violent crime rate)				ln (adult property crime rate)			
Adult prisonersin custody / adult population	-.010 (.008)	-.053 (.013)	----	----	-.016 (.007)	-.046 (.010)	----	----
Adult prisoners in custody / adult violent crime	----	----	-.690 (.058)	-.707 (.067)	----	----	-.389 (.052)	-.424 (.050)
Unemployment Rate	-.004 (.004)	-.003 (.004)	-.008 (.004)	-.002 (.004)	.020 (.004)	.020 (.003)	.019 (.004)	.021 (.003)
% Black	-.058 (.024)	-.077 (.109)	-.066 (.021)	-.034 (.104)	-.034 (.019)	-.182 (.077)	-.037 (.017)	-.160 (.073)
% Metro	.008 (.006)	.071 (.041)	.002 (.005)	.054 (.035)	.008 (.005)	-.008 (.029)	.006 (.005)	-.019 (.029)
Drinking age=18	.016 (.025)	-.016 (.026)	.017 (.021)	-.001 (.024)	-.026 (.020)	.001 (.022)	-.024 (.019)	.009 (.021)
Drinking age=19	-.037 (.026)	-.022 (.022)	-.018 (.023)	-.015 (.021)	-.030 (.017)	-.042 (.017)	-.020 (.017)	-.039 (.016)
Drinking age=20	.053 (.035)	.003 (.029)	.053 (.029)	.020 (.028)	.056 (.031)	-.024 (.020)	.050 (.030)	-.013 (.020)
Age distribution, year dummies, and state-fixed effects included?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-level trends included?	No	Yes	No	Yes	No	Yes	No	Yes
Adjusted R-squared	.963	.979	.976	.984	.929	.958	.940	.962
Number of observations	395	395	391	391	395	395	391	391
Implied crime reduction per delinquent in custody	-.12	-.65	-.69	-.71	-1.26	-3.62	-2.48	-2.70

Notes: Dependent variable is the natural log of juvenile crime in the named crime category. All regressions are weighted least squares using state populations as weights. White-standard errors in parentheses. Age dummies, year dummies, age of majority dummies, and state-fixed effects are included in all specifications. Values in the bottom row of the table are the implied reductions in crime associated with holding one additional juvenile delinquent in custody for one year, evaluated at the sample means.

Table 4: Changes in Crime Rates and the Transition from the Juvenile Court to the Adult Court

	Relative punitiveness of adult versus juvenile court in states where age of majority is 18				Relative punitiveness in states where age of majority is 17		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year to year % change in crime for cohort	Most Punitive (N=61)	Intermediate (N=115)	Least Punitive (N=102)	Difference of (1) - (3)	Most Punitive (N=29)	Least Punitive (N=29)	Difference of (5) - (6)
Violent crime							
15-16	40.6 (3.8)	37.5 (2.6)	39.9 (3.8)	0.7 (5.4)	51.2 (5.4)	37.1 (5.0)	14.1 (7.2)
16-17	25.1 (3.1)	28.4 (2.4)	24.8 (3.2)	0.3 (4.5)	13.0 (4.4)	39.4 (6.7)	-26.4 (8.0)
17-18	-3.8 (3.6)	10.2 (3.1)	23.1 (3.4)	-26.9 (5.0)	26.3 (6.1)	29.7 (3.6)	-3.4 (7.1)
18-19	0.5 (2.4)	3.8 (1.8)	5.9 (1.6)	-5.4 (2.9)	-3.8 (2.7)	0.5 (2.5)	-4.3 (3.7)
Property Crime							
15-16	8.4 (1.5)	8.4 (1.0)	6.3 (1.0)	2.1 (1.8)	13.2 (2.1)	9.6 (3.0)	3.6 (3.7)
16-17	-1.9 (1.5)	-1.8 (1.0)	-5.4 (0.9)	3.5 (1.7)	-6.7 (2.6)	7.1 (3.4)	-13.8 (4.3)
17-18	-20.5 (1.7)	-12.8 (1.7)	-9.2 (1.5)	-11.3 (2.3)	-2.6 (3.2)	4.0 (3.2)	-6.6 (4.5)
18-19	-19.4 (1.3)	-16.2 (1.0)	-15.9 (0.9)	-3.5 (1.6)	-21.3 (1.8)	-20.9 (1.4)	-0.4 (2.2)

