



Child Maltreatment, Abortion Availability, and Economic Conditions*

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Received May 15, 2003; Accepted February 11, 2004

Abstract. Child maltreatment is a substantial problem in the U.S. yet has received relatively little attention from economists. This article examines the relationship between abortion availability and economic factors at the time children were conceived and subsequent measures of child maltreatment in the U.S. as well as the influence of contemporaneous economic conditions. Our measures of child maltreatment are state-level rates of child abuse and neglect reports, the fraction of children receiving social services, and child deaths and murders. The results indicate that legalized abortion for each successive cohort led to a decline in total reported incidents of child abuse and neglect of about 10 percent and a negative effect on the fraction of children receiving social services. Child deaths and murders are not related to abortion legalization. Medicaid funding restrictions are associated with an increase in substantiated reports of abuse and an increase in murders by relatives or parents; other post-legalization restrictions are not consistently associated with the various measures of child maltreatment. The effects of welfare benefits, average income, and unemployment rates are mixed.

Keywords: child abuse, abortion, welfare

JEL Classification: I3, I10, J13

Child maltreatment may be related to women's access to abortion and their economic circumstances for several reasons. Sociological and medical studies suggest that "unwanted" or unplanned children are subject to more maltreatment by their parents or caretakers than are desired children (Susan J. Zuravin, 1987). In addition, these children may be more likely to be born and raised in less favorable situations, which in turn foster maltreatment. Changes in the timing of births (such as more or

*We thank Jere Behrman, Greg Duncan, Anna Gonce, and Christina Paxson for helpful discussions and/or assistance with the data. Bitler gratefully acknowledges the financial support of the National Institute of Child Health and Human Development and the National Institute on Aging. Any analyses, interpretations, or conclusions reached are those of the authors and not NICHD, NIA, or NCHS, which is responsible only for part of the initial data used in this analysis. The views and conclusions are those of the authors and do not necessarily represent those of the Federal Reserve Bank of Atlanta, the Federal Reserve System, or any other organization. Part of this work was done while the second author was at Occidental College.

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fewer births to teens) and changes in total family size also influence the likelihood of child maltreatment (Zuravin, 1987, 1988; Mary I. Benedict, Roger B. White, and Donald A. Cornely, 1985). Such underlying factors may be related to the availability of abortion providers and to economic conditions. Greater access to abortion providers could lead to fewer births of unwanted or unplanned children and less subsequent child abuse, and better economic circumstances at the time of conception or currently could lead to fewer unwanted births and less financial stress and thereby less child abuse. This article investigates these possibilities.

Child maltreatment is a substantial problem in the U.S. Almost 3 million cases of child abuse and neglect were reported to state child protective service agencies in 1999 (U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2001). Estimates suggest that more than 800,000 children were maltreated that year, or about 12 victims per 1000 children (U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2001). Over one-fifth of these victims suffered physical abuse, and 11 percent sexual abuse (U.S. Department of Health and Human Services, Administration on Children, Youth and Families, 2001). About three children die each day as a result of maltreatment (Deborah Daro and Leslie Mitchel, 1990). Child maltreatment also involves considerable direct financial costs: states expended over \$14 billion on child welfare services in 1996 (Rob Geen, Shelley Waters Boots, and Karen C. Tumlin, 1999).

Previous research suggests several reasons why child maltreatment may be associated with general economic circumstances both at the time of conception and contemporaneously. Because fertility appears to respond to economic conditions (e.g., Rajeev Dehejia and Adriana Lleras-Muney, 2003), the pool of women having children in bad economic times may differ from that having children in good economic times. This suggests that economic conditions at the time of conception may affect subsequent outcomes, including maltreatment. In particular, children born during adverse economic conditions may be less desired than children born during good economic times and therefore more likely to be abused. Current economic conditions may also affect abuse. Worse economic conditions may increase depression and stress among adults, which in turn lead to child maltreatment (Christina Paxson and Jane Waldfogel, 2002).

Economic theories and empirical findings also give several reasons why child maltreatment may be linked to abortion availability. Access to abortion may allow women to better control the number and timing of births, reducing the number of unwanted children and thereby reducing maltreatment (e.g., Jonathan Gruber, Phillip Levine, and Douglas Staiger, 1999). Carlos Seiglie (2003) presents a model in which increases in birth control use—which includes abortions—decrease maltreatment by reducing the number of unwanted children; indeed, smaller family sizes lead to less maltreatment of all children in a family, regardless of whether their individual births were desired. In other words, having an unwanted birth increases the likelihood that all children in the family are maltreated. However, an alternative theory is that access to abortion increases sexual activity because abortion serves as insurance

against undesired pregnancies (Thomas J. Kane and Douglas Staiger, 1996). Under this hypothesis, increased availability of abortion may lead to more unplanned births and thereby possibly more maltreatment. Paxson and Waldfogel (2002) note that single parenthood also may be associated with greater maltreatment. Because abortion legalization appears to have reduced nonmarital births more than marital births (Joshua D. Angrist and William N. Evans, 1999; Phillip B. Levine et al., 1999), this may be an additional channel by which abortion availability affects maltreatment.

Little research has directly examined the relationship between abortion availability and child maltreatment.¹ Studies have, however, found that abortion availability is associated with sizable changes in fertility behavior and child outcomes. Increased abortion availability leads to lower birth rates and higher abortion rates, particularly among teens and racial minorities (Levine et al., 1999). Estimates indicate that births fell by about 4–7 percent overall because of abortion legalization, with even larger declines among teens, nonwhites, and unmarried women (Angrist and Evans, 1999; Levine et al., 1999). Abortion legalization also led to a decline in neonatal mortality rates (Michael Grossman and Steven Jacobowitz, 1981), and increased public funding of abortions may have led to improved birth weights and other birth outcomes (Kenneth J. Meier and Deborah R. McFarlane, 1994). In addition, abortion legalization appears to have improved the average living conditions of children by reducing the number of children who would have lived in single-parent families, lived in poverty, received welfare, and died as infants (Gruber, Levine, and Staiger, 1999).² Abortion legalization is also associated with lower adoption rates among children born to white women, suggesting that fewer unwanted children were born and then placed for adoption after abortion became legally available (Marianne P. Bitler and Madeline Zavodny, 2002).

