# The Impact of Legalized Abortion on Teen Childbearing*

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July 2002

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## ABSTRACT

After four decades of uninterrupted increases, teen childbearing by unmarried mothers abruptly reversed trend in the early 1990s. Convincing explanations for this reversal have proven illusive. We offer evidence that the legalization of abortion in the 1970's can explain half of the overall decline in teen childbearing in the 1990's and all of the fall in unmarried teen childbearing.

## I. Introduction

Out-of-wedlock births to teenagers in the United States more than tripled between the years 1950 and 1990. Throughout the 1980s, both scholars and the popular press characterized teenage pregnancy as one of the nation's great social ills.[1] Analysts at the time expected the rate of unmarried births to teens to remain high or even increase. Seemingly without warning, however, the trend abruptly reversed in 1991. After a forty-one year uninterrupted rise, the unmarried teen birth rate suddenly fell by 11 percent between 1991 and 2000. The overall teen birth rate, including both married and unmarried mothers, decreased by 22 percent during this period.

A number of possible explanations have been put forth to explain these declines including greater use of condoms as a consequence of the AIDS epidemic, the recent increased popularity of injected and implanted long-term contraceptives, decreased welfare generosity, and a strong economy. These factors, however, do not offer a compelling explanation for the unprecedented drop in out-of-wedlock teen births in the 1990s. Gains from increased use of condoms and long-term contraceptives have been largely offset by decreased use of the pill.[2] Links between welfare generosity and teenage pregnancy have been found to be tenuous at best [Nathan et al. 1999]. Finally, while the increased job opportunities of a strong economy may alter teen behavior, the

[1] See Ed. Hayes [1987] for a selection of scholarly literature on the issue from the late 1970s and early 1980s. See Luker [1996: 81-84] for a summary of the popular press coverage between 1978 and 1990.

[2] Using data from the National Survey of Family Growth, Abma and Sonsenstein [2001] reported that among sexually active teen females between 1988 and 1995 pill use dropped from 43 percent to 25 percent, condom use increased from 31 percent to 38 percent, and implants and injectables increased from 0 percent to 9 percent. The net effect was a 9 percent *decrease* in contraceptive use. Piccinio and Mosher [1998] used the same data to analyze trends from 1982 to 1995 and got very similar results.

unmarried teen birth rate did not significantly decline at any time between 1940 and 1990 in spite of numerous economic cycles. Thus, while each of these factors might plausibly account for some of the decline, their cumulative impact appears to fall short of a complete explanation.

In this paper we propose an additional explanation for the drop in teen births during the 1990s: the legalization of abortion two decades earlier. While the link between the current availability of abortion and teen childbearing is straightforward (since abortion is an alternative to carrying a baby to term), the relationship we focus on is far more subtle: legalized abortion in the 1970s led to fewer babies being born under circumstances in which their parents were less willing or able to provide nurturing environments. When these cohorts grew up to be teenagers, their improved childhood environment had the benign effect of reducing the frequency with which they themselves became teen mothers.

Previous empirical evidence supports the plausibility of the argument. Levine et al. [1996] found that teen childbearing fell by 12 percent in the early 1970s with the introduction of legalized abortion, compared to a decline of only 5 percent for non-teens. To the extent that several studies have offered evidence that teen childbearing is correlated across generations, one would expect a decrease in teen fertility induced by rising rates of abortion in the 1970s to have an echo-effect a generation later [Newcomer and Udry 1984; Card 1981; Kahn and Anderson 1992; Haveman et al. 1996 in Maynard Ed.]. Gruber et al. [1999] found that children born before legalized abortion were

substantially more prone to poverty. Numerous studies have confirmed that teen fertility rates are higher among the poor.[3] Moreover, Dagg [1991] found that children of parents who were denied the right to an abortion were substantially more likely to engage in delinquent behavior. Finally, Donohue and Levitt [2001] present evidence suggesting a link between legalized abortion and a decline in crime rates one generation later.

There are strong parallels between criminal activity among young males and out-of-wedlock births among teenage girls. For instance, the aggregate time series trends for juvenile crime and unmarried teen births follow similar patterns (see Figure 1). Furthermore, the factors such as poverty, poor academic performance, unstable households, and drug-use, which put a young man at increased risk for criminal justice involvement, have also been shown to predict teen births.