Notes: Values in the table are state-population weighted means of the percent change in crime committed by the named cohort from last year to this year. Standard deviations are in parentheses. Boxed values reflect passage from the juvenile to the adult court. The number of observations listed at the top of the table is the number of state-year pairs in the category. Relative punitiveness is computed using the formula in equation 2. The ranges in columns 1, 2 and 3, are >2, 1-2, and <1, respectively. The cutoff separating columns 5 and 6 is 1.5.

Table 5: Regression Analysis of Crime Rates and the Transition from Juvenile to Adult Court

	% Δ in Violent Crime			% Δ in Property Crime		
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Become adult * relative punitiveness	-.114 (.025)	-.117 (.022)	-.121 (.018)	-.049 (.015)	-.053 (.013)	-.050 (.009)
Become adult	.257 (.054)	.199 (.052)	.214 (.039)	.115 (.034)	.083 (.036)	.090 (.025)
Relative punitiveness	-.025 (.006)	-.019 (.005)	-.090 (.015)	-.015 (.004)	-.008 (.003)	-.008 (.007)
Δ % black	----	-.42 (.05)	-.70 (.24)	----	-.19 (.03)	-.52 (.13)
Δ % metro	----	.20 (.04)	-.35 (.15)	----	.03 (.02)	-.21 (.06)
Δ unemp. rate	----	-1.14 (.76)	-.36 (.74)	----	.83 (.36)	1.02 (.38)
% Δ in crime among those age 22+	----	.41 (.08)	.52 (.06)	----	.06 (.06)	.08 (.05)
Age,cohort,and year dummies?	No	Yes	Yes	No	Yes	Yes
State-cohort interactions?	No	No	Yes	No	No	Yes
Adj. R-squared	.053	.414	.445	.039	.465	.521

Notes: Dependent variable is the percent change in the named crime category for a cohort from the preceding to current year. The unit of observation is an age cohort in a state and year. Cohorts aged 15 to 21 are included in the regressions for the period 1978-93, yielding a total of 2,737 observations. All regressions estimated using weighted least squares using state-populations as weights. White-standard errors in parentheses. The interaction in the top row captures the effect of relative punitiveness on crime rates in the year following transition to the adult court.

Table 6: The Impact of Juvenile Punishment Severity on Later Adult Criminal Behavior

	ln (violent crime)		ln (property crime)	
Variable	(1)	(2)	(3)	(4)
Severity of punishment in last year as juvenile	-.057 (.030)	-.035 (.032)	-.024 (.027)	.006 (.025)
Severity of current adult punishment	-.629 (.067)	-.638 (.102)	-.376 (.073)	-.486 (.080)
Severity of current juvenile punishment	-.076 (.040)	-.035 (.035)	-.048 (.036)	-.028 (.030)
Unemployment Rate	-.022 (.005)	-.024 (.005)	.007 (.004)	.011 (.005)
% Black	-.140 (.026)	----	-.104 (.022)	----
% Metro	-.014 (.009)	----	-.018 (.009)	----
Age=19	.202 (.024)	.170 (.020)	.566 (.027)	.548 (.020)
Age=20	.124 (.015)	.092 (.013)	.342 (.015)	.337 (.012)
Age=21	.151 (.022)	.135 (.019)	.254 (.025)	.239 (.014)
Age=22	.062 (.011)	.047 (.010)	.114 (.010)	.112 (.008)
Age=23	.070 (.019)	.070 (.019)	.079 (.019)	.066 (.009)
Year, legal drinking age, cohort, and state fixed effects included?	Yes	Yes	Yes	Yes
State trends included?	No	Yes	No	Yes
Number of observations	1,453	1,453	1,455	1,455
Adjusted R-squared	.993	.994	.991	.993

