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THE 1997 REVISIONS TO WASHINGTON'S JUVENILE OFFENDER SENTENCING LAWS: AN EVALUATION OF THE EFFECT OF LOCAL DETENTION ON CRIME RATES

The Washington Legislature directed the Washington State Institute for Public Policy (Institute) to evaluate the changes made during the 1997 session to the state's juvenile sentencing laws.[1] This report is one of three publications on the study.[2]

Summary

The Legislature established Washington's current juvenile sentencing system in 1977, and revised certain key aspects in 1994 and 1997. One policy change in 1997 gave juvenile court judges more discretion to use county detention facilities for juvenile offenders not sentenced to the state. The Institute examined whether the use of detention affects juvenile crime rates. We found that the admission rate to juvenile detention facilities appears to influence several types of juvenile arrest rates. This finding is consistent with other research. We conducted a cost-benefit analysis and found that taxpayers receive a positive rate of return for detention, although these returns have declined significantly in recent years. We also found that taxpayers get a larger return from some other crime reduction strategies, indicating that a policy portfolio of sanctions and research-based programs leads to an efficient use of taxpayer dollars.

Background

In Washington, a person 17 years of age or younger who commits a criminal offense is subject to the state's juvenile justice laws.[3] These laws have changed significantly over the last 90 years and, today, Washington has a juvenile sentencing system that is unique among the 50 states.

Washington's first juvenile code was adopted in 1913.[4] That initial system, which remained in effect for 65 years, gave local juvenile courts and probation staff considerable discretion in how to sanction and treat juveniles arrested for crimes.

By the 1970s, the legislature had grown concerned that juveniles arrested for similar offenses were not being similarly prosecuted and, if adjudicated, were not being similarly sanctioned. For example, a juvenile burglar in Benton County might be sanctioned differently than a juvenile burglar in King County. Even within one jurisdiction, it was noted, juveniles with the same crimes were sometimes receiving different sanctions. Some observed that this was particularly true for minorities. The legislature was also concerned that some serious juvenile offenders were not receiving sanctions consistent with the severity of their offenses.[5]

To address these concerns, the 1977 Legislature fundamentally changed the juvenile sentencing laws when it adopted a presumptive, determinate sentencing system. The 1977 statute, which continues to be the basis of Washington's juvenile system, established a statewide sentencing grid. The grid indicates the sanction a juvenile offender will receive, depending on the seriousness of the juvenile's offense, the juvenile's age, and his or her criminal history. Sentences can range from a variety of local sanctions to confinement in a

[1] RCW 13.40.0357. For information, contact this report's author: Steve Aos (saos@wsipp.wa.gov).
[2] A second report examines the "automatic decline" provisions in the 1997 revisions. A third and final report, available September 2002 after state and King County detention data are successfully merged, will cover the remaining legislatively-posed research questions.
[3] RCW 13.40.
[4] Governor's Juvenile Justice Advisory Committee, 2001 Juvenile Justice Report, hereafter GJJAC 2001.
[5] For a history of Washington's juvenile and adult sentencing systems, see: David Boerner and Roxanne Lieb (2001) "Sentencing Reform in the Other Washington." In *Crime and Justice: A Review of Research,* Volume 28, edited by Michael Tonry. Chicago: University of Chicago Press.

state juvenile correctional facility. Judges can deviate from the grid, but the grid is presumed to be the sentencing standard for the state.[6] In addition to adopting a determinate sentencing philosophy, the 1977 Legislature made a key decision when it shifted the legal responsibility for which public entity files charges on a juvenile. The 1977 law took that responsibility away from juvenile court staff and gave it to county prosecutors.

The 1994 and 1997 Legislatures amended the 1977 statute by, among other things, automatically transferring cases to adult criminal court when a 16- or 17-year-old is charged with certain serous crimes.

The 1997 Legislative revisions also modified and simplified the juvenile grid by making it a function of two factors (the seriousness of the juvenile's offense and the youth's criminal history) rather than three (a juvenile's age was deleted). Further, the 1997 revisions gave juvenile court judges more discretion in the use of local sanctions, including when to order confinement for up to 30 days in a county-run juvenile detention facility. In contrast, the pre-1997 system was more prescriptive in determining when a judge could—or could not—impose a sentence to a local detention facility.