From the perspective of identifying a causal link to abortion legalization, however, teen childbearing has an important advantage over crime. Birth certificate data report a mother's age and her state of birth, allowing a precise link to the abortion prevalence in the time and place the mother was born. With crime data, in contrast, the age of the offender is known only when an arrest is made and the criminal's state of birth is unavailable, which has led some to question the causal link between abortion legalization and crime (Joyce 2001). Relative to Donohue and Levitt (2001), therefore, the identification strategy available in this paper is far more direct.

[3] The first report to address this issue, 11 Million Teenagers: What Can Be Done about the Epidemic of Adolescent Pregnancies in the United States, was published by the Alan Guttmacher Insititute in 1976 (now out of print). Subsequently, Klerman [1991 in A.C. Huston Ed.] and Moore et al. [1993] have confirmed that poverty induces teen birth.

In this paper, we present evidence supporting the hypothesis that the legalization of abortion in the 1970s plays an important role in explaining the decline in unmarried teen births roughly two decades later. We find that the historical abortion rate, that is, the abortion rate *in the state and year of a teenager's own birth,* is strongly negatively correlated with teen fertility, even after controlling for a variety of other factors including race and Hispanic status, state-income, unemployment, welfare generosity, and current abortion rates in the state of residence. This holds true for both married and unmarried teens. Our results are robust to a wide range of alternative specifications. Based on our point estimates, legalized abortion in the 1970s may account for as much as half of the overall decline in teen fertility over the last decade, and all of the drop in unmarried teen childbearing.

The remainder of this paper is organized as follows. Section II overviews abortion legalization in the 1970s, and then presents the theoretical link between abortion, unwantedness, and later teen childbearing. Section III describes our identification strategy and presents the empirical results. Section IV explores the sensitivity of the effect to exact maternal age and the extent to which the decline in teen childbearing represents a reduction in lifetime fertility or simply a delay in the timing of births. Section V concludes. A data appendix with the sources of all variables used in the analysis is also provided.

## II. The Causal Pathway Between Legalized Abortion and Fewer Teen Births

Under English common law, abortion was legal if performed before "quickening" (when the first movements of the fetus could be felt, usually around the fourth month of pregnancy). In 1828, New York became the first state to outlaw abortion, and by the end of the century, every state had followed New York's lead.[4] In the late 1960s, the pendulum began to swing towards partial liberalization of abortion law in a number of states, culminating with full legalization in five states in 1970 -- New York, Washington, Alaska, and Hawaii, and California.[5] The United States Supreme Court ruling in *Roe v. Wade* brought legalized abortion to the entire nation on January 22, 1973. While there is little data on the number of illegal abortions performed before the decision in *Roe*, it is clear that in its aftermath the number of abortions performed in the United States grew sharply [Michael 1999].[6]

The question that we now address is how could this legalization of abortion that began in the 1970s lead to a reduction in teen births in the 1990s? The theoretical argument is essentially the same as the one used by Donohue and Levitt [2001] for the effect of abortion on crime. Legalized abortion can reduce aggregate teen births in two ways. First, legalized abortion reduces the sheer number of future teens, which reduces

[4] See Mohr [1978] for a thorough history of abortion law in the United States prior to 1900.

[5] See Merz, Jackson, and Klerman [1995] for a review of state abortion laws in the years prior to *Roe*. Joyce [2001] breaks the trend of earlier research by adding Washington D.C. to this list of early legalizers. He cites *United States v. Vuitch*, 305 F. Supp. 1032 (DC 1969), which overturned the District's antiabortion statute. However Lader [1973: 113] comments that until a mid-1971 Supreme Court ruling on the case, "The medical profession generally ignored the Federal Court. [Hospital] abortion committees rejected most applicants." Regardless, we show that our results are robust to the inclusion or exclusion of the District.

[6] See Donohue and Levitt [2001] for a more complete discussion.

the number of teen mothers (a cohort size effect). Second, legalized abortion changes the composition of cohorts by reducing the frequency of births of individuals who are more likely to become teen mothers (a cohort quality effect).

All else constant, a smaller birth cohort would reduce the number of teen births once the females in this cohort reached adolescence. Levine et al. [1996] reported a 5 percent drop in cohort sizes following legalized abortion. If these abortions represented just a random sample of the population, one would expect a corresponding drop in the number of teen births as the cohorts entered adolescence.