Notes: Dependent variable is listed at the top of each column. The unit of observation is an age cohort in a given state and year, e.g. 19 year-olds in New York in 1993. Ages 19 to 24 are included in the regressions, for the years 1985, 1987, 1989, 1991, and 1993. All measures of severity of punishment are computed based on prisoners per violent crime. "Current" punishments are once-lagged to ameliorate ratio-bias. The omitted age category is age 24. Year, legal drinking age, cohort, and state-fixed effects are included in all specifications. Method of estimation is weighted least squares, with the weights proportional to state population. Standard errors are adjusted to take into account the fact that multiple observations are drawn from a given state and year. Because % black and % metro variables are linearly interpolated from decennial census data, they are not separately identified when state trends are included in the model.

References

Altschuler, David, and Troy Armstrong, 1984, "Intervening with Serious Juvenile Offenders," in R. Mathias, P. Demuro, and R. Allinson (eds.), Violent Juvenile Offenders, San Francisco: National Council on Crime and Delinquency.

Becker, Gary, 1968, "Crime and Punishment: An Economic Approach," *Journal of Political Economy* 76:169-217.

Bennett, William, John DiIulio, Jr., and John Walters, 1996, Body Count, New York: Simon & Schuster.

Benson, Bruce, Iiljong Kim, and David Rasmussen, 1997, "Deterrence and Public Policy: Trade-offs in the Allocation of Police Resources," Forthcoming, *International Review of Law and Economics*.

Blumstein, Alfred, Jacqueline Cohen, Jeffrey Roth, and Christy Visher (eds.), 1986, Criminal Careers and 'Career Criminals', Wash DC: National Academy of Sciences.

Blumstein, Alfred, Daniel Nagin, and Jacqueline Cohen (eds.), 1978, Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates, National Academy of Sciences, Washington DC.

Boland, Barbara, and James Q. Wilson, 1978, "Age, Crime, and Punishment," *Public Interest* 51(spring):22-34.

Cameron, Samuel, 1988, "The Economics of Crime Deterrence: A Survey of Theory and Evidence," *Kyklos* 41:301-323.

Coates, R., A. Miller, and L. Ohlin, 1982, Diversity in a Youth Correctional System, Cambridge, MA: Ballinger.

Cohen, Mark, 1995, "The Monetary Value of Saving a High Risk Youth," Mimeo, Vanderbilt University.

Department of Justice, 1995, Sourcebook of Criminal Justice Statistics: 1995, Washington DC: U.S. Department of Justice

DiIulio, John, and Anne Piehl, 1991, "Does Prison Pay? The Stormy National Debate over the Cost-Effectiveness of Imprisonment," *The Brookings Review* (fall), 28-35.

Donohue, John J., and Peter Siegelman, 1994, "Is the United States at the Optimal Rate of Crime?" Mimeo, American Bar Foundation.

Donziger, Steven R., 1996, The Real War on Crime, New York: Harper-Collins.

Ehrlich, Isaac, 1973, "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation," *Journal of Political Economy* 81:531-567.

Ehrlich, Isaac, 1981, "On the Usefulness of Controlling Individuals: An Economic Analysis of Rehabilitation, Incapacitation, and Deterrence," *American Economic Review* 71:307-322.

Federal Bureau of Investigation. Uniform Crime Reports, Federal Bureau of Investigation, Washington, DC (multiple editions).

Glaeser, Edward, Bruce Sacerdote, and Jose Scheinkman, 1996, "Crime and Social Interactions," *Quarterly Journal of Economics* 111:507-548.

Greenwood, Peter, and Franklin Zimring, 1985, One More Chance: Promising Intervention Strategies for Chronic Juvenile Offenders, Santa Monica, CA: RAND Corporation.