The influence of economic conditions on child abuse and neglect has also been the focus of relatively few studies. Using data from the 1990s, Paxson and Waldfogel (1999, 2002, 2003) find that decreases in a state's current welfare benefits are associated with large contemporaneous increases in child neglect and with more children living in foster care. They also conclude that child maltreatment tends to be less prevalent when current economic conditions are better; in some of their results, current poverty rates are positively associated with abuse, although current average income is also positively associated with abuse in some specifications. Sheila Ards (1992) suggests that child maltreatment is positively related to the unemployment rate and negatively related to average income. Seiglie (2003) also reports a positive association between child maltreatment and the unemployment rate.

Our analysis of child maltreatment makes several contributions to the literature. Because the incidence of child abuse is extremely difficult to measure accurately, we take a comprehensive approach toward examining child maltreatment. We estimate determinants of reported rates of child abuse and neglect, provision of government-funded social services, child deaths possibly resulting from abuse, and murders of children. We focus on the effect of abortion availability and the influence of economic conditions both contemporaneously and at the approximate time of

conception, an approach that accounts for selection in the degree of wantedness of children who are born and has not been used in previous studies. It is relatively straightforward why current economic conditions may influence the likelihood of maltreatment, but economic factors at the time of conception also may affect abuse today if they influenced whether a child was wanted or planned. As noted above, children born during adverse economic times may be less desired by their parents, increasing the odds of subsequent abuse, a possibility we examine here. Long-ago economic conditions also may matter by affecting family size, which has been linked with child abuse. Because our measures differ in severity of maltreatment, the extent to which these factors affect the measures may vary across outcomes. Research by Lawrence M. Berger (2003), for example, suggests that the determinants of abuse differ by severity of maltreatment.

The rest of the paper proceeds as follows. Section 1 describes the data. Section 2 describes our use of panel data techniques to estimate the influence of abortion availability and economic factors on state-level measures of child maltreatment. Section 3 presents the results, which indicate that availability of legal abortion is associated with fewer reports of child abuse and neglect and with fewer children receiving social services but not with fewer abuse-related deaths or murders, suggesting that abortion legalization led to lower rates of less extreme child maltreatment but had no effect on severe child abuse. We do not find a consistent relationship between economic conditions—either at the time of conception or contemporaneously—and our measures of child maltreatment. Our results do suggest that more generous welfare benefits before birth may be related to lower prevalence of child maltreatment and higher average incomes before birth to fewer murders of children. Section 4 concludes.

1. Data

Because complete and accurate data on child maltreatment are not available, we use several measures that proxy for child maltreatment: reports of child abuse and neglect, provision of social services, deaths, and murders. Each captures a different aspect of child maltreatment and different degree of severity and has both advantages and limitations. We briefly discuss each measure in turn.

1.1 Child abuse and neglect reports

Our first measure of child maltreatment is based on the number of reports of child abuse and neglect. State-level data for the period 1976–1996 are available on the total number of incidents of child maltreatment reported to authorities (except 1988–1989, when data are not available). Because an incident can involve multiple children in the same household, this measure proxies for the number of families per year in which children are maltreated. For the period 1990–1996, data on the

number of substantiated victims of maltreatment by single year of age are available, and we use these data as well.³ We convert the reported number of child maltreatment incidents into a rate by dividing by the number of children aged 0–17 (in 1000s) in the given state and year, and the number of victims into a rate by dividing by the age-specific population. As the first row of Table 1 reports, the maltreatment report rate averages about 2 percent of all children aged 0–17 during 1976–1996. The substantiated victim rate is slightly lower at about 1.4 percent of children during 1990–1996 (row 2).

The child abuse and neglect reports data have several limitations, as discussed by Paxson and Waldfogel (1999, 2003). Not all instances of child maltreatment are reported, and the total number of incidents is unknown because there are no

Table 1. Descriptive statistics for measures of child maltreatment.^a

	Mean (1)	S.E. (2)	N (3)	Period (4)	Ages aggregated (5)
<i>Reports of child abuse and neglect per 1000 children aged 0–17^b</i>					
Reported incidents rate	18.52	0.33	948	1976–1996 ^c	Yes
Substantiated victims rate	13.94	0.11	5427	1990–1996	No
<i>Children receiving social services from public welfare agencies per 100 children aged 0–17^d</i>					
Social services receipt rate	3.97	0.16	242	1970–1975	Yes
<i>Deaths due to possible abuse (murder, head trauma, external causes, other accidents) per 100,000 children aged 0–17^e</i>					
Death rate	14.65	0.05	159,730	1968–1996	No
<i>Murders per 1,000,000 children aged 0–17, by perpetrator^f</i>					
Rate for murders by a parent	5.93	0.11	19,278	1976–1996	No
Rate for murders by any relative or unknown perpetrator	15.15	0.21	19,278	1976–1996	No

^aShown are means and standard errors of annual state-level rates for all states with data available for the years and age groups indicated. Observations are weighted by the relevant state/year population. Data that are not age-aggregated are by single year of age for ages 0–17.

^bSource: American Humane Association, *National Analysis of Official Child Abuse and Neglect Reporting* and the National Committee to Prevent Child Abuse, *Current Trends in Child Abuse Reporting and Fatalities*.

^cExcludes 1988 and 1989.

^dSource: Department of Health, Education, and Welfare, *Child Welfare Statistics*.

^eSource: National Center for Health Statistics, Mortality Data. Data are disaggregated by child's race and sex as well as by single year of age.

^fSource: James A. Eox, Uniform Crime Reports: Supplementary Homicide Reports.

reliable estimates of the fraction of incidents of child abuse that are reported. Reported rates of maltreatment trend upward from 1976 until the late 1980s and then flatten out during the 1990s; increased public awareness of child abuse, more stringent reporting requirements for teachers and health care workers, and broader definitions of child abuse led to an increase in child abuse reports during the 1970s and 1980s. The regression model (described in detail below) includes year fixed effects and state-specific time trends in part to control for such factors. Another concern is that reporting requirements, definitions of abuse, and data reported differ over time and across states, as do standards for substantiation.⁴ This helps motivate our inclusion of state and year fixed effects in the regression model (discussed below), which control for time-invariant differences across states in such factors and national changes in actual abuse rates and reporting of abuse. Not all states reported child abuse and neglect data each year, creating unbalanced panels; in particular, we do not use data for California on reports or substantiated victims during the 1990s.⁵

1.2 *Social services*

Our second measure of child maltreatment is the fraction of children who received social services from public welfare agencies and voluntary child welfare agencies and institutions. This variable proxies for the number of children whose living circumstances were bad enough to result in intervention by a public child welfare agency. We hypothesize that such children were at greater risk of being maltreated; the fraction of these children who were actually abused or neglected is unknown. Child welfare services includes all social services provided by state and local agencies under the Aid to Families with Dependent Children (AFDC) program and the Child Welfare Services program (Title IV, Parts A and B of the Social Security Act).⁶ Most of the children who received social services lived with a parent or other relative, although about 12 percent were in foster care. The data on social service receipt are only available for the period 1970–1975. We convert the data on the number of children receiving social services into rates by dividing by the total number of children (in 100s) aged 0–17 in the state/year. As row 3 of Table 1 reports, an average of 4 percent of children received social services during the sample period.