In sum, Washington's juvenile presumptive determinate sentencing system, first enacted 25 years ago and amended several times since, remains the state's juvenile sentencing policy. As mentioned, Washington is unique among the states. Washington is the only state that has a presumptive determinate sentencing system for juvenile offenders, although nearly half of the states (including Washington) have since adopted various forms of determinate systems for adult offenders.[7]

Evaluation of the 1997 Act: Research Questions

The Legislature directed the Institute to study the 1997 revisions to Washington's juvenile sentencing system. The Institute is required to: a) examine whether the revisions have affected the rate of initial offense commission and recidivism; b) determine the effects by age, race, and gender; c) compare the utilization and effectiveness of sentencing alternatives and manifest-injustice determinations before and after the revisions; and d) examine the impact and effectiveness of changes made in the exclusive original jurisdiction of the juvenile court over juvenile offenders.

This report examines the question: Does the use of local juvenile detention facilities affect local juvenile crime rates? The 1997 revisions gave juvenile court judges more discretion to use county detention facilities for sentences. Thus, a key question is whether detention actually works to lower juvenile crime rates.

Part of this question is also economic in nature. If the use of detention lowers crime rates, then benefits accrue to taxpayers and citizens because some level of crime is avoided. On the other hand, juvenile detention facilities are expensive. In this report, we provide an estimate of the economic "bottom line" of juvenile detention facilities in Washington, weighing the benefits of avoided crime against the costs of the detention facilities. We also compare the estimated rate of return on detention facilities to other taxpayer-financed crime reduction programs.

[6] In 2000, juvenile court judges sentenced offenders within the grid's standard range 97 percent of the time. Of those 3 percent of offenders sentenced outside of the standard range, 86 percent received increased sanctions and 14 percent received reduced sanctions (GJJAC 2001).

[7] Utah adopted voluntary juvenile guidelines in 1997.

The Use of Juvenile Detention in Washington

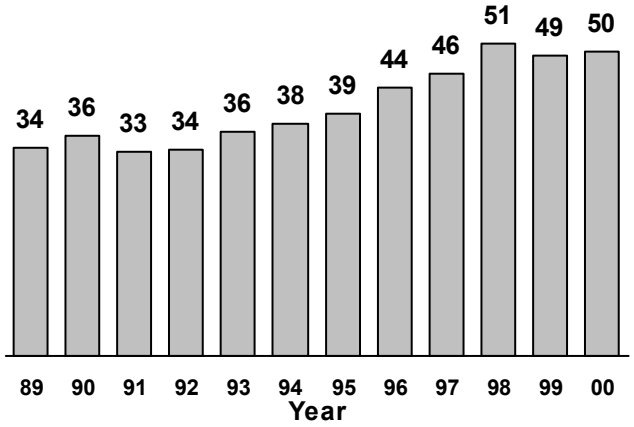
Washington's system of secure confinement of juvenile offenders includes 21 county-owned juvenile detention facilities and a variety of state-owned or contracted facilities for more serious juvenile offenders. Washington's juvenile sentencing law determines which offenders can or must be sentenced to the local and state systems. Juveniles with sentences to confinement over 30 days are transferred to the state system.

Juvenile offenders with sentences less than or equal to 30 days serve time in one of the county detention facilities. The average length of stay in a detention facility is about 11 days. The Washington State Sentencing Guidelines Commission conducted a survey that found on an average day in 1998 there were about 1,000 youth in the county juvenile detention facilities in Washington.[8]

During 2000, there were about 34,000 admissions of juveniles to these local detention facilities.[9] Figure 1 shows the rate at which juveniles have been admitted to the detention facilities from 1989 to 2000.[10] In 1989, there were about 34 admissions per 1,000 juveniles (10 to 17 years old) in the state. By 2000, the admission rate stood at 50 per 1,000 youth.

Figure 1

Admission Rates to County Juvenile Detention Facilities in Washington, Admissions Per 1,000 10- to 17-Year-Olds



[8] Edward Vukich (2000) *Juvenile Detention in Washington State: Population, Capacity and Programming in Local Facilities.* Olympia: Sentencing Guidelines Commission.

[9] Since some juveniles are admitted more than once during a year, the number of individuals admitted is less than the total number of annual admissions.

