Juvenile Crime and Punishment

Steven D. Levitt

University of Chicago

Over the last two decades juvenile violent crime has grown almost twice as quickly as that of adults. This paper finds that changes in relative punishments can account for 60 percent of that differential. Juvenile offenders are at least as responsive to criminal sanctions as adults. Sharp drops in crime at the age of majority suggest that deterrence (and not merely 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.

I. Introduction

The divergence of trends of juvenile and adult violent crime in the last decade represents a potentially alarming development in the fight against crime. The rate at which juveniles were arrested for violent crime rose 79 percent between 1978 and 1993, almost three times the increase over that time period for adults. The divergence in murder is even more striking: over that same period, juvenile murder arrests rose 177 percent, whereas the murder arrest rate for adults actually *fell* 7 percent. For property crime, both juvenile and adult arrest 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 dramatic change in relative punishments provides an excellent opportunity for testing the economic model of crime (Becker

---

[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.

1968; Stigler 1970; Polinsky and Shavell 1984). The most fundamental prediction of the economic approach is that changes in expected punishment will influence criminal behavior. Distinguishing between juvenile and adult punishments also makes it possible to explore a number of other more subtle implications. The first of these is the response of juvenile crime to changes in the expected punishment of adults; or, stated in economic terms, are juvenile and adult crime substitutes or complements? To the extent that there are a limited number of criminal opportunities that juveniles and adults compete for, one might expect there to be substitution between the two. On the other hand, if adult criminals serve as role models for juveniles, then they might be complements. Second, there are important issues of intertemporal choice. If criminal activities involve learning by doing or investment in crime-related human capital, then changes in the expected punishment of juveniles may affect not only their current crime involvement but also the amount of crime committed in the future. Changes in adult punishments, even though they do not affect juveniles directly, may change the future expected returns to crime and thereby affect the current investment decisions of juveniles. Finally, *punishment* itself may affect the returns to crime versus legitimate activities, leading to long-run changes in criminal involvement. For instance, if juvenile detention centers facilitate the acquisition of criminal human capital or stigmatize those in custody, then harsh punishment of juveniles may reduce crime in the short run but increase it over a longer time horizon.

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 response of juvenile crime to sanctions. Although 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; "A Nation's Children in Lockup," 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 on 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 ac-

[2] See, e.g., Ehrlich (1973, 1981), Blumstein, Nagin, and Cohen (1978), Witte (1980), Cameron (1988), DiIulio and Piehl (1991), Grogger (1991), Donohue and Siegelman (1994), Marvell and Moody (1994, 1996), Tauchen, Witte, and Griesinger (1994), and Levitt (1996, 1997). It is worth noting that few of these empirical studies have any power to distinguish deterrence from incapacitation and therefore provide only an indirect test of the economic model of crime.

tual 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, that is, the age at which they become subject to the punishments of the adult court. As one youth who recently turned 16 (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 by Glassner et al. in a juvenile detention facility, saw his 1–4-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" (p. 220). 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, when state-level panel data for the period 1978–93 are used, harsher punishments for juveniles are strongly associated 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 high degree of substitutability between juvenile and adult crime; there is no systematic response of juvenile crime to the expected punishment facing adults, or vice versa. Nor does there appear to be a strong relationship between the punitiveness of the juvenile justice system that a cohort faces when young and the extent of criminal involvement for that cohort later in life.

Evidence that a substantial fraction of the crime reduction results from deterrence (and not simply incapacitation) comes from analysis of changes in crime rates around the age of majority. States in which 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 in which the juvenile courts are most lenient vis-à-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 in which 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 overview of the juvenile justice system and discusses the available data sources and their important limitations. Section III 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 1978–93. Section IV looks at changes in crime in the years immediately surrounding the transition from the juvenile to the adult court. Section V 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.

II. Background on the Juvenile Justice System

In the United States, all states have separate systems for dealing with juvenile and adult criminals.[3] The age of majority, that is, the age at which an individual becomes subject to the adult court, varies between 16 and 19. There are many distinctive features of the juvenile justice system, as detailed in Krisberg and Austin (1993) and Greenwood (1995). For the purposes of this paper, it is necessary to highlight only a few of the differences between juvenile and adult courts. First, juvenile criminal histories are at least partially, and often fully, sealed from adult courts. Second, those sentenced by juvenile courts are sent to correctional facilities separate from adult offenders. Third, the juvenile justice system handles not only cases involving delinquents (juveniles accused of adult crimes), but also status offenses (crimes that apply only to juveniles such as truancy or running away from home) and cases involving dependent and neglected children.

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 options include, in declining order of severity, training schools, ranches and camps, halfway houses, and shelters. 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.

The primary source of data on juvenile corrections is censuses of

---

[3] In less than 1 percent of juvenile 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.

public and private juvenile facilities performed roughly every two years between 1978 and 1993.[4] State-level data are available from each of these censuses. For making comparisons 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 these two years a close proxy for the delinquent population is available.[5]

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 1 year) are not available annually at the state level. For that reason, jail populations are omitted from the analysis, as is standard in the literature. Jail inmates represent about one-third of the adult incarcerated population. That share has been fairly constant over time. Data are 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 16 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:[6]

---

[4] 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 at the time of this writing but were provided to me by OJJDP. A 1995 census has also been conducted, but no data have yet been made available.