The social services data are based on administrative records, making them a fairly accurate count of children receiving services. However, the data are almost certainly an undercount of the number of children who should receive social services because of substandard living circumstances. The extent to which the data are an underestimate is likely to differ across states, which differ in their standards for intervention. In addition, states' social services budgets and standards may have changed over time, so we include state and year fixed effects and state-specific time trends in the regression model. As with the child maltreatment reports data, not all states reported social services data each year.

1.3 Deaths

We also estimate the effect of abortion availability and economic conditions on child deaths that may be due to child abuse or neglect. We consider deaths resulting from murders, head traumas, external causes, and “other accidents” (all accidents except car accidents) to possibly be related to maltreatment. The deaths data are annual numbers by single year of age for ages 0–17 by sex and race (white, black, and other) during the period 1968–1996 and are from death certificates. Because child deaths are infrequent, we present death rates per 100,000 children (compared with per 1000 for child maltreatment reports and per 100 children for social services receipt). As Table 1 indicates, almost 15 children per 100,000 die each year of causes possibly related to maltreatment.

The advantages of using data on deaths are that virtually all deaths are reported and that extreme child abuse can lead to death. However, the cause of death may be misclassified, with children who die as a consequence of abuse possibly classified as dying of unknown causes, for example. Up to 60–85 percent of child abuse and neglect fatalities in the U.S. are recorded as due to other causes (Marcia E. Herman-Giddens et al., 1999; Charles F. Johnson, 2000). We note that since death is an extreme outcome of child maltreatment, the determinants of child deaths may differ from the determinants of child maltreatment reports and of children receiving social services; in particular, abortion availability may have different effects on parents who are likely to abuse their children until death occurs than on parents whose maltreatment is less severe. Living in reduced economic circumstances or having less access to abortion providers might affect whether a parent wants a child and therefore the likelihood of neglect but might not affect the likelihood of extreme child abuse that results in death. An advantage of using the deaths data is that it is presented separately by age, race, and gender, and for the period 1979–1996 is presented by state of birth, mitigating possible measurement error in the abortion variables due to differences between state of birth and state of current residence.

1.4 Murders

Our final measure of child maltreatment is murders of children in each state and year during the period 1976–1996. The murder data are by single year of age for children aged 0–17 and by relationship of the perpetrator to the victim and are from the Uniform Crime Reports. As the descriptive statistics in Table 1 indicate, we examine murders committed by a parent and by any person who is a relative or an unknown person (i.e., a person not known to be unrelated to the victim). We do not report specifications analyzing murders by known non-relatives because we hypothesize that the first-order effects of economic conditions and abortion access should be on abuse by relatives. Murders by any relative or by an unknown perpetrator account for about 1 percent of child deaths from any cause. As the descriptive statistics indicate, parents account for slightly over one-third of murders by relatives or unknown persons.

As with the data on deaths, the motivation for using data on murders is that extreme child abuse can result in murder of the child. One North Carolina study suggests that almost 85 percent of homicides of children under age 11 were due to child abuse, and parents accounted for almost 64 percent of child abuse fatalities (Herman-Giddens et al., 1999). However, as noted above, many deaths resulting from child abuse are not be classified as murder. In addition, the relationship status of perpetrators to victims may be misreported. The homicide data are therefore almost certainly an undercount of child abuse incidents that end in murder but are nevertheless another proxy for the number of deaths resulting from child maltreatment. As with the deaths data, the determinants of child murders may differ from the determinants of measures of less extreme maltreatment.⁷

1.5 Abortion availability and economic conditions

This analysis uses state-level data to examine the relationship between various measures of child maltreatment and abortion availability and economic conditions. The variables used to measure abortion availability are a variable indicating whether abortion is legal in a state and six variables indicating whether three forms of post-legalization restrictions are enforced or enjoined. The post-legalization restrictions examined here are Medicaid funding restrictions, which prevent the public health insurance program for low-income families from paying for abortions; parental involvement laws, which typically require a woman under the age of 18 to notify her parents or obtain their consent prior to an abortion; and mandatory delay laws, which require women to receive information about abortion procedures and alternatives to abortion and then wait a certain number of hours before the procedure can be performed. A restriction is enjoined if a court has issued an injunction to prevent enforcement of that law. We distinguish between enforced and enjoined post-legalization restrictions because several previous studies suggest that enforced laws have different effects than enjoined laws.

There are several sources of variation in the timing of abortion legalization and post-legalization restrictions across states. Abortion became legally available across the U.S. after the *Roe v. Wade* decision in January 1973. Prior to this, women had access to legal abortion in several states that had repealed their abortion laws. In 1970, Alaska, Hawaii, New York, and Washington repealed laws declaring abortion illegal or had such laws struck down by the state supreme courts; New Jersey and Vermont followed in 1972. California did not formally repeal its law declaring abortion illegal before *Roe*, but abortion was widely available in that state by 1969.⁸ There is also considerable variation across states in the adoption and timing of enforced and enjoined post-legalization abortion restrictions.

We use this variation in timing to identify the relationship between abortion availability at the time of conception and our measures of subsequent child maltreatment. However, our child maltreatment data are state-level annual averages, not individual-level observations, and some measures (child maltreatment reports and

social services receipt) include children of different ages, making it impossible to determine abortion policy in the year before each child was born. We therefore created measures of average exposure to abortion restrictions during the year of conception for the age-aggregated data. If the child maltreatment measure is for children aged 0–17 in New York in 1988, for example, our abortion legalization variable is a weighted average of the legal status of abortion in New York during 1970–1987, where the weights are the population of children aged 0–17 in New York in 1988. Post-legalization restrictions are calculated analogously.⁹ For data that are by single year of age (the substantiated reports of abuse for 1990–1996 and the deaths and murders data), the abortion availability variables are measured one year prior to the year of the data less the age of the child (i.e., one year before the approximate year of birth).