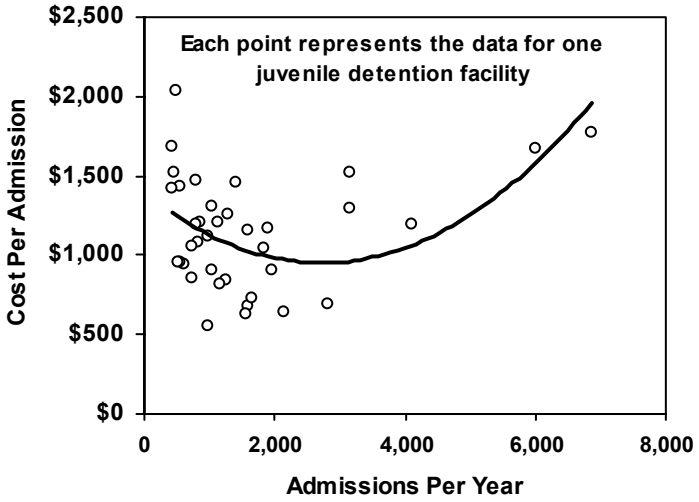
This represents a 47 percent increase in the use of detention over those years.

The Cost of Juvenile Detention Facilities in Washington

In 2001 dollars, the annual operating cost of the 21 county-run juvenile detention facilities is about $43 million.[11] Figure 2 shows the average operating cost per admission to the facilities. The Figure reveals a "U" shaped average cost curve, typical of many types of businesses.[12] The Institute estimated this

Figure 2

Operating Cost Per Admission, County Juvenile Detention Facilities



relationship empirically and determined that for the typical juvenile detention facility in Washington, the average operating cost per admission is about $1,025 (in 2001 dollars).[13]

In addition to operating costs, juvenile detention facilities require capital construction costs. The Institute has estimated that the annualized capital payment per detention bed

[10] GJJAC (2001). Figure 1 begins with 1989 since the admission data prior to that year are not as reliable.

[11] Vukich (2000). For this estimate, the 1998 operating costs reported in the Vukich report were escalated to 2001 dollars using the Implicit Price Deflator.

[12] The data portrayed on Figure 2 come from the Vukich survey and a 1995 survey conducted by the Institute. See Mason Burley and Robert Barnoski (1997) *Washington State Juvenile Courts: Workloads and Costs,* The Institute publication is available at: <www.wsipp.wa.gov/crime/pdf/crtsurv.pdf>.

[13] The Institute estimated a quadratic cost curve with average admission cost as a function of admissions, admissions squared, and average length of stay. The data are the 39 observations from the two surveys described in footnote 12. Details are available on request.

is about $10,700 in 2001 dollars.[14] At the average length of stay of about 11 days, these capital costs amount to about $323 per typical stay in a juvenile detention facility. Thus, an estimate of the total taxpayer cost of an average stay in juvenile detention is about $1,348 ($1,025 operating and $323 capital).

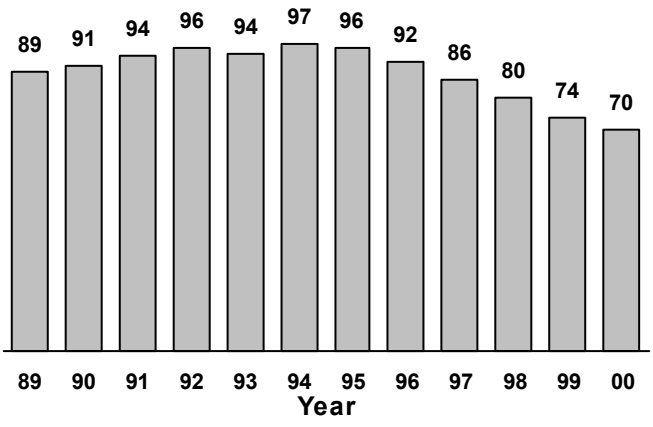
Juvenile Arrest Rates in Washington

The purpose of this study is to determine whether the use of juvenile detention affects the juvenile crime rate. In this study, juvenile crime is measured as the juvenile arrest rate.[15]

Figure 3 shows the total juvenile arrest rate in Washington for the years 1989 to 2000. In 1989 there were about 89 juvenile arrests per 1,000 juveniles (10 to 17 years old) in the state. That rate rose during the first half of the 1990s but then started to fall. By 2000, the juvenile arrest rate stood at 70 per 1,000 youth. This represents a 21 percent drop in the juvenile arrest rate between 1989 and 2000.