Greenwood, Peter, 1986, "Differences in Criminal Behavior and Court Response among Juvenile and Young Adult Offenders," in Crime and Justice: A Review of Research, edited by Michael Tonry and Norval Morris, 7:151-87. Chicago: University of Chicago Press.

Greenwood, Peter, 1995, "Juvenile Crime and Juvenile Justice," in Crime, edited by James Q. Wilson and Joan Petersilia, San Francisco: ICS Press.

Griliches, Zvi, and Jerry Hausman, 1986, "Errors in Variables in Panel Data," *Journal of Econometrics* 31:93-118.

Grogger, Jeff, 1991, "Certainty vs. Severity of Punishment," *Economic Inquiry* 29:297-309.

Krisberg, Barry, and James Austin, 1993, Reinventing Juvenile Justice, Newbury Park, CA: Sage.

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

Levitt, Steven, 1997a, "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime," Forthcoming, *American Economic Review*.

Levitt, Steven, 1997b, "Why Do Increased Arrest Rates Appear to Reduce Crime: Deterrence, Incapacitation, or Measurement Error?" Forthcoming, *Economic Inquiry*.

Lipsey, Mark, 1991, "Juvenile Delinquency Treatment: A Meta-Analysis Inquiry into the Variability of Effects," in Meta-Analyses for Explanation: A Casebook, Beverly Hills, CA: Sage.

Los Angeles Times, 1993, "A Nation's Children in Lockup," August 22.

Lott, John, 1992, "An Attempt at Measuring the Total Monetary Penalty from Drug Convictions: the Importance of an Individual's Reputation," *Journal of Legal Studies* 21:159-187.

Marvell, Thomas, and Carlisle Moody, 1994, "Prison Population Growth and Crime Reduction," *Journal of Quantitative Criminology* 10:109-140.

Marvell, Thomas, and Carlisle Moody, 1996, "Specification Problems, Police Levels, and Crime Rates," *Criminology* 34:609-646.

Myers, Stuart, 1983, "Estimating the Economic Model of Crime: Punishment vs. Deterrent Effects," *Quarterly Journal of Economics* 98:157-166.

Nagin, Daniel, 1996, "Criminal Deterrence Research: A Review of the Evidence and a Research Agenda for the Outset of the 21st Century," Mimeo, Carnegie Mellon University.

Office of Juvenile Justice and Delinquency Prevention, 1992, National Juvenile Custody Trends: 1978-1989, Washington, DC: U.S. Department of Justice.

Office of Juvenile Justice and Delinquency Prevention, 1995, Juveniles Taken into Custody: Fiscal Year 1993, Washington, DC: U.S. Department of Justice.

Sampson, Robert, "The Community." in Crime, James Q. Wilson and Joan Petersilia (eds.), San Francisco: Institute for Contemporary Studies.

Sampson, Robert, and John Laub, 1993, Crime in the Making: Pathways and Turning Points through Life, Cambridge, MA: Harvard University Press.

Schneider, Anne, and Laurie Ervin, 1990, *Social Science Quarterly* 71:585-601.

Spelman, William, 1994, Criminal Incapacitation, New York: Plenum.

Stigler, George, 1970, "The Optimum Enforcement of Laws," *Journal of Political Economy* 78:526-536.

Tauchen, Helen, Anne Witte, and Harriet Griesinger, 1994, "Criminal Deterrence: Revisiting the Issue with a Birth Cohort," *Review of Economics and Statistics* 76:399-412.

Visher, Christy, 1986, "The RAND Inmate Survey: A Reanalysis," in Blumstein, A. et al. (eds.), Criminal Careers and "Career Criminals," Volume II, National Academy Press: Washington, D.C.

Waldfogel, Joel, "Does Conviction have a Persistent Effect on Income and Employment?" *International Review of Law and Economics* 14:103-119.

Wilson, James Q., 1994, "What to Do About Crime?" *Commentary* 98:(September) 25-34.

Witte, Ann, 1980, "Estimating the Economic Model of Crime with Individual Data," *Quarterly Journal of Economics* 94:57-84