Our hypothesis is that abortion legalization should be negatively associated with child maltreatment. As discussed above, this relationship could be due to fewer unwanted children being born and subsequently maltreated or, given the link between family size and maltreatment, because of smaller family sizes, which may affect all children in a family. We expect enforced post-legalization restrictions to be positively associated with child maltreatment because the restrictions made it more difficult for at least some women to obtain abortions. Enjoined post-legalization restrictions may be either positively or negatively associated with child maltreatment. An enjoined restriction may increase abortion accessibility, thereby lowering subsequent rates of child abuse. Alternatively, women and providers may be confused by an injunction or not be aware that a law is enjoined, creating the same effect as an enforced restriction. In addition, although an enjoined restriction is not currently being enforced, its adoption reflects a desire by the federal or state government to restrict abortion access and may affect abortion access and prevalence if providers reduce or increase abortion services in anticipation of the injunction being either lifted or permanently overturned.

Table 2 reports means for the abortion policy variables during the various time periods covered by the data examined in this analysis. The first column, 1976–1996, corresponds to the period covered by the data on total reports of child abuse and neglect (1988 and 1989 are excluded due to lack of data), and column 2 to the period for which data on the number of substantiated victims are available. Column 3 (1970–1975) corresponds to the social services data; column 4 (1968–1996) to the data on deaths; and column 5 (1976–1996) to the data on murders.

The means indicate that there was relatively little variation in some of the abortion variables. During 1990–1996 (the victims data period), almost all children aged 0–17 were born after abortion legalization, and during 1970–1975 (the social services data period), almost all children were born before abortion was legally available. Very few children in any of the data sets were exposed to either enforced or enjoined mandatory delay laws (in 1992, Mississippi was the first state to enforce a mandatory delay law). We include the abortion variables in the regressions in the pattern indicated by Table 2 (i.e., the mandatory delay variables are not included in the social services receipt regression because no such laws were in place then) and caution that there is little variation in some of the abortion variables.

Table 2. Sample means for abortion and economic variables, by time period.^a

	1976–1996 ^b (1)	1990–1996 (2)	1970–1975 (3)	1968–1996 (4)	1976–1996 (5)
<i>Abortion policy during year of conception</i>					
Abortion legal	0.66	0.99	0.03	0.48	0.70
Medicaid funding restriction enforced	0.64	0.59	0.98	0.72	0.59
Medicaid funding restriction enjoined	0.09	0.13	0.00	0.07	0.13
Parental involvement law enforced	0.41	0.14	0.98	0.57	0.37
Parental involvement law enjoined	0.12	0.25	0.00	0.08	0.13
Mandatory delay law enforced	0.001	0.003	–	0.0004	0.001
Mandatory delay law enjoined	0.004	0.012	–	0.0015	0.003
<i>Economic conditions contemporaneously</i>					
Log of real average AFDC benefits	1.36	1.29	1.69	1.51	1.39
Log of real per capita income	9.90	9.79	9.58	9.81	9.91
Unemployment rate	6.94	6.89	4.84	6.36	6.85
<i>Economic conditions during year of conception</i>					
Log of real average AFDC benefits	1.55	1.08	1.61	1.71	1.57
Log of real average per capita income	9.67	9.93	9.16	9.55	9.70
Unemployment rate	6.13	6.06	4.62	5.70	6.25
Number of observations	948	5427	242	159,730	19,278

^aAll observations are weighted by the relevant population in the state/year. Column (1) corresponds to the period covered by the data on total reports of child abuse and neglect, and column (2) to the period for which data on the number of substantiated victims are available. Column (3) corresponds to the social services data; column (4) to the data on deaths; and column (5) to the data on murders. The data appendix lists data sources.

^bExcludes 1988 and 1989.

The regression models, which the next section describes in detail, include controls for economic conditions both at the time of conception and contemporaneously. The regressions include the log of real average AFDC benefits, the log of real income per capita, and the overall unemployment rate and its lag. We expect that higher welfare benefits, higher average income, and lower unemployment rates at the time of

conception are each associated with lower rates of child abuse because income is generally believed to be positively associated with the desire to have children. However, higher welfare benefits at the time of conception might induce women who otherwise would not have given birth to have children, perhaps resulting in more “less wanted” children and more subsequent abuse. We also expect higher current welfare benefits and better prevailing economic conditions to be associated with less maltreatment. Bad economic times can be associated with more stress, perhaps increasing abuse, or, alternatively, they may be associated with less parental time, increasing neglect. As noted above, the impact of economic conditions and abortion availability may differ across our measures of maltreatment because the propensity to severely abuse a child may be relative unaffected by such factors.

2. Methods

We use several econometric techniques to estimate the determinants of our measures of child maltreatment. For the child abuse and neglect reports and victims data and for the social services data, we regress natural logs of the child maltreatment rates on the abortion variables, measures of economic conditions, and a large set of other controls in ordinary least squares (OLS) regressions. For the deaths and murders data, we regress the number of murders or deaths on the covariates, which include the log of the relevant population, in negative binomial regressions. We use negative binomial regressions for the deaths and murders models because a large number of observations of deaths and murders are equal to zero in annual state-level data by single year of age.¹⁰

All of the regressions include controls for economic conditions and other factors at the state level.¹¹ In addition to the economic variables discussed above, the regressions control for the percentage of the population living in urban areas because reporting of child maltreatment is believed to be more prevalent in urban areas. We also include variables measuring the fraction of births that are nonwhite because of the possibility of racial differences in child maltreatment prevalence and reporting; the number of prisoners per capita to help capture the law-enforcement climate within a state; and the number of hospital beds and doctors per capita in order to control for the prevalence of health care providers, who are mandatory reporters of child maltreatment and some of whom provide abortions.¹² The regressions further include two dummy variables indicating whether the state legislature and governor are all Republican or all Democratic (the omitted category is divided government); two variables measuring the number of marriages and divorces per 1000 women aged 15–44; and a variable indicating whether the state allows unilateral divorce because previous research suggests that passage of unilateral divorce laws led to a decline in domestic violence (Thomas S. Dee, 2003; Betsey Stevenson and Justin Wolfers, 2003).¹³ Sample means for these variables are reported in Table A.1, and data sources are in the Appendix.