Figure 3

Juvenile Arrest Rates in Washington
1989 to 2000
Arrests Per 1,000 10- to 17-Year-Olds



[14] S. Aos, P. Phipps, R. Barnoski, R. Lieb (2001) "The Comparative Costs and Benefits of Programs to Reduce Crime Version 4.0," Washington State Institute for Public Policy, available at: <www.wsipp.wa.gov/crime/pdf/costbenefit.pdf>.

[15] If the data were available, of course, it would be better to measure the number of juvenile crimes reported to police rather than the number of juvenile arrests made by police. Unfortunately, this is not possible because reported crime statistics are not compiled by the age of the offender, since crime victims often do not know the age of the perpetrator of the crime. For arrests, on the other hand, police do record the age of the person arrested. As discussed in the Appendix, since not all police and sheriffs offices report arrest statistics every year, we have adjusted the arrest rates used in this study to reflect the non-reporting jurisdictions.

Has the Detention Rate Affected the Juvenile Arrest Rate?

The information in Figure 1 indicates that in the last decade juvenile detention rates have risen. The information on Figure 3 shows that juvenile arrest rates have declined. Is there a cause-and-effect relationship between these two trends? More generally, do changes in detention rates lead to changes in arrest rates for juveniles?

To test this relationship, the Institute conducted a statistical analysis of juvenile arrest rates in Washington. The technical details behind this analysis are discussed in the Appendix.

We found that several types of juvenile arrests appear to be influenced by the rate of admissions to juvenile detention facilities. In particular, it appears that juvenile violent arrests and property arrests are lower today, in part because the detention rate was increased during the 1990s. We did not find a similar effect for juveniles arrested for drug and alcohol offenses: the rate of detention does not seem to influence the rate of these substance-abuse arrests.

What is the estimated magnitude of the effect of juvenile detention on juvenile violent and property arrest rates? We found that a 10 percent increase in the detention admission rate (the number of admissions per 1,000 juveniles 10 to 17 years old) leads to about a 2 to 4 percent reduction in juvenile violent and property arrest rates.

This relationship is quite similar to the conclusions of a recent review of the effect of adult prison on overall crime rates.[16] The study reviewed available national research and concluded that a 10 percent increase in adult incarceration leads to a 3 percent reduction in serious crime. The finding is also similar to other work the Institute has performed on overall incarceration rates in Washington and their effect on crime rates in the state.[17]

[16] W. Spelman (2000) "The Limited Importance of Prison Expansion." In *The Crime Drop in America,* edited by Alfred Blumstein and Joel Wallman, New York: Cambridge University Press, page 104.

[17] S. Aos (2002). Presentation to Washington State Senate Ways and Means Committee, January 29, 2002.

There have been few empirical studies specifically on the effects of criminal sanctions on juveniles. Two studies, however, have recently been published.[18] Both found that juvenile offenders do respond to criminal sanctions, and Levitt (1998) concludes that "juvenile offenders are at least as responsive to criminal sanctions as adults." The Institute's findings presented in this report are consistent with these other results.

The Costs and Benefits of Juvenile Detention in Washington

Given the result just reported—that juvenile detention facilities appear to have an effect on the juvenile arrest rate—the Institute conducted a cost-benefit analysis of juvenile detention facilities. The analysis follows the same costing methods the Institute has used to study the economics of a wide array of crime reduction strategies.[19]

The results of the cost-benefit analysis are summarized in Table 1. To develop the estimates, the Institute first estimated the magnitude of the effect of detention on arrests. The first section of Table 1 reports the estimated number of arrests avoided per detention admission. Overall, about .7 arrests were avoided per admission in 1990, but this fell to only .33 arrests avoided in 2000.

Why the decline in the effectiveness of detention over the 1990s? As with any business, diminishing returns occur as a market begins to be saturated. That is, earnings erode when resource expansion increases faster than the market—in this case, the number of juveniles in Washington. The rate of detention increased significantly during the 1990s and diminishing returns started to take effect as more juveniles—less crime-prone on the margin—were brought into the detention system. Thus, an admission to a detention facility today appears to avoid fewer arrests than it did a decade ago.