More interesting is the proposition that legalized abortion disproportionately affects those who will be at the highest risk for teen birth. Numerous studies show that abortion is more heavily utilized in households that are less capable of providing a nurturing environment for children. Hayes[1987: 58] reported that thirty percent of abortions in the years after legalization were performed by teenagers. Furthermore, women in poverty are significantly more likely to utilize abortion than the general population [Alan Guttmacher Institute 1994]. Consistent with these facts, Levine et al. [1996] show that the percentage drop in births post-*Roe* was roughly twice as high for nonwhite and teen mothers than for the non-teen, white population.

Research on children born as a result of a denied abortion has consistently suggested the presence of adverse life circumstances. David et al. [1988] cites several Swedish studies that show that children of mothers who were denied abortion were

significantly more likely to receive governmental economic assistance, suffer from mental-illness, and experience higher rates of criminality (among boys) and depression (among girls). Dagg [1991] found that these children were substantially more prone to adverse circumstances, even when controlling for socio-economic factors. Moreover, Gruber et al. [1999] reported that children in the United States who were not born due to abortion legalization would have been 70 percent more likely to live in single parent families, 40 percent more likely to live in poverty, and 50 percent more likely to live in a household receiving welfare than the average child of the time. The literature strongly supports the view that denied abortion access increases the number of children who grow up under adverse circumstances.

A large body of research has focused on the link between unfavorable childhood circumstances and teenage birth. Over 80 percent of teen women who give birth grow up in poverty as compared to 38 percent of the general teen female population [Alan Guttmacher Institute 1994]. Moore and Waite [1977] found a strong association between low levels of education and teen pregnancy. Using data from the University of Michigan's Panel Study of Income Dynamics, An et al. [1993] showed that daughters of mothers on welfare were significantly more likely to experience early childbearing. In a long-term study of black women in New Haven, Horwitz et al. [1991] found that children who experience emotional loss are more likely to seek security through early sexual activity and pregnancy. Moreover, demographic groups that are disproportionately affected by poverty and poor social conditions consistently experience higher teen birth

rates. Blacks and Hispanics have teen birth rates that are twice as high as whites. [Alan Guttmacher Institute 1994]. All of this leads us to believe that the impact of legalized abortion on teen births could be far greater than the simple 5 percent reduction suggested by the post-legalization decrease in births.

## III. Empirical Evidence on Legalized Abortion Affecting Teen Birth Rates

Our empirical analysis attempts to demonstrate a relationship between teen births in the 1990s and legalized abortion in the 1970s. We begin with a review of the national time series of teen births and abortion. While far from conclusive, the observed patterns fit well with our hypothesis. We then examine state-level panel data linking historical abortion rates and current teen childbearing and explore the sensitivity of our findings to a wide range of alternative specifications .

### A. National Time Series

Figure 2 presents the number of unmarried and total births per 1,000 females aged 15-19 in the United States between 1950 and 1999 as reported in Vital Statistics of the United States. There are two striking features of this figure. First, after a 41 consecutive years of increase, the out-of-wedlock teen birth rate declined in 1992 and by 2000 was 11 percent below its peak. Second, the total teen birth rate began to decrease sharply in that same year, after a seven-year increase. By 2000, it had dropped 22 percent off its high.[8]

[8] There is a slight "blip" upward of the unmarried teen birth rate in 1994, which interrupts an otherwise steady downward trend. We do not have an explanation for this apparent aberration in the data.

The timing of these unexpected breaks in the national time series is highly consistent with the impact of legalized abortion. In 1991, the first cohort affected by *Roe v. Wade* would have been approximately 17 years old. Young women from this cohort would just be entering the peak years of teenage childbearing (births to women aged 17 to 19 account for roughly 80 percent of all teen births).

The subsequent decade-long decline is further consistent with our theory. With each passing year after 1991, the fraction of teen mothers who were born after legalization increases. Figure 3 shows that the number of abortions performed annually rose steadily each year after legalization until stabilizing around 1980. Until this date, each successive cohort of future teens was exposed to an increasing rate of abortion at the time of birth. Beginning roughly 19 years after this date, cohorts entering their teen years had no longer been subjected to these increasing rates. Consequently, we would hypothesize that after 1999, the impact of legalized abortion on teen childbearing will have stabilized.