[5] In 1983 and 1985, the number of juveniles in public vs. private facilities is available. Delinquents are overwhelmingly held in public facilities, whereas nondelinquents are typically placed in privately run facilities. Interpolating the fraction of juveniles that are delinquent in public and private facilities by state from the 1979 and 1987 juvenile censuses, one can approximate the number of delinquents in 1983 and 1985. Given that there was little change in these fractions between 1979 and 1987, 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 1 percent of the actual national totals (which, unlike state-level breakdowns, are reported) in both 1983 and 1985. Dropping 1983 and 1985 from the analysis does not greatly change the results.

[6] Using 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 underreporting of age-specific arrest rates in some states in particular

$$\text{CRIME}_{cst} = \frac{\text{ARRESTS}_{cst}}{\text{ARRESTS}_{st}} \times \text{CRIME}_{st}, \qquad (1)$$

where c indexes cohorts, s corresponds to states, and t represents time. Where the cohort index is 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, juveniles tend to commit less severe offenses (Greenwood 1995).

III. Panel Data Results

This section presents state-level panel data estimates of the response of juvenile crime to criminal justice sanctions, with other factors controlled for. For purposes of comparison, parallel specifications are estimated for adult crime. The impact of a range of alternative specifications and assumptions on the estimates is also examined.

The basic empirical specification is

$$\ln(\text{JuvCrime}_{st}) = \beta\text{JuvCustody}_{st-1} + \mathbf{X}'_{st}\Gamma + \lambda_t + \theta_s + \epsilon_{st}, \qquad (2)$$

where s indexes states and t corresponds to time. JuvCrime is the estimated number of juvenile crimes per juvenile aged 15–17.[7] Separate regressions are estimated for violent and property 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. The variable $\mathbf{X}$ is a vector of institutional, demographic, and economic control variables including the percentage black, the percentage 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. The variable λ represents year dummies, and θ denotes state fixed effects. 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. In some specifications,

---

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.

[7] Denominating the crime rates by population aged 15–17 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.

adult custody variables and adult crime rates are also included. In a previous version, state-level trends were also included without materially changing the results. With the exception of percentage black and percentage residing in metropolitan areas, which are linearly interpolated between decennial censuses, all data are available annually.

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.[8] To minimize simultaneity and concerns of ratio bias, 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. In contrast to the standard errors-in-variables case, this bias exaggerates the estimated impact of custody rates on crime.[9]

An alternative measure of custody rates is the number of individuals in custody as a fraction of the population aged 15–17, rather than as a fraction of the crime rate. 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 population aged 15–17 (which appears in the denominator of both the left-hand-side variable and the custody rate) does not adequately capture the group "at risk" for crime, 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

---

[8] 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. The stock of delinquents in custody rather than the flow of new admissions is used for two reasons. First, the latter is not separately calculated for delinquents and nondelinquents. Second, the number of new admissions does not capture the severity of sentences. This is particularly important because the number of annual admissions is roughly 10 times greater than the one-day counts because of a large number of very short stays.

[9] 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 are used, there are clear signs of ratio bias; i.e., the coefficients from specifications in which 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.

rates, for example, 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 this custody coefficient will understate the true relationship to crime.[10] 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). 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 simultaneity and omitted variables.

Equation (2) is estimated using state-level panel data at roughly 2-year intervals over the period 1978–93. 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 percentage black disappears. Because state fixed effects are included in the regressions, the demographic variables, which exhibit little within-state variation, 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 and using the two custody proxies. In columns 2, 4, 6, and 8, adult crime and custody rates are also included as control variables. Adult crime is included both to control for omitted features that may be influencing juvenile crime rates and to capture any direct influence this variable may have. Adult custody rates are included because the severity of adult punishments may affect the attractiveness of juvenile crime, either because of decreased competition from adult criminals or by changing the future expected returns from criminal involvement.

---

[10] Such omitted variables may also lead the earlier custody measure (arrests per crime) to understate the true relationship if the omitted control variables are also correlated with arrests per crime.

TABLE 1

SUMMARY STATISTICS

| VARIABLE | MEAN | STANDARD DEVIATION | | MINIMUM | MAXIMUM |
		Full Sample	Within-State		
Violent crime commission rate (per 1,000 population):					
Juvenile	20.6	12.7	6.6	.9	153.1
Adult	12.3	5.5	2.1	1.0	53.4
Property crime commission rate (per 1,000 population):					
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 population):					
Delinquent juveniles	5.5	3.9	1.5	1.1	23.3
Adult prisoners	4.7	2.2	1.6	.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 to juvenile custody rate (per violent crime)	1.42	.70	.53	.29	7.75
Population aged 15–17 (× 1,000)	468.4	347.2	48.6	15	1,265
Population aged 18–34 (× 1,000)	1,673.0	1,284.4	119.1	63	4,759
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	.9	15.3	100.0
% black	11.8	7.9	.4	.2	70.3

NOTE.—Data are state-level observations for roughly every 2 years over the period 1978–93, corresponding to the years in which juvenile custody data are available. Because of occasional missing data, the number of observations varies between 391 and 395. Reported means and standard errors are population weighted. When population appears in the denominator of a variable, juveniles are defined as those aged 15–17 and adults those aged 18–34. 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. Percentage black and percentage metropolitan are linearly interpolated between decennial census years.