All regressions include both contemporaneous and year-of-conception values of the economic and other variables. The contemporaneous values capture the effect of

current conditions on the prevalence of maltreatment, and the year-of-conception values capture the influence of conditions at the time children were conceived. All of the abortion availability variables included here are measured at the time of conception; contemporaneous measures of abortion access are not included since they should not affect the wantedness of children currently alive.

The regressions also include state and year fixed effects and state-specific linear time trends. The state and year fixed effects control for time-invariant differences across states and for changes over time common to all states, respectively. The time trends capture any trend in the dependent variable within each state. The substantiated victims, deaths, and murders regressions also include fixed effects for year of conception. The reports and social services data are aggregated across ages 0–17, so those regressions instead include controls for the distribution of the population across 1-year age groups. The deaths regression also includes interactions of race and sex fixed effects. We report robust (White-corrected) standard errors, and observations are weighted by the relevant population. Because each regression includes a large number of covariates as well as the various fixed effects and time trends, we only report the coefficients of the abortion availability and economic variables.

3. Results

Abortion legalization is negatively associated with some measures of child maltreatment. In the child abuse and neglect reports data, abortion legalization is associated with a significantly lower rate of total reported incidents of child maltreatment (Table 3, column 1). In the social services data, availability of legal abortion is negatively associated with the fraction of children receiving social services data at the 10 percent level (Table 3, column 3). The substantiated victim rate during 1990–1996 is not significantly associated with legalization, which is not surprising given that few of these children (less than 1 percent) were born in the pre-legalization period. The regressions for deaths and murders also do not indicate a statistically significant impact of abortion legalization (Table 4).

Where significant, the estimated magnitudes of the coefficients of the legal abortion variables are sizable. Using the result in column 1 of Table 3 to approximate the effect among children born in a year in which abortion was legal relative to children born in a year in which abortion was illegal, abortion legalization is associated with a 10 percent decline in the number of maltreatment reports per 1000 children. Although this estimate is large, it is plausible given that legalization reduced births by about 4–7 percent, with larger effects among teens, minorities, and unmarried women. Finding a larger effect on reports of maltreatment than on births is not surprising if children who were not born after legalization were at higher risk of maltreatment (had they been born) than the general population. In addition, the effect on maltreatment is likely larger than the effect on births because of effects on children already born—existing children may have experienced less maltreatment if

Table 3. Determinants of rates of reported child maltreatment and social services receipt.^a

	Abuse reports 1976–1996 (1)	Substantiated victims 1990–1996 (2)	Social services recipients 1970–1975 (3)
<i>Abortion policy during year of conception</i>			
Abortion legal	-1.739** (0.720)	0.067 (0.166)	-24.769* (13.768)
Medicaid funding restriction enforced	-0.495 (0.392)	0.118*** (0.040)	4.040 (5.596)
Medicaid funding restriction enjoined	0.936 (0.478)	0.229*** (0.071)	34.237 (20.678)
Parental involvement law enforced	-0.566 (0.292)	-0.035 (0.032)	-7.522* (3.898)
Parental involvement law enjoined	-0.693** (0.324)	-0.029 (0.040)	-3.896 (6.288)
Mandatory delay law enforced	0.154 (1.080)	-0.635*** (0.170)	–
Mandatory delay law enjoined	2.191*** (0.841)	-0.323*** (0.099)	–
<i>Economic conditions contemporaneously</i>			
Log of real average AFDC benefits	-0.220 (0.169)	-0.121 (0.096)	0.370 (0.616)
Log of real per capita income	0.223 (0.671)	0.228 (0.263)	-3.382 (3.034)
Unemployment rate	0.020 (0.014)	0.011 (0.008)	0.106 (0.182)
<i>Economic conditions during year of conception</i>			
Log of real average AFDC benefits	-2.971*** (0.580)	-0.021 (0.444)	8.873 (8.094)
Log of real per capita income	-0.005 (1.740)	-1.948 (1.790)	-2.890 (7.331)
Unemployment rate	0.392* (0.225)	-0.051 (0.043)	0.088 (1.562)
Number of observations	948	5427	242

^a Regressions also include other controls, fixed effects, and state-specific linear time trends (see text for details). Standard errors are in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

legal abortion led to smaller family sizes. The estimated effect on the fraction of children receiving social services is even larger than the effect on maltreatment reports. This may be due to the fact that it is estimated using data for a different period (1970–1975 instead of 1976–1996), but the magnitude of this estimate should be viewed with some caution since it is based on only 6 years of data.¹⁴

The difference between the large relationship of abortion legalization with abuse reports and social services receipt versus its small, insignificant relationship with child deaths and murders is likely due to the fact that severe abuse that results in death is relatively rare. In addition, the association between wantedness and abuse severity may be non-linear. If wantedness and family size have greater effects on less severe child abuse than on severe abuse, we would expect to find little association between legalization—which affects wantedness and family size—and child deaths and murders.

The results for post-legalization restrictions are somewhat mixed. Child abuse and neglect reports are negatively associated with the presence of an enjoined parental involvement law (Table 3, column 1). The fraction of children who are substantiated victims of maltreatment is positively associated with Medicaid funding restrictions

Table 4. Determinants of abuse-related child deaths and murders.^a

	Possible abuse ^b (1)	Murders by parents (2)	Murders by any relative or unknown (3)
<i>Abortion policy during year of conception</i>			
Abortion legal	0.010 (0.082)	-0.265 (0.191)	0.012 (0.171)
Medicaid funding restriction enforced	0.073 (0.045)	0.142* (0.075)	0.202** (0.083)
Medicaid funding restriction enjoined	-0.030 (0.062)	0.023 (0.096)	0.033 (0.114)
Parental involvement law enforced	-0.062 (0.045)	-0.012 (0.082)	-0.080 (0.088)
Parental involvement law enjoined	0.049 (0.048)	0.010 (0.078)	0.033 (0.087)
Mandatory delay law enforced	-0.053 (0.164)	-0.074 (0.255)	-0.075 (0.250)
Mandatory delay law enjoined	-0.127 (0.152)	0.022 (0.175)	0.446** (0.200)
<i>Economic conditions contemporaneously</i>			
Log of real average AFDC benefits	0.016 (0.043)	-0.063 (0.256)	0.237 (0.192)
Log of real per capita income	0.032 (0.128)	0.431 (0.951)	-0.435 (0.678)
Unemployment rate	-0.010** (0.005)	-0.009 (0.024)	-0.016 (0.018)
<i>Economic conditions during year of conception</i>			
Log of real average AFDC benefits	-0.035 (0.054)	-0.179 (0.193)	-0.090 (0.177)
Log of real per capita income	-0.174 (0.137)	-0.940 (0.633)	-1.404*** (0.493)
Unemployment rate	-0.005 (0.007)	-0.036 (0.022)	-0.023 (0.019)
Number of observations	159,730	19,278	19,278

^aRegressions also include other controls, fixed effects, and state-specific linear time trends (see text for details). Standard errors are in parentheses.