The bottom line shown on Table 1 indicates that juvenile detention does produce a positive return for the investment. During 2000, for example, the average admission to a juvenile detention facility cost $1,348, but avoided .33 arrests resulting in $2,670 in crime victim and taxpayer benefits. The estimated benefit-to-cost ratio is thus $1.98 in benefits per dollar of cost. The Table shows that the economic bottom line of detention decreased significantly during the 1990s, as diminishing returns followed the rapid system expansion.

Table 1
Estimated Benefit-to-Cost Ratios for Admissions to Juvenile Detention Facilities in Washington, 1990, 1995, 2000

	Type of Arrest	1990	1995	2000
Arrests Avoided Per Detention Admission(1)	Violent	0.034	0.037	0.020
	Property	0.612	0.571	0.273
	Drug	0.000	0.000	0.000
	Other	0.054	0.056	0.036
	Total	0.699	0.665	0.330
Total Victim and Criminal Justice System Costs Avoided(2)	Violent	$2,706	$2,988	$1,615
	Property	$2,212	$2,066	$987
	Drug	$0	$0	$0
	Other	$100	$104	$68
	Total	$5,018	$5,158	$2,670
Taxpayer Cost of Detention Per Admission(3)		$1,348	$1,348	$1,348
Benefit-to-Cost Ratio(4)		$3.72	$3.83	$1.98

(1) Avoided arrests (marginal effect) for each year are computed with the estimated elasticities (-.350; -.442; 0.00; -.076; for violent, property, drug, and other arrests, respectively, see Table 2), multiplied by that year's ratio of actual detention admissions to arrests by type.
(2) Avoided costs (in 2001 dollars) computed by multiplying the estimated avoided arrests (above) by the estimated value to victims and taxpayers *per* avoided arrest ($80,262; $3,615; $3,438; $1,872; for a violent, property, drug, and other arrest, respectively). Details available on request, or in Aos(2001).
(3) Detention costs (in 2001 dollars), as discussed in body of report.
(4) Total avoided costs divided by detention admission costs.

How do these economic returns compare with alternative juvenile crime control measures available to policymakers? In short, while taxpayers receive a positive return for detention, they get an even higher return on their dollar from some other crime reduction strategies. For example, the legislature funded a program in the juvenile courts called Aggression Replacement Training. The Institute's preliminary evaluation of this program reveals a benefit-to-cost ratio of $14.23.[20] More generally, the Institute found that some crime-reduction programs can also produce attractive taxpayer returns (Aos, 2001). This indicates that policymakers can use a portfolio of sanctions and research-based programs to give taxpayers a good return on their dollar.

[18] S. D. Levitt (1998) "Juvenile Crime and Punishment," *Journal of Political Economy,* 106(6): 1156-1185. H. N. Mocan, D. I. Rees (2000) "Economic Conditions, Deterrence and Juvenile Crime: Evidence From Micro Data," University of Colorado monograph.

[19] For details of the Institute's approach, see Aos (2001).

[20] R. Barnoski (2002) "Washington State's Implementation of Aggression Replacement Training for Juvenile Offenders: Preliminary Findings," Washington State Institute for Public Policy: <www.wsipp.wa.gov/crime/JuvJustice.html>.

Technical Appendix

This Appendix describes technical details of an econometric model developed to estimate the effects of juvenile detention on juvenile arrest rates; it is intended for technical audiences. The model uses a panel data set, assembled for this analysis, with pooled cross sections over time. Panel models have been used with increasing frequency in the last 10 years to estimate the effects of prison and other criminal justice policy variables on crime rates.[21] Panel models have the distinct advantage of allowing fixed unobserved factors to be controlled in a regression analysis.

Most of the previous research has focused primarily on the effect of adult criminal justice variables (prison and police) on total crime rates. Only a few studies have tried to estimate the effect of *juvenile* sanctions on *juvenile* crime.[22] Levitt (1998) and Mocan and Rees (2000) found that juveniles do respond to criminal sanctions in ways not dissimilar to the way adults respond to adult sanctions.

The basic units of observation for this study are the 39 counties in Washington, for the years 1989 to 2000. As will be discussed, it was necessary to aggregate the 39 counties into 7 regions, producing a final sample of 84 observations (7 regions for 12 years).