The coefficients on the custody rates of juvenile delinquents are presented in the first two rows. In all eight columns, the variable delinquents in custody is negatively related to juvenile crime rates and is statistically significant at the .05 level. To aid in interpretation of the magnitude of these coefficients, the next-to-last row of the table presents the annual crime reduction, evaluated at the sample

TABLE 2

Relationship between Juvenile Crime Rates and Criminal Justice Punitiveness

VARIABLE	In (Juvenile Violent Crime Rate)				In (Juvenile Property Crime Rate)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Delinquents in custody/juvenile population	−.032 (.011)	−.024 (.010)	...	...	−.012 (.006)	−.013 (.006)	...	...
Delinquents in custody/juvenile violent crime	...	...	−.574 (.091)	−.498 (.098)	...	...	−.167 (.053)	−.176 (.056)
In (adult crime rate)	...	.55 (.11)	...	.35 (.14)	...	.18 (.08)	...	.16 (.08)
Adults in custody/adult population	...	−.024 (.015)	...	...	...	.007 (.008)	...	...
Adults in custody/adult violent crime	...	...	...	−.135 (.174)	...	...	...	.146 (.064)
Unemployment rate	.007 (.012)	.009 (.011)	.008 (.010)	.009 (.010)	.018 (.006)	.014 (.006)	.019 (.006)	.016 (.005)
% black	−.160 (.039)	−.131 (.035)	−.118 (.038)	−.102 (.040)	−.081 (.020)	−.075 (.020)	−.067 (.021)	−.060 (.021)
% metropolitan	.040 (.013)	.032 (.012)	.030 (.013)	.027 (.012)	.019 (.006)	.018 (.006)	.016 (.006)	.015 (.006)
Drinking age = 18	−.188 (.050)	−.200 (.048)	−.132 (.050)	−.144 (.049)	−.079 (.026)	−.074 (.025)	−.062 (.026)	−.057 (.026)
Drinking age = 19	−.226 (.050)	−.202 (.048)	−.179 (.047)	−.167 (.046)	−.044 (.024)	−.040 (.024)	−.028 (.023)	−.027 (.023)
Drinking age = 20	.023 (.080)	.008 (.072)	.005 (.072)	.009 (.066)	.021 (.044)	.009 (.041)	.016 (.043)	.007 (.040)
Age, year, and state fixed effects included?	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	.926	.931	.939	.941	.947	.948	.952	.952
Implied change in juvenile crime per delinquent in custody	−.66	−.49	−.57	−.50	−3.96	−4.29	−2.68	−2.82
Implied change in juvenile crime per adult in custody	...	−.08	...	−.04	...	.36	...	.62

NOTE.—Dependent variable is the natural log of the juvenile crime rate in the named crime category. All regressions are weighted least squares, with state populations used as weights. White standard errors are in parentheses. Age dummies, year dummies, and state fixed effects are included in all specifications. Values in the last two rows of the table are the implied reductions in crime associated with holding one additional juvenile delinquent or one additional adult in custody for 1 year, evaluated at the sample means. For purposes of calculating the custody and crime rates, the juvenile population is defined as aged 15–17 and the adult population is defined as aged 18–34. Number of observations varies between 391 and 395 across specifications because of occasional missing data.

means, associated with increasing the number of delinquents in cus-
tody by one. The four specifications for violent crime yield an esti-
mated reduction of between 0.49 and 0.66 violent crimes for each
delinquent-year of custody. For property crime, the corresponding
reduction is approximately three to four crimes. When one takes
into account that these changes correspond only to the number of
reported crimes rather than actual victimizations, the magnitude of
the estimates is consistent with previous estimates of crimes elimi-
nated 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).

In comparisons of the implied impacts of the alternative delin-
quent custody variables in the next-to-last row of the table, it does
not appear that ratio bias in the second custody measure (delin-
quents per violent crime) is playing an important role empirically.
The estimated impact per delinquent in custody for the second mea-
sure (cols. 3, 4, 7, and 8) is similar to or smaller than those for the
first custody measure, which is not affected by ratio bias.[11]

Columns 2, 4, 6, and 8 of the table include adult crime and custody
rates as covariates. Adding these variables has little impact on the
estimated coefficients on the juvenile custody variables. In all in-
stances, the adult crime rate enters with a positive and statistically
significant coefficient, likely suggesting the presence of omitted fac-
tors that are correlated with both juvenile and adult crime rates.
The adult custody measures are negatively correlated with juvenile
violent crime but are not statistically significant. Taken literally,
these results weakly suggest that harsher adult punishments lead ju-
veniles to reduce their violent crime, perhaps because the future
expected returns to these crimes are lower. It is difficult to place
much faith in that interpretation, however, since adult custody rates
carry a positive sign in the property crime regressions. The property
crime results suggest possible substitution between juvenile and
adult criminals: the more adult criminals that are behind bars, the
greater the opportunities for juveniles. It seems reasonable that
there would be greater substitutability among property crimes than
violent crimes. In every case, the implied change in juvenile crime
per delinquent in custody is far greater than the corresponding
change from locking up an adult, as would be expected.

[11] 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 (1998) demonstrates that ratio bias is lessened in the former specification.
Long-differenced specifications (i.e., regressions in which variables are the differ-
ence between the 1993 and 1978 observations) yield *larger* coefficients on the juve-
nile custody measure that is affected by ratio bias, but similar estimates on the other
juvenile custody variable.