^bIncludes murders, head traumas, external causes, and all accidents except car accidents.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

and negatively with mandatory delay laws, both regardless of enforced or enjoined status (Table 3, column 2). Social services provision is negatively associated with enforced parental involvement laws (Table 3, column 3). Enforced Medicaid restrictions are positively associated with murders (Table 4). These results do not indicate a clear effect of post-legalization restrictions, although on balance they suggest that Medicaid funding restrictions may lead to more child maltreatment, including severe abuse that results in death.

The results for welfare benefits are generally weak, although higher welfare benefits at the time of conception are associated with a reduction in child maltreatment reports. Contemporaneous welfare generosity does not have a significant effect on any of our measures of child maltreatment.

The effect of welfare generosity on child maltreatment may depend on abortion availability if more generous welfare benefits enable low-income individuals to circumvent abortion restrictions. For example, higher welfare benefits might have enabled some pregnant low-income women to afford to travel to another state if their own state had not yet legalized abortion. If so, then terms interacting

welfare benefits with abortion restrictions should be negatively associated with child maltreatment. Alternatively, among people who take advantage of the welfare system in states with generous benefits, child abuse might not depend on abortion restrictions, causing the coefficients of the interaction terms to be positively associated with child maltreatment. Migration in response to cross-state differences in welfare generosity could also lead make the interaction terms significant. In results not shown here, we interacted the abortion variables with welfare benefits at the time of conception or contemporaneously in order to test these hypotheses. The results were mixed. In general, the interaction terms had the opposite sign of the main effect of abortion variables, but there was no clear pattern across our measures of child maltreatment or measures of abortion restrictions.

The results for average income and unemployment shown in Tables 3 and 4 are uneven. Average income at the time of conception is negatively associated with child murders by relatives or unknown persons but not significantly associated with measures of less severe maltreatment. The unemployment rate at the time of conception is positively associated with reports of child maltreatment (Table 3). The contemporaneous unemployment rate is negatively associated with deaths possibly due to abuse (Table 4); this is consistent with findings by Christopher J. Ruhm (2000) that mortality is procyclical.

In results not shown in the tables, we found few consistent relationships between our measures of child maltreatment and the other variables included in the models. Current marriage rates are significantly positively associated with several measures of child maltreatment reports, and current availability of unilateral divorce is significantly positively associated with murders. The lag of the current unemployment rate was generally insignificant, and the lag of the year of conception unemployment rate was significantly negative in several specifications.

3.1. Robustness

We estimated a variety of other specifications to verify the robustness of the results. One possible concern about our findings is our specifications include a large number of other covariates. We estimated all of the models using a more parsimonious specification that dropped many of the economic and other control variables. Of these controls, the regressions included only the age dummies (or age shares); the controls for race, ethnicity, and urban residence; and the dummy variable for the presence of unilateral divorce laws. All of these are plausibly exogenous. The impact of legal abortion on overall reports of abuse was quite robust to the more parsimonious specification, as was the impact of Medicaid funding restrictions on substantiated victims. In the parsimonious specification, the coefficient on legal abortion for social services use remained statistically significant but fell in magnitude to about one-half the estimate reported in Table 3. The results for deaths and murders were also quite similar to those in

Table 4 except, in the murders by parents regression, the impact of abortion legalization was negative and statistically significant and the coefficient of the enforced Medicaid restriction variable shrank in magnitude and was no longer significant.

We also examined the robustness to using different age groups to create our age-aggregated measure of exposure to abortion laws. A potential concern about the findings using age-aggregated data is that our measure of abortion exposure assumes that child abuse is distributed across the population uniformly by age (this is not a problem with the data by single year of age). To remedy this, we created four alternative measures of the year-of-conception variables, weighting by the population aged 0–3, 0–4, 15–17, and 0–4 plus 15–17, respectively, and estimated the regressions assuming all abuse occurred among children of these ages. The motivation for choosing these age groups is that very young children are more vulnerable to extreme forms of child abuse, and young adults (ages 15–17) may be more likely to be involved with social service providers or child protective services for other reasons (such as delinquency) and hence have higher reporting rates of abuse.¹⁵ All of the results were qualitatively similar to those in the tables, although not all coefficients could be identified in all specifications because some of the abortion variables do not vary when looking at some of the narrower age groups.

We tried several other specifications to verify robustness. We estimated the log-linear models for abuse reports and victims correcting for autocorrelation within states and obtained qualitatively similar results.¹⁶ We used Tobit models to estimate the deaths and murders regressions instead of negative binomial models because Tobit models are also appropriate when a large proportion of the values of the dependent variable are zero, although we are skeptical of the validity of the assumptions behind Tobit models in this framework. The results were generally similar to those shown in the tables, although abortion legalization was positively associated with murders by a parent in the Tobit models and not in the negative binomial models. In addition, we estimated the determinants of murders by nonrelatives; the coefficient on the legalization variable was negative and significant, and the pattern of significance of the other variables was not similar to those shown in Table 4.¹⁷

Finally, we examined the robustness of the reports and substantiated victims results to different treatments of the California data, which are not included after 1989 in the results shown in Table 3 because of data quality issues. In the reporting rate regression, the coefficient of the legalization variable becomes insignificant and the coefficient of the enforced parental involvement law significant (with the same signs as in Table 3, column 1) if the post-1989 California data are included. If all of the pre-1990 California observations are instead dropped, the reports results are similar to those in the table. In the substantiated victim rate regression, the coefficients of the Medicaid restrictions variables become insignificant and the contemporary economic conditions significant (with the same signs as in Table 3, column 2) when the California observations are included.