The Models Four separate models were estimated in this analysis: one for violent arrests, one for property arrests, one for drug and alcohol arrests combined, and one for all other arrests. For each model, the general structure takes the following fixed effects panel form:

$$\ln(Arrestrate)_{rt} = \beta_0 + \beta_1 \ln(Detrate)_{rt} + \psi' X_{rt} + \varphi R_r + \delta T_t + \varepsilon_{rt}$$

The arrest rate for region *r* in time period *t* is estimated as a linear function of the juvenile detention rate, a vector of X labor market and other covariates, and separate region R and year T dummies. As is common in econometric specifications of crime models, the arrest and detention variables are expressed as natural logs, allowing the β_1 coefficient to be interpreted directly as an elasticity. The primary covariates used in this analysis are the level of real retail wages and the level of real per capita income. Both of these variables, particularly the retail wage variable, have been found to be significantly related to crime rates.[23] The expected sign on the wage variable is negative: the economic model of crime would suggest that the higher the legal wage (as approximated for youth by retail wages), the lower the criminal activity. The expected sign of the detention rate variable is also negative: the higher the detention rate, the lower the expected arrest rate.

As in virtually all crime models, the problem of simultaneity bias arises. In this case, the arrest rate may be dependent on the detention rate, but the detention rate may be dependent on the arrest rate. To

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[21] Some of the significant and more recent studies include the following. S. D. Levitt (1996) "The Effect of Prison Population Size on Crime Rates: Evidence From Prison Overcrowding Litigation," *The Quarterly Journal of Economics,* 111(2): 319-351. S. D. Levitt (2001) "Alternative Strategies for Identifying the Link Between Unemployment and Crime," *Journal of Quantitative Criminology,* 17: 377-390. Steven Levitt (1997) "Using Electoral Cycles in Police Hiring to Estimate the Effect of Police on Crime." *American Economic Review,* 87: 270-290. T. Marvell, C. Moody (1994) "Prison Population Growth and Crime Reduction," *Journal of Quantitative Criminology* 10(2): 109-140. T. Marvell, C. Moody (1996) "Specification Problems, Police Levels, and Crime Rates," *Criminology,* 34(4): 609-646. S. Raphael and R. Winter-Ebmer (2001) "Identifying the Effect of Unemployment on Crime," *Journal of Law & Economics,* 44(1): 259-284. T. Cherry (2001) "Financial Penalties as an Alternative Criminal Sanction: Evidence From Panel Data," *Atlantic Economic Journal,* 29(4): 450-458. Christopher Cornwell and William N. Trumbull (1994), "Estimating the Economic Model of Crime With Panel Data." *The Review of Economics and Statistics,* 76(2): 360-366. E. Gould, B. Weinberg, D. Mustard (2002) "Crime Rates and Local Labor Market Opportunities in the United States: 1979-1997," *The Review of Economics and Statistics,* 84(1): 45-61. J. Grogger (1998) "Market Wages and Youth Crime." *Journal of Law and Economics,* 16: 756-791. S. Machin, C. Meghir (2000) "Crime and Economic Incentives: The Institute for Fiscal Studies, WP 00/17 <http://www.ifs.org.uk/workingpapers/wp0017.pdf>.
T. Kovandzic, J. Sloan (2002) "Police Levels and Crime Rates Revisited: A County-Level Analysis From Florida (1980-1998)." *Journal of Criminal Justice*, 30: 65-76. H. Dezhbakhsh, P. Rubin, J. Shepherd (2002) "Does Capital Punishment Have a Deterrent Effect? New Evidence From Post-Moratorium Panel Data," Department of Economics, Emory University.

[22] S. D. Levitt (1998) "Juvenile Crime and Punishment," *Journal of Political Economy,* 106(6): 1156-1185. H. N. Mocan, D. I. Rees (2000) "Economic Conditions, Deterrence and Juvenile Crime: Evidence From Micro Data," University of Colorado monograph.