B. Teen Births as a Function of Historical Abortion Rates

The observations in the previous section are consistent with a link between historical abortion rates and current teen childbearing. We now conduct a more

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However, it is interesting to note that 17 years prior to 1994, in August of 1977, the Hyde Amendment went into effect, which prevented Medicaid funds from being used to provide abortion to poor women. The interpretation of this amendment was somewhat liberalized in 1978 and many states stepped in to fund abortions that had previously been funded by the federal government [Boonstra and Sonfield 2000].

[9] Since many factors affect teen birth, we do not expect the teen birth rate to necessarily stop falling after 1999 (although, all else constant, we would expect the rate of decrease to diminish).

systematic investigation using within-state differences over time and cohort-specific abortion rates to analyze the relationship between abortion rates following legalization and changes in teen fertility during the period from 1985-1997.

Figure 4 relates post-legalization abortion rates by state to changes in the number of teen births between the cohorts born in 1970 and 1976. The cohort born in 1970 was likely to have been conceived in 1969, prior to legalized abortion, whereas the 1976 cohort was conceived a few years after Roe v. Wade. We limit the sample to women born in the United States. If greater rates of abortion are associated with fewer teen births when the cohorts reach adolescence, then one would expect to observe a downward-sloping relationship in Figure 4. Indeed, that is precisely the pattern that appears for both unmarried and married teen births. The states with the highest abortion rates after legalization (D.C., Maryland, New York, New Jersey, and California) tend to see declines in unmarried teen births (ratios below one), whereas many other states experience large increases. Married teen births are falling almost everywhere, but more so in places with high abortion rates.

Regression analysis allows a more rigorous test of the hypothesis. We use the following estimation equation:

$$(1) \qquad ln(TEEN\_BIRTHS_{sbt}) = b_1 HABORT_{sbt-a-1} + b_2 CABORT_{st} + X_{st}' + 2_{ya} + 8_{sa} + ,_{stb}$$

where *s*, *t*, *b*, and, *a* index state, year, birth cohort, and age respectively. The left-hand

side variable is the logged number of teen births (either unmarried, married, or total) to mothers of a particular birth cohort residing in a given state in a given year.[10] The independent variables include two abortion measures in addition to a set of state-level controls. The first abortion variable (*HABORT*) corresponds to the abortion rate that prevailed when the mother was herself born – what we call the historical abortion rate).[11] Two alternative proxies for *HABORT* are used in the empirical work. In some specifications, we use the abortion rate in the year preceding the mother's birth in the mother's current state of residence. The primary attribute of this measure is that it is straightforward to compute. An important drawback of this measure, however, is that there is substantial cross-state mobility between the time of a woman's own birth and her teenage years. Thus, our second proxy for historical abortion rates -- the weighted average of the abortion rates that prevailed in the state of *birth* for teenagers currently residing in the state – is likely a better measure. We construct this measure based on cross-state mobility patterns for teenagers using the 1990 Census. Precise details of the procedure are provided in the Appendix. Although our primary interest is in the historical abortion rate, it is important to also control for current abortion rates in a state because of the direct impact contemporaneous abortion rates may have on birth rates.

Other variables in the regression are as follows. *X* represents a vector of state-

[10] . Ideally, teen births would be measured on a per capita basis, but reliable population data are not available by state by year by single year of age. We do, however, include the logged state population between the ages of 15 and 19 (which is available on an annual basis although it is likely to suffer from substantial measurement error) as a right-hand-side variable. So in practice, our regression is very much like a regression of the teen birth rate.