4. Conclusions

Our findings suggest that abortion legalization lowered rates of child abuse and neglect as measured by the reported rate of incidents of child maltreatment. Abortion legalization is also associated with a reduction in the fraction of children receiving social services in our results. However, we do not find a significant relationship between abortion legalization and child deaths or murders, suggesting that availability of legal abortion has little effect on extreme forms of child abuse that result in death. Alternatively, abortion legalization may have affected deaths and murders but the impact either cannot be estimated in the annual state-level data used here or is masked by errors in recording the cause of death.¹⁸

We do not find a consistent relationship between post-legalization restrictions and reported child maltreatment rates among children aged 0–17. However, Medicaid funding restrictions appear to be positively associated with the number of substantiated victims of abuse and with both of our measures of the number of murders, all of which are data by single year of age. Generally, child maltreatment tends to be negatively associated with the presence of enforced or enjoined restrictions on the availability of abortions to minors.

Welfare generosity at the time of conception is negatively associated with reports of child maltreatment but not associated with measures of more extreme abuse. In addition, contemporaneous average welfare payments are not significantly related to any of the measures of child abuse and neglect. These results are surprising given the strong association between child maltreatment and contemporaneous welfare generosity reported in several previous studies. However, we use different data sources, different control variables (including measures at the time of conception), and focus on different time periods than previous research. We stress that some of our results do indicate that welfare generosity affects child maltreatment, even though the effect does not appear to be contemporaneous in our results. Given the importance of welfare reform as a policy issue and its potential effects on child abuse and neglect, the relationship between welfare payments and child maltreatment merits further investigation.¹⁹

Appendix A. Variables, descriptions, and sources

Reports of child abuse and neglect and substantiated victims. Number of reports divided by number of children aged 0–17, and number of victims by single year of age for 0–17 divided by number of children of the same age. Source: American Humane Association, National Analysis of Official Child Abuse and Neglect Reporting (various years); National Committee to Prevent Child Abuse, Current Trends in Child Abuse Reporting and Fatalities (various years).

Children receiving social services. Number of children receiving services divided by number of children aged 0–17. Source: Department of Health, Education, and Welfare, Child Welfare Statistics (various years).

Deaths. Number of deaths, by cause of death. The ICD-8 codes corresponding to murder are E960–E978: head trauma, 430–438; external causes, E980–E999; and other accidents, E800–E807, E825–E949. Source: National Center for Health Statistics, Mortality Data, 1968–1996.

Murders. Number of murders, by perpetrator. Source: James A. Fox, Uniform Crime Reports: Supplementary Homicide Reports 1976–1999 (2001).

Population. Population by age and sex. Source: U.S. Bureau of the Census website, <http://eire.census.gov/popest/estimates.php>.

Abortion laws. Variables measuring exposure to legal abortion and post-legalization restrictions during year prior to birth. Source: Roy Lucas (1968); Jon F. Merz, Catherine A. Jackson, and Jacob A. Klerman (1995); Rebecca Blank, Christine C. George, and Rebecca A. London (1996); and Philip J. Cook et al. (1999).

Average AFDC benefits. Average benefits per recipient family, deflated using the personal consumption expenditures index (1996 = 100) Source: U.S. Bureau of the Census, Statistical Abstract (various years) and Robert Moffitt.

Average income. Per capita personal income, deflated using the personal consumption expenditures deflator (1996 = 100). Source: U.S. Bureau of Economic Analysis website, <http://www.bea.doc.gov/bea/regional/spi/>.

Unemployment rate. Total average annual unemployment rate. Source: U.S. Bureau of Labor Statistics, Employment and Earnings (various years); U.S. Bureau of Labor Statistics, Geographic Profile of Employment and Unemployment (various years).

Percentage of population living in metropolitan areas. Source: U.S. Bureau of the Census, Statistical Abstract (various years).

Doctors. Number of doctors per 1000 persons. Source: American Medical Association, Physician Characteristics and Distribution in the United States (various years).

Hospital beds. Number of hospital beds per 1000 persons. Source: American Hospital Association, Hospital Statistics (various years).

Prisoners. Number of state and federal prisoners per 1,000,000 persons. Source: Department of Justice, Bureau of Prisons, Prisoners in State and Federal Institutions (various years); U.S. Bureau of the Census, Statistical Abstract (various years).

Percent of births nonwhite. Source: U.S. Bureau of the Census, Statistical Abstract (various years).

State political composition. Dummy variables for Republican and Democratic governor and majority of state Senate and House. Source: Council of State Governments, The Book of the States (various years).

Marriages and divorces. Number of marriages and divorces per 1000 women aged 15–44. Source: National Center for Health Statistics, Vital Statistics of the United States (various years); U.S. Bureau of the Census, Statistical Abstract (various years).

Unilateral divorce. Dummy variable for unilateral divorce available. Source: Leora Friedberg (1998).

Table A.1. Sample means for other control variables.^a

	1976–1996 ^b (1)	1990–1996 (2)	1970–1975 (3)	1968–1996 (4)	1976–1996 (5)
<i>Contemporaneously</i>					
Percentage of population living in metro areas	75.50	77.19	69.60	74.88	76.39
Doctors per 1000 persons	2.13	2.39	1.48	1.96	2.16
Hospital beds per 1000 persons	4.05	3.59	7.61	5.13	3.96
Prisoners per 100,000 persons	215.64	331.87	90.61	175.02	224.03
Percentage of births nonwhite	19.00	20.38	18.04	–	19.03
Dummy for Republican control of state government	0.07	0.12	0.24	0.11	0.07
Dummy for Democratic control of state government	0.40	0.28	0.37	0.37	0.36
Marriages per 1000 women	43.14	41.67	52.69	44.97	42.40
Divorces per 1000 women	21.19	20.40	18.04	20.03	20.94
Dummy for unilateral divorce available	0.52	0.51	0.19	0.46	0.55
<i>During year of conception</i>					
Percentage of population living in metro areas	71.77	74.05	63.86	69.44	72.91
Doctors per 1000 persons	1.74	2.00	1.26	1.62	1.78
Hospital beds per 1000 persons	6.00	4.26	8.51	6.88	5.80
Prisoners per 100,000 persons	135.53	189.12	100.76	122.72	138.31
Percentage of births nonwhite	15.04	16.34	9.69	–	15.29
Dummy for Republican control of state government	0.11	0.05	0.16	0.14	0.10
Dummy for Democratic control of state government	0.43	0.39	0.44	0.42	0.42
Marriages per 1000 women	47.37	46.02	38.85	48.34	46.69
Divorces per 1000 women	19.22	21.58	10.83	17.37	19.53
Dummy for unilateral divorce available	0.35	0.51	0.03	0.27	0.40

^aShown are sample means for other variables included in the regressions. All observations are weighted by the relevant population in the state/year. Column (1) corresponds to the period covered by the data on total reports of child abuse and neglect, and column (2) to the period for which data on the number of substantiated victims are available. Column (3) corresponds to the social services data; column (4) to the data on deaths; and column (5) to the data on murders. The data appendix lists data sources.