[23] See studies by Gould (2002), Grogger (1998), and J. Doyle, E. Ahmed, R. Horn (1999) "The Effects of Labor Markets and Income Inequity on Crime: Evidence From Panel Data," *Southern Economic Journal,* 65(4): 717-738.

identify the arrest equation, an instrumental variable (IV) is needed to break the simultaneity bias.[24] For the crime model estimated here, this simultaneous relationship means that the effect of detention on the arrest rate will be understated with OLS estimation unless the simultaneity can be broken with an IV. In this study, a reasonable IV was found. The IV reflects the way Washington's juvenile detention system is structured geographically. The variable is whether a county owns a detention facility or rents space in some other county's facility. As noted below, not all counties own a facility, and it was found (in a reduced-form estimation discussed in the footnote to Table 2) that those counties that own their own facility are significantly more likely to use detention as a sanction than those counties that have to rent space in a neighboring county and transport juveniles across county lines. The argument for this IV is that a county's decision to own its own facility, usually made decades earlier, is unrelated to juvenile arrest rates, except insofar as facility ownership plays a role in how often detention is used as a sanction. Using this IV for the detention rate variable, two-stage least squares was used to estimate the equations described above. The results for both the OLS and TSLS estimations are presented so that results can be compared.

The Data For each county, data were collected on the number of juvenile arrests made by city police and county sheriffs. Arrest data were collected separately for violent, property, drug, and other arrests. Information was also obtained on the number of police or sheriff offices that did not report juvenile arrests in any year.[25] County and city level juvenile population data for 1989 to 2000, for 10- to 17-year-olds, were obtained from the Washington State Office of Financial Management. This information was used to estimate, for each county for each year, the percent of a county's juvenile population where the local police unit failed to report arrest data. Imputations were then made, making sure that any imputed rate was reasonably consistent with prior-year and following-year arrest rates for the jurisdiction.

County level information was also collected on retail wages, retail employment, and personal income. These data were obtained from the Local Area Personal Income data maintained in the federal Bureau of Economic Analysis' Regional Economic Information System. Retail wages and personal income per capita were computed for each county for each year. The Implicit Price Deflator for Personal Consumption Expenditures was used to express these dollar values in constant terms. Information was also collected on the percent of a county's personal income represented by income maintenance transfers. Additional information was collected on the percent of a county's total population that was white and nonwhite, and on the land area in each county so that a population-per-square-mile variable could be tested.

Data on admissions to county juvenile detention facilities were obtained from the GJJAC reports. In Washington, there are 39 counties and 21 juvenile detention facilities. Thus, many counties purchase detention space from those counties that own their own facilities. To develop a geographically-consistent data set for the arrest data (aggregated at the county level) and the detention data (reported only at the facility level), it was necessary to identify, year by year, which counties rented space from facility-owning counties. An analysis of these contractual arrangements revealed seven logical "juvenile detention regions" in Washington. These regions were selected to ensure that the arrest statistics would match as closely as possible the total detention admission statistics reported for counties that own facilities.[26] Since the overall 10-to 17-year-old population of these seven regions is quite similar, weighted least squares regressions were not used.

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[24] J. M. Wooldridge (2000) *Introductory Econometrics, A Modern Approach,* Cincinnati: South-Western College Publishing; J. M. Wooldridge (2002) *Econometric Analysis of Cross Section and Panel Data,* Cambridge: The MIT Press; and W. H. Greene (2000), *Econometric Analysis, 4th Ed.,* New Jersey: Prentice Hall.

[25] These data are initially collected by the Washington Association of Sheriff's and Police Chiefs and they are then reported annually by the Governor's Juvenile Justice Advisory Committee.

[26] Two of the largest counties in Washington, King and Pierce, own their own facilities and are their own regions for this analysis. There is a third detention region in northern Puget Sound composed of Skagit, Snohomish, Whatcom, Island, and San Juan Counties. There is another region in Southwest Washington composed of Clark and Skamania Counties. A fifth western Washington region includes all other western Washington counties (Clallam, Cowlitz, Grays Harbor, Kitsap, Lewis, Mason, Thurston, Jefferson, Pacific, and Wahkiakum). These counties have used each other's facilities over the 1989 to 2000 period. In eastern Washington, two regions were created to reflect the two juvenile detention markets in that part of the state. One region includes Yakima, Benton, Franklin, Walla Walla, Kittitas, Klickitat, and Columbia Counties. The seventh region includes the other eastern Washington counties (Chelan, Grant, Okanogan, Spokane, Douglas, Ferry, Stevens, Pend Oreille, Lincoln, Adams, and Whitman).

The Results The results of the regressions are shown in Table 2. The variable of interest is the detention rate (DETRATE). For both OLS and TSLS methods, all of the detention coefficients carry the expected negative signs. They are statistically significant in all equations except the drug arrest models (detention apparently has no effect on the level of juvenile drug arrests in a community) and the TSLS estimate for the violent arrest model. The elasticities are in the range of those plausibly estimated in many of the studies described in footnote 21.