An increased fraction of the population that is black is associated with lower juvenile crime rates, and more metropolitan residents have the opposite effect. Caution is warranted in interpreting these parameters, both because of the limited variation in these variables, since they are linearly interpolated, and because the two variables are highly positively correlated. A one-percentage-point increase in the unemployment rate is associated with roughly a 1–2 percent increase in the number of juvenile crimes committed, with a larger impact on property crime. There is some limited evidence that lower drinking ages are correlated with less crime.

In order to better interpret the magnitude of the estimates for juvenile crime in table 2, parallel specifications for adult crime are presented in table 3. This table is identical in structure to table 2, except that all the juvenile variables have been replaced by adult variables. The adult custody variables are negatively related to adult crime rates in all specifications and are statistically significant in six of eight cases. The impact of adding an additional prisoner, presented in the next-to-last row of the table, is sometimes similar in magnitude to the results for juveniles in table 2, and in other cases smaller. Each additional adult prisoner in custody is associated with a 0.12–0.69 reduction in violent crime annually (vs. 0.49–0.66 for juveniles). The adult property crime coefficient ranges from -1.26 to -2.48, compared to -2.68 to -4.29 for juveniles. Thus it appears that the reduction in crime associated with putting a juvenile in custody is at least as great as that from incarcerating an adult criminal.

Adding juvenile crime and custody rates to table 3 has little impact on the coefficients. Juvenile crime is positively correlated with adult crime. Juvenile custody rates do not have any clear impact on adult crime rates. The coefficients are never statistically significant and flip sign across specifications, even within a given crime category.

The unemployment rate has an impact on adult property crime similar in magnitude to that for juveniles but carries the opposite sign for violent crime. Percentage black again enters negatively, whereas percentage metropolitan carries a positive coefficient. The drinking age has a mixed effect.

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.

TABLE 3

RELATIONSHIP BETWEEN ADULT CRIME RATES AND CRIMINAL JUSTICE PUNITIVENESS

VARIABLE	ln (Adult Violent Crime Rate)				ln (Adult Property Crime Rate)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Adults in custody/adult population	−.010 (.008)	−.005 (.007)	...	...	−.016 (.007)	−.016 (.007)	...	...
Adults in custody/adult violent crime	...	...	−.690 (.058)	−.656 (.060)	...	...	−.389 (.052)	−.369 (.053)
ln (juvenile crime rate)	...	.14 (.03)	...	.07 (.03)	...	.10 (.05)	...	.09 (.04)
Juveniles in custody/juvenile population	...	−.002 (.006)	...	...	...	.001 (.005)	...	...
Juveniles in custody/juvenile violent crime	...	...	...	.020 (.033)	...	...	...	−.032 (.024)
Unemployment rate	−.004 (.004)	−.006 (.004)	−.008 (.004)	−.008 (.004)	.020 (.004)	.019 (.004)	.019 (.004)	.017 (.004)
% black	−.058 (.024)	−.038 (.023)	−.066 (.021)	−.057 (.021)	−.034 (.019)	−.026 (.020)	−.037 (.017)	−.027 (.017)
% metropolitan	.008 (.006)	.003 (.006)	.002 (.005)	.000 (.005)	.008 (.005)	.006 (.005)	.006 (.005)	.005 (.004)
Drinking age = 18	.016 (.025)	.043 (.027)	.017 (.021)	.029 (.023)	−.026 (.020)	−.018 (.021)	−.024 (.019)	−.013 (.018)
Drinking age = 19	−.037 (.026)	−.006 (.027)	−.018 (.023)	−.005 (.023)	−.030 (.017)	−.025 (.017)	−.020 (.017)	−.014 (.017)
Drinking age = 20	.053 (.035)	.049 (.029)	.053 (.029)	.052 (.027)	.056 (.031)	.054 (.029)	.050 (.030)	.047 (.028)
Age, year, and state fixed effects included?	yes	yes	yes	yes	yes	yes	yes	yes
Adjusted R^2	.963	.966	.976	.976	.929	.930	.940	.941
Implied change in adult crime per adult in custody	−.12	−.06	−.69	−.66	−1.25	−1.25	−2.48	−2.38
Implied change in adult crime per juvenile in custody	...	−.16	...	.08	...	.50	...	−.78

NOTE.—Dependent variable is the natural log of the adult crime rate in the named crime category. All regressions are weighted least squares, with state populations used as weights. White standard errors are in parentheses. Age dummies, year dummies, and state fixed effects are included in all specifications. Values in the last two rows of the table are the implied reductions in crime associated with holding one additional juvenile delinquent or one additional adult in custody for 1 year, evaluated at the sample means. For purposes of calculating the custody and crime rates, the juvenile population is defined as aged 15–17 and the adult population is defined as aged 18–34. Number of observations varies between 391 and 395 across specifications because of occasional missing data.

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. Reestimating 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 0.57 and 2.68 in table 2). For adults, the alternative custody variable yields per prisoner reductions of 0.37 violent crimes and 3.84 property crimes (compared to 0.69 and 2.48 in table 3). This alternative definition of the custody rate suggests that incarcerating an additional juvenile provides a substantially greater decline in crime than adding one more adult.