^bExcludes 1988 and 1989.

Notes

1. Recent research by Seiglie (2003) finds that the number of abortions relative to the number of children is negatively associated with child neglect during 1990–1996 but positively associated with sexual abuse.
2. Abortion legalization also may have led to a reduction in crime by reducing births among women who are more likely to have children who would engage in criminal activity or by changing the timing of childbearing in a manner that reduced future criminal behavior among children (John J. Donohue and Steven D. Levitt, 2001). However, other studies have found conflicting results (Theodore Joyce, 2004; John R. Lott and John E. Whitley, 2001).
3. A report is substantiated if sufficient evidence to meet state law is found to indicate that a child has been abused or neglected. Some states also report the number of indicated victims (cases where there is evidence of maltreatment but the legal standard for substantiation is not met). We combine substantiated and indicated counts and refer to them as substantiated.
4. All states had mandatory reporting laws in place by 1967, before the beginning of our data; however, the scope of the laws differs across states.
5. We use all available data except for data from California during the 1990s, which have substantial reporting errors. The California data during this period do not include cases that are closed or transferred. The robustness of the reports and victims results to different treatments of the California data are discussed in the robustness section of the results. A complete list of the states and years included for each data source is available on request.
6. Receipt of AFDC benefits alone is not considered a social service by the data source. A child must also have received other social services to be included. However, the data source indicates that some states include AFDC recipients, which the state fixed effects should control for.
7. The murders data are also from a different source than the deaths data; differences between the Uniform Crime Reports and the death certificates, which are filled out by different parties, may lead to differences in determinants.
8. Angrist and Evans (1999). Fourteen other states and the District of Columbia reformed their abortion laws in the late 1960s or early 1970s to allow for legal abortion in cases such as rape and incest; abortion became legally available to all women in these states after *Roe*. We do not distinguish these states from states that neither reformed nor repealed their abortion laws prior to *Roe* because few women had access to legal abortion in these states.
9. Our construction of the age-weighted variables is similar to that in Donohue and Levitt (2001). For all but the youngest children, this measure of abortion exposure implicitly assumes that children currently live in the state in which they were born. In the 1990 Census, about 80 percent of children aged 0–17 lived in the state in which they were born. For the deaths data, state of birth is available for 1979–1996, and we use these to compute the measures for the year before birth. In the deaths data, 91 percent of child deaths occur in the same state as the state of birth during 1979–1996, when information about the state of birth was available on the death certificate data.
10. We use counts and negative binomial regressions for the deaths and murders data (instead of the log rates used in the OLS regressions for the reports and social services data) because deaths and murders are very infrequent events, which make log-linear models inappropriate. The negative binomial models we estimate implicitly transform the data into rates by offsetting using the (log) size of the age-specific population. All of the negative binomial models estimated here rejected the hypothesis of using a Poisson model instead of a negative binomial model. Results using Tobit models are discussed below in the robustness section and are available on request; we do not focus on Tobit regressions results because the Tobit models are subject to misspecification in the presence of heteroscedasticity and we are reluctant to specify the parametric form of the heteroscedasticity and because, conceptually, count models are more appropriate.
11. The regressions for the child abuse and neglect reports also include controls for whether the state reported the number of children instead of number of incidents, whether the state reported duplicate reports (more than one report per incident or per child), and whether it is unknown whether the state reported duplicate reports.

12. We do not include variables measuring the fraction of births that are nonwhite in the deaths regression since the deaths data are race-specific. We instead include fixed effects for three race groups (white, black, and other), each interacted with sex to control for racial and gender make-up of the state. The population data used in the deaths regression are also race- and sex-specific.
13. Sample means and results for these variables are not shown in the tables and are available from the authors on request.
14. We also note that it is difficult to disentangle the relationship between child maltreatment and abortion legalization from the underlying time trend in each data set. Identification of the legal variable is particularly problematic in age-aggregated data because the fraction of children aged 0–17 conceived when abortion was legally available is an almost perfectly linear function over time within each state until 1990 (or earlier in states that legalized abortion prior to *Roe*), after which the abortion legal variable is always equal to one because all children aged 0–17 were born when abortion was legal. The construction of the age-weighted measure of exposure to legal abortion creates this linearity problem. Donohue and Levitt (2001) report that their estimates for the period when this collinearity occurs are sensitive to the inclusion of linear time trends; this also occurs in our results when we restrict regressions to the period before 1991 (not reported here). We note that, in the social services data, almost all of the variation in the legal abortion variable comes from states that legalized prior to *Roe*. Studies of abortion behavior suggest that the effect of pre-*Roe* repeals on fertility was larger than the effect of *Roe*, perhaps explaining the large magnitude of the result for social services.
15. We also estimated the regressions shown in Table 3 without weighting the observations. The negative relationships between abortion legalization and total abuse reports and abortion legalization and children receiving social services were relatively robust.
16. We did not estimate the models for social services correcting for within-state autocorrelation because the data are only available for 6 years, yielding at most five observations for estimating an AR(1).
17. This negative relationship between abortion legalization and murders by nonrelatives appears consistent with research suggesting that abortion legalization led to a reduction in crimes committed by young adults. However, our result should be interpreted in this manner with caution given that we do not solely examine murders committed by young adults here.
18. If abortion legalization for each cohort reduced the incidence of child maltreatment by 10 percent, as our estimates indicate, about one in 730 maltreated children die as a result of abuse, and the effect is linear, then child deaths and murders would fall by about 0.015 percent as a consequence of legalization. Such a small effect would be difficult to estimate precisely. (We calculate the fraction of abused children who die as a consequence of maltreatment as 1095 deaths per year divided by 800,000 maltreated children, based on the estimates given by U.S. Department of Health and Human Services, Administration for Children, Youth and Families, 2001, and Daro and Mitchel, 1990.)
19. For preliminary research on the effect of welfare reform on child welfare caseloads, see Geen et al. (2001) and Paxson and Waldfogel (2003).

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