For the property arrest model and the "other arrest" model, TSLS increased, as expected, the magnitude of the elasticity significantly. For example, the OLS property arrest elasticity for the detention variable is -.242 and the elasticity increased to -.442 with the TSLS estimation using the IV. These elasticities imply that a 10 percent increase in the rate of admissions to juvenile detention facilities decreases juvenile property crime arrest rates by 2.4 percent (the OLS estimate) or 4.4 percent (the TSLS estimate). The effect of detention on the "other arrest" category is statistically significant, but smaller in magnitude.

The two violent arrest models produce an interesting result. The magnitude of both detention elasticities are about the same (-.363 and -.349), but the OLS estimate is significant while the TSLS coefficient is not. It is normal to expect TSLS standard errors to be greater than OLS standard errors, and the similarity of the coefficients increases the confidence that the true elasticity for violent arrests is in the neighborhood of -.35. The similar coefficients imply that simultaneity is not an issue for the use of detention for violent arrests, while it is for other types of arrests. One explanation for this is that Washington's structured sentencing grid is quite prescriptive for serious violent offenses and it requires local detention time, or longer sentences to the state system. Thus, judges have little opportunity for a "detention supply response" for these violent offenses. For property and other types of less serious offenses, however, judges have considerably more discretion in how they use local detention, and this is reflected in the differences between the OLS and TSLS estimates.

Table 2
Estimated Regression Coefficients

Method	Variable	Coef.	*p*	HCE *p*	R^2
Violence Arrest Models					
OLS	Ln(DETRATE)	-0.363	0.04	0.04	0.77
	Ln(REALPCI)	-4.523	0.00	0.00	
	Ln(RETWAGE)	1.312	0.34	0.34	
TSLS	Ln(DETRATE)	-0.349	0.53	0.43	0.77
	Ln(REALPCI)	-4.494	0.00	0.00	
	Ln(RETWAGE)	1.307	0.35	0.35	
Property Arrest Models					
OLS	Ln(DETRATE)	-0.242	0.00	0.00	0.92
	Ln(REALPCI)	-1.215	0.02	0.01	
	Ln(RETWAGE)	-2.548	0.00	0.00	
TSLS	Ln(DETRATE)	-0.442	0.10	0.06	0.91
	Ln(REALPCI)	-1.599	0.03	0.02	
	Ln(RETWAGE)	-2.480	0.00	0.00	
Drug Arrest Models					
OLS	Ln(DETRATE)	-0.105	0.40	0.39	0.91
	Ln(REALPCI)	-0.910	0.24	0.22	
	Ln(RETWAGE)	-1.838	0.06	0.09	
TSLS	Ln(DETRATE)	-0.397	0.32	0.31	0.90
	Ln(REALPCI)	-1.474	0.18	0.13	
	Ln(RETWAGE)	-1.738	0.09	0.09	
Other Arrest Models					
OLS	Ln(DETRATE)	-0.046	0.00	0.00	0.98
	Ln(REALPCI)	-0.155	0.02	0.01	
	Ln(RETWAGE)	-0.346	0.00	0.00	
TSLS	Ln(DETRATE)	-0.076	0.03	0.01	0.98
	Ln(REALPCI)	-0.214	0.02	0.01	
	Ln(RETWAGE)	-0.335	0.00	0.00	

N = 84 in all models (7 regions, 1989 to 2000). All models include a full set of region and time dummy variables (output not shown). The table shows the coefficent, the p-value from the regular standard errors, the p-value from the White heteroskedasticity-consistent standard errors, and the R-squared. Estimation was performed with EViews 4.1 Software.

The instrumental variable in the TSLS models is the percent of a region's juvenile population where the counties in the region own their own detention facilities. In reduced form, where Ln(DETRATE) = c + Ln(REALPCI) + Ln(RETWAGE) + PCTWITHOWN + region dummies + time dummies, the PCTWITHOWN variable is statistically significant (.0003).

The wage and income variables are consistent with earlier research findings. The level of real retail wages affects property and other arrests significantly, but does not exhibit a significant effect on violent arrests. The real per capita income variable (an important variable that proxies a number of socio-economic conditions) is significant in all equations, again with the exception of the drug arrest models.