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 committing such offenses, suggesting possible preventative benefits of holding them in custody. When the variable nondelinquent juveniles in custody is added as a regressor in the regressions for violent crime, it carries a negative, statistically significant coefficient that is almost identical in magnitude to that of delinquents in custody. The number of nondelinquents 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, 13 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; 83 percent of juveniles in public training schools were in facilities described as "secure" versus 28 percent in private training schools (Office of Juvenile Justice and Delinquency Prevention 1989).

There is a voluminous literature addressing the strengths and weaknesses of these two alternative philosophies (Coates, Miller, and Ohlin 1978; Altschuler and Armstrong 1984; 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 facilities 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, yielding a larger incapacitation effect. 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.

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. There are, however, two potential weaknesses with the preceding analysis. First, it is difficult to know the extent to which omitted variables or simultaneity might be biasing the coefficients. Ordinary least squares estimates appear to understate the impact of custody measures on crime in past research (Levitt 1996). Second, it is impossible to differentiate between deterrence and incapacitation within the framework of the preceding section. Changes in custody rates increase the expected punishment, which similarly affects both deterrence and incapacitation.

In this section, a different identification strategy is used. In particular, changes in behavior immediately following the transition from the juvenile to the adult court are examined. This shift represents an abrupt change in punishments. If deterrence is at work, then one would expect an abrupt change in behavior associated with passage to adult status.[12] If, on the other hand, 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

[12] 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.

timing of arrest and sentencing, as well as the fact that juvenile records are sealed so that young adults initially receive relatively light sentences because of the absence of a criminal record. It seems likely that large immediate changes in behavior associated with the age of majority are likely to primarily reflect deterrence.[13]

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 et al. 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 be important qualitative differences in the circumstances of custody (e.g., a juvenile ranch vs. 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 entail a higher psychic cost for a 14-year-old than for 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 the 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 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

---

[13] 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.

disappear from the analysis.[14] 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 are available, a measure of punitiveness is computed as follows:

$$\text{RelativePunitiveness}_{st}$$
$$= \frac{\text{AdultPrisoners}_{st}/\text{AdultViolentCrime}_{st}}{\text{JuvenileDelinquents}_{st}/\text{JuvenileViolentCrime}_{st}}. \quad (3)$$

The harsher adult punishments are relative to juvenile punishments, the greater the measure of relative punitiveness and, consequently, the greater 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 that should attenuate any measured differences between the different groups, making it more difficult to find significant results.

Columns 1–3 of table 4 divide observations for states in which 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 in which the transition to adult court is associated with the greatest increase in punishment (a ratio greater than two). Column 2 captures state-year pairs with moderate increases in punitiveness with the onset of adult status, and column 3 reflects those cases with apparent decreases (or, possibly, the smallest increases) in the severity of punishment.[15] 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 boldfaced observations represent the age at which an individual passes from the juvenile court to the adult court.[16]

The first row of column 1 in table 4 shows that in those states in

---

[14] 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.

[15] Although the observations in col. 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.

[16] 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.

TABLE 4

CHANGES IN CRIME RATES AND THE TRANSITION FROM THE JUVENILE COURT TO THE ADULT COURT
(Year-to-Year Percentage Change in Crime for Cohorts)

COHORT	RELATIVE PUNITIVENESS OF ADULT VS. JUVENILE COURT IN STATES IN WHICH AGE OF MAJORITY IS 18				RELATIVE PUNITIVENESS IN STATES IN WHICH AGE OF MAJORITY IS 17		
	Most Punitive (N = 61) (1)	Intermediate (N = 115) (2)	Least Punitive (N = 102) (3)	Difference of (1) − (3) (4)	Most Punitive (N = 29) (5)	Least Punitive (N = 29) (6)	Difference of (5) − (6) (7)
			Violent Crime				
15–16	40.6 (3.8)	37.5 (2.6)	39.9 (3.8)	.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)	.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	.5 (2.4)	3.8 (1.8)	5.9 (1.6)	−5.4 (2.9)	−3.8 (2.7)	.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 (.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 (.9)	−3.5 (1.6)	−21.3 (1.8)	−20.9 (1.4)	−.4 (2.2)

NOTE.—Values in the table are state-population weighted means of the percentage change in crime committed by the named cohort from last year to this year. Standard deviations are in parentheses. Boldfaced 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 eq. (2). The ranges in cols. 1, 2, and 3 are > 2, 1–2, and < 1, respectively. The cutoff separating cols. 5 and 6 is 1.5.

which 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. When columns 1–3 are compared 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 in which punishments increase the most with the adult court (col. 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 committed by 18-year-olds increases 23.1 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.[17]

Columns 5 and 6 present parallel estimates for states in which the age of majority is 17. Because of 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 percentage 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.

---

[17] Bear in mind that the estimated crime rate by cohort is not a direct measure of crime involvement, but rather is 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 so 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 police officer's effort.

It is also interesting to compare the patterns observed in states in which the age of majority is 18 to those in which it is 17. For both crime categories, the change in crime is smaller for 18-year-olds becoming adults (cols. 1–3) than for 18-year-olds who were previously treated as adults (cols. 5 and 6). This suggests that even in states in which 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 in which 17-year-olds are treated as adults and adults are punished severely (col. 5), crime growth rates for 17-year-olds are lower than in states in which 17-year-olds remain juveniles (cols. 1–3). On the other hand, when 17-year-olds are treated leniently as adults (col. 6), increases in crime are even greater than in states in which 17-year-olds are juveniles.

It is possible to formalize the analysis of table 4 by including covariates. The equation estimated is

$$\%\Delta\text{Crime}_{cst} = \beta_1(\text{Majority}_{cst} \times \text{RelPun}_{st}) + \beta_2\text{Majority}_{cst}$$
$$+ \beta_3\text{RelPun}_{st} + \mathbf{X}_{st}\theta + \lambda_c + \phi_t + \mu_{c-t} + \epsilon_{cst}, \quad (4)$$

where c indexes cohorts, s corresponds to states, and t captures time. The dependent variable is the percentage 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 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. The variable $\mathbf{X}$ is a vector of state-year covariates that are constant across cohorts within a state and year, for example, percentage black. The terms 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 1978–93. Thus, for each state-year pair, there are seven observations corresponding to each of the different age groups. The results are presented in table 5. Columns 1–3 correspond to violent crime, and columns 4–6 reflect property crime. Columns 1 and 4 include only the age of majority indicator,

TABLE 5

REGRESSION ANALYSIS OF CRIME RATES AND THE TRANSITION FROM JUVENILE
TO ADULT COURT

VARIABLE	PERCENTAGE CHANGE IN VIOLENT CRIME			PERCENTAGE CHANGE IN PROPERTY CRIME		
	(1)	(2)	(3)	(4)	(5)	(6)
Become adult × relative	−.114	−.117	−.121	−.049	−.053	−.050
punitiveness	(.025)	(.022)	(.018)	(.015)	(.013)	(.009)
Become adult	.257	.199	.214	.115	.083	.090
	(.054)	(.052)	(.039)	(.034)	(.036)	(.025)
Relative punitiveness	−.025	−.019	−.090	−.015	−.008	−.008
	(.006)	(.005)	(.015)	(.004)	(.003)	(.007)
Δ % black	· · ·	−.42	−.70	· · ·	−.19	−.52
		(.05)	(.24)		(.03)	(.13)
Δ % metropolitan	· · ·	.20	−.35	· · ·	.03	−.21
		(.04)	(.15)		(.02)	(.06)
Δ unemployment rate	· · ·	−1.14	−.36	· · ·	.83	1.02
		(.76)	(.74)		(.36)	(.38)
Percentage Δ in crime	· · ·	.41	.52	· · ·	.06	.08
among those aged		(.08)	(.06)		(.06)	(.05)
22+						
Age, cohort, and year						
dummies?	no	yes	yes	no	yes	yes
State-cohort interactions?	no	no	yes	no	no	yes
Adjusted R^2	.053	.414	.445	.039	.465	.521

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

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 first 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 in which 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), the 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.[18] 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.[19] 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 increase in crime. Moreover, since juvenile records are sealed from adult courts, initial sentences for those just beyond the age of majority tend to be lenient because of the apparently clean record of the offender.

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 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 and isolating, and may facilitate the transmission of crime-specific human capital (Sampson and Laub 1993).

To test these competing hypotheses, the following specification is utilized:

---

[18] Previous studies have also suggested that absolute punishments in some states' juvenile courts may be greater than in the adult court (Greenwood 1986; "A Nation's Children in Lockup," 1993).

[19] In Texas, for instance, where the age of majority is 17, over 40 percent of all juveniles released in 1992 were 16 years of age (Office of Juvenile Justice and Delinquency Prevention 1995, p. 106). In contrast, less than 10 percent of juveniles released in Texas that year were 17 years old or older. Another extreme example of this pattern occurs in Missouri, where only 4.5 percent of juveniles released were held beyond the age of majority.

$$\ln(\text{Crime}_{ast}) = \beta_1(\text{AduCustody}_{s,t-1}) + \beta_2[\text{JuvCustody}_{s,t-(a-m)-1}]$$
$$+ \mathbf{X}_{st}\Gamma + \lambda_t + \theta_s + \psi_a + \epsilon_{ast}, \qquad (5)$$

where a indexes age, s corresponds to state, 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 19–24, 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 in which a given cohort was subject to the juvenile courts. For instance, for the cohort of 24-year-olds, a 7-year lag on juvenile custody rates is included for a state in which the age of majority is 18. An 8-year lag would be included for states in which 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. Roughly 5 percent of individuals aged 15–24 move across state lines each year; this number is roughly twice as high as for Americans as a whole (Hansen 1997). 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.[20] The key coefficients are in the first 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 10 times as great in all in-

---

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

TABLE 6

IMPACT OF JUVENILE PUNISHMENT SEVERITY ON LATER
ADULT CRIMINAL BEHAVIOR

VARIABLE	ln (Violent Crime)		ln (Property Crime)	
	(1)	(2)	(3)	(4)
Severity of punishment in last year	−.057	−.035	−.024	.006
as juvenile	(.030)	(.032)	(.027)	(.025)
Severity of current adult	−.629	−.638	−.376	−.486
punishment	(.067)	(.102)	(.073)	(.080)
Severity of current juvenile	−.076	−.035	−.048	−.028
punishment	(.040)	(.035)	(.036)	(.030)
Unemployment rate	−.022	−.024	.007	.011
	(.005)	(.005)	(.004)	(.005)
% black	−.140	⋯	−.104	⋯
	(.026)		(.022)	
% metropolitan	−.014	⋯	−.018	⋯
	(.009)		(.009)	
Age = 19	.202	.170	.566	.548
	(.024)	(.020)	(.027)	(.020)
Age = 20	.124	.092	.342	.337
	(.015)	(.013)	(.015)	(.012)
Age = 21	.151	.135	.254	.239
	(.022)	(.019)	(.025)	(.014)
Age = 22	.062	.047	.114	.112
	(.011)	(.010)	(.010)	(.008)
Age = 23	.070	.070	.079	.066
	(.019)	(.019)	(.019)	(.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^2	.993	.994	.991	.993

NOTE.—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 19–24 are included in the regressions for the years 1985, 1987, 1989, 1991, and 1993. All measures of severity of punishment are computed on the basis of 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 percentage black and percentage metropolitan variables are linearly interpolated from decennial census data, they are not separately identified when state trends are included in the model.

stances. 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
does not have a first-order impact on later criminal involvement.
This finding is consistent with longer-term deterrent effects and

criminal human capital/stigma effects roughly offsetting one another, or both simply being small in magnitude.[21]

VI. 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 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 reduction in crime 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 in which 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.

With 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 juveniles 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, rates of juvenile violent and property crime rose 107 and 7 percent, respectively. For adults, the corresponding increases were 52 and 19 percent. On the basis of the estimates of table 2, if juvenile punishments had increased proportionally with those of adults, then the predicted percentage changes in juvenile violent and property crime over this period would have been 74 and 2 percent.[22] 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. Under this hypothetical scenario, the relative decrease in juvenile property

---

[21] 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.

[22] These estimates are based on cols. 3 and 7 of table 2. Categorically similar results are obtained with the other specifications in either table 2 or table 3.

crime rates relative to adult rates would have been almost as great as the relative increase in juvenile violent crime rates relative to adult rates.

Under the assumption that murder responds to punishment in the same manner as violent crimes more generally, the shift in relative punishments is able to account for only 25 percent of the differential growth in juvenile and adult homicide rates. The sharp divergence in homicide rates relative to other crime rates requires explanations beyond simply a change in relative punishments. Both the rise of crack cocaine and the increased usage of handguns by juveniles since the mid 1980s appear to play a role (Blumstein 1995; Cook and Laub 1997; Donohue and Levitt 1998).

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. On the basis of 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 than that of the typical adult prisoner: total spending per resident in public juvenile facilities was roughly $33,000 in 1990, the last year for which data are available (Office of Juvenile Justice and Delinquency Prevention 1995). In comparison, according to the Department of Justice (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.

Because of 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 (1992), 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.

References

Altschuler, David, and Armstrong, Troy. "Intervening with Serious Juvenile Offenders." In *Violent Juvenile Offenders: An Anthology*, edited by Robert A. Mathias, Paul DeMuro, and Richard S. Allinson. San Francisco: Nat. Council Crime and Delinquency, 1984.

Becker, Gary S. "Crime and Punishment: An Economic Approach." *J.P.E.* 76 (March/April 1968): 169–217.

Bennett, William J.; DiIulio, John J., Jr.; and Walters, John P. *Body Count: Moral Poverty—and How to Win America's War against Crime and Drugs*. New York: Simon & Schuster, 1996.

Blumstein, Alfred. "Youth Violence, Guns, and the Illicit-Drug Industry." *J. Criminal Law and Criminology* 86 (Fall 1995): 10–36.

Blumstein, Alfred; Cohen, Jacqueline; Roth, Jeffrey; and Visher, Christy, eds. *Criminal Careers and "Career Criminals."* 2 vols. Washington: Nat. Acad. Press, 1986.

Blumstein, Alfred; Nagin, Daniel; and Cohen, Jacqueline, eds. *Deterrence and Incapacitation: Estimating the Effects of Criminal Sanctions on Crime Rates*. Washington: Nat. Acad. Sci., 1978.

Boland, Barbara, and Wilson, James Q. "Age, Crime, and Punishment." *Public Interest*, no. 51 (Spring 1978), pp. 22–34.

Cameron, Samuel. "The Economics of Crime Deterrence: A Survey of Theory and Evidence." *Kyklos* 41, no. 2 (1988): 301–23.

Coates, Robert B.; Miller, Alden D.; and Ohlin, Lloyd E. *Diversity in a Youth Correctional System: Handling Delinquents in Massachusetts*. Cambridge, Mass.: Ballinger, 1978.

Cohen, Mark. "The Monetary Value of Saving a High Risk Youth." Manuscript. Nashville: Vanderbilt Univ., Law School, 1995.

Cook, Philip, and Laub, John H. "The Unprecedented Epidemic in Youth Violence." Manuscript. Durham, N.C.: Duke Univ., 1997.

Department of Justice. *Sourcebook of Criminal Justice Statistics: 1995*. Washington: Dept. Justice, 1995.

DiIulio, John, and Piehl, Anne Morrison. "Does Prison Pay? The Stormy National Debate over the Cost-Effectiveness of Imprisonment." *Brookings Rev.* 9 (Fall 1991): 28–35.

Donohue, John J., III, and Levitt, Steven D. "Guns, Violence, and the Efficiency of Illegal Markets." *A.E.R. Papers and Proc.* 88 (May 1998): 463–67.

Donohue, John J., III, and Siegelman, Peter. "Is the United States at the Optimal Rate of Crime?" Manuscript. Chicago: American Bar Found., 1994.

Ehrlich, Isaac. "Participation in Illegitimate Activities: A Theoretical and Empirical Investigation." *J.P.E.* 81 (May/June 1973): 521–65.

———. "On the Usefulness of Controlling Individuals: An Economic Analysis of Rehabilitation, Incapacitation, and Deterrence." *A.E.R.* 71 (June 1981): 307–22.

Glaeser, Edward L.; Sacerdote, Bruce; and Scheinkman, José A. "Crime and Social Interactions." *Q.J.E.* 111 (May 1996): 507–48.

Glassner, Barry; Ksander, Margret; Berg, Bruce; and Johnson, Bruce. "A Note on the Deterrent Effect of Juvenile vs. Adult Jurisdiction." *Soc. Problems* 31 (December 1983): 219–21.

Greenwood, Peter W. "Differences in Criminal Behavior and Court Re-

sponse among Juvenile and Young Adult Offenders." In *Crime and Justice: A Review of Research*, vol. 7, edited by Michael Tonry and Norval Morris. Chicago: Univ. Chicago Press, 1986.

————. "Juvenile Crime and Juvenile Justice." In *Crime*, edited by James Q. Wilson and Joan Petersilia. San Francisco: Inst. Contemporary Studies Press, 1995.

Greenwood, Peter W., and Zimring, Franklin E. *One More Chance: The Pursuit of Promising Intervention Strategies for Chronic Juvenile Offenders*. Santa Monica, Calif.: Rand Corp., 1985.

Griliches, Zvi, and Hausman, Jerry A. "Errors in Variables in Panel Data." *J. Econometrics* 31 (February 1986): 93–118.

Grogger, Jeffrey. "Certainty vs. Severity of Punishment." *Econ. Inquiry* 29 (April 1991): 297–309.

Hansen, Kristin A. "Geographic Mobility, March 1995 to March 1996." *Current Population Reports*, ser. P20, no. 497. Washington: Dept. Commerce, 1997.

Krisberg, Barry, and Austin, James F. *Reinventing Juvenile Justice*. Newbury Park, Calif.: Sage Publications, 1993.

Levitt, Steven D. "The Effect of Prison Population Size on Crime Rates: Evidence from Prison Overcrowding Litigation." *Q.J.E.* 111 (May 1996): 319–51.

————. "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *A.E.R.* 87 (June 1997): 270–90.

————. "Why Do Increased Arrest Rates Appear to Reduce Crime: Deterrence, Incapacitation, or Measurement Error?" *Econ. Inquiry* 36 (July 1998): 353–72.

Lipsey, Mark. "Juvenile Delinquency Treatment: A Meta-Analysis Inquiry into the Variability of Effects." In *Meta-Analysis for Explanation: A Casebook*, edited by Thomas D. Cook et al. Beverly Hills, Calif.: Sage Found., 1992.

Lott, John R., Jr. "An Attempt at Measuring the Total Monetary Penalty from Drug Convictions: The Importance of an Individual's Reputation." *J. Legal Studies* 21 (January 1992): 159–87.

Marvell, Thomas B., and Moody, Carlisle E. "Prison Population Growth and Crime Reduction." *J. Quantitative Criminology* 10 (March 1994): 109–40.

————. "Specification Problems, Police Levels, and Crime Rates." *Criminology* 34 (November 1996): 609–46.

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

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

Office of Juvenile Justice and Delinquency Prevention. *Children in Custody*. Washington: Dept. Justice, 1989.

————. *Juveniles Taken into Custody: Fiscal Year 1993*. Washington: Dept. Justice, 1995.

Polinsky, A. Mitchell, and Shavell, Steven. "The Optimal Use of Fines and Imprisonment." *J. Public Econ.* 24 (June 1984): 89–99.

Sampson, Robert J. "The Community." In *Crime*, edited by James Q. Wilson and Joan Petersilia. San Francisco: Inst. Contemporary Studies Press, 1995.

Sampson, Robert J., and Laub, John H. *Crime in the Making: Pathways and Turning Points through Life*. Cambridge, Mass.: Harvard Univ. Press, 1993.

Schneider, Anne L., and Ervin, Laurie. "Specific Deterrence, Rational Choice, and Decision Heuristics: Applications in Juvenile Justice." *Soc. Sci. Q.* 71 (September 1990): 585–601.

Stigler, George J. "The Optimum Enforcement of Laws." *J.P.E.* 78 (May/June 1970): 526–36.

Tauchen, Helen; Witte, Anne D.; and Griesinger, Harriet. "Criminal Deterrence: Revisiting the Issue with a Birth Cohort." *Rev. Econ. and Statis.* 76 (August 1994): 399–412.

Visher, Christy. "The RAND Inmate Survey: A Reanalysis." In *Criminal Careers and "Career Criminals,"* vol. 2, edited by Alfred Blumstein et al. Washington: Nat. Acad. Press, 1986.

Waldfogel, Joel. "Does Conviction Have a Persistent Effect on Income and Employment?" *Internat. Rev. Law and Econ.* 14 (March 1994): 103–19.

Witte, Ann D. "Estimating the Economic Model of Crime with Individual Data." *Q.J.E.* 94 (February 1980): 57–84.