[11] For a mother of age *a* who gives in state *s* in year *y*, this value would be the abortion rate in *s* in the year t-*a*-1. See [Donohue and Levitt 2001] for a complete discussion of this methodology.

level controls that includes the population aged 15-19, percentage of Hispanic teens, the percentage of Black teens, a number of current state laws relating to abortion (parental notification, mandatory delay, and Medicaid funding prohibitions), AIDS cases per capita, the unemployment rate, the poverty rate, welfare generosity, and beer consumption. All of our specifications include state-fixed effects and year-age interactions ($2_{ya}$) to control for any unobserved factors that are constant across states for a given cohort in a given year, for example, nation-wide changes in tastes for children. Our most fully parameterized specifications replace state-fixed effects with state-age interactions which allow for systematic differences across states in birth rates by age.[12]

Table I presents summary statistics from the data sample Standard deviations for the raw data are presented, as are standard deviations after removing year-age and state-age interactions.[13] The latter standard deviations are relevant since they reflect the variation actually used in identifying our parameters. The number of teen births is broken down by marital status and single year of age. Note that these are raw numbers, not rates per capita, due to the absence of reliable data on annual, state-level population counts by gender, marital status, and single year of age. The number of teens giving birth rises steadily with age. Unmarried births to 19 year olds are four times as frequent as unmarried births to 15 year olds; married births to 19 year olds occur fifteen times more

[12] We can also add state-year interactions in the regression as well without absorbing all of the variation in the historical abortion rate (although all of our other covariates have no variation within state and year so they would become extraneous). We report the results later in the paper, but did the analysis so late that it is not presented in any tables.

[13] Actually, the numbers currently in the last column of the table only have state-fixed effects removed, but we will remedy this in the next draft.

often than married births among 15 year olds. Overall, more than two-thirds of all teen fertility is to unmarried mothers.

The Black and Hispanic controls measure the percentage of females aged 15 to 19 who were either Black or Hispanic. These racial and ethnic variables are potentially important for three reasons. First, as demonstrated in Figure 5, the birth rate for both these groups is more than twice that of whites. Second, there are significant changes in teenage female population composition over time, as shown in Figure 6. The nation's Hispanic teen female population grew by an astounding 48 percent between 1985 and 1997, while the number of white teens actually declined. Finally, Figure 7 shows that more than 50 percent of the Hispanic increase was concentrated in two states – California and Texas. These large inter-state variations in female teen demographics suggest the importance of controlling for changes in ethnic composition.

The basic regression results are shown in Table II. The first four columns of the table report estimates for unmarried births; the final four columns reflect married births. The first specification in each set of results use the historical abortion rate for a woman's current state of residence. This variable is likely to suffer from substantial measurement error due to cross-state and international migration. Nonetheless, we present results using this measure because it is similar in spirit to the abortion measure used in Donohue and Levitt (2001), who were restricted to use this cruder metric because of limited information on the mobility of criminals. The second specification for both unmarried and married teens is identical to the first column, except that we restrict the sample to

American-born women. Women born outside the U.S. clearly cannot have been affected by historical abortion rates within the U.S. Moreover, because of the large Hispanic immigrant population, the results might be particularly sensitive to including foreign-born women. The third and seventh columns use our preferred measure of historical abortion rates, based on the place of birth of teenagers, as opposed to current state of residence. The final columns add state-age interactions to the specification. In all cases, the reported standard errors are corrected to take into account both correlation due to multiple observations in the regression for a given state and year (since the unit of observation is state-year-single year of age), and serial correlation within a given birth cohort over time.[14]

The first row of the table presents the coefficients of the historical abortion rate For unmarried teens, the coefficient is negative and statistically significant, indicating that higher abortion rates at the time of the mother's birth decreases the prospect of teen fertility. As would be predicted, eliminating foreign-born women increases the magnitude of the estimate (column 2 versus column 1), as does using the better measure of the historical abortion rate (column 3 versus column 2). A similar pattern is observed

[14] To correct for correlation within a state and year, we cluster the data by state and year. To correct for serial correlation, we use the method of Bhargava et al. (1982). NOTE TO READER, WE HAVE NOT ACTUALLY CORRECTED THESE STANDARD ERRORS FOR SERIAL CORRELATION YET.

for married teen births.[15]

The coefficients on the historical abortion variable are large in magnitude. The national average historical abortion rate in 1997 in the sample is roughly 373 per 1,000 live births. The point estimates from the most fully saturated models suggest a 5.4 log point reduction in teen births for each increase of 100 historical abortions per 1000 live births. Thus, relative to a counterfactual with no abortion, the reduction in teen fertility (both married and unmarried) is about 20 percent.[16] The change in the historical abortion rate for teenagers between 1991 and 1997 is roughly 200 per 1,000 (373 per 1,000 in 1997 versus 172 per 1,000 in 1991). That rise in historical abortion rates is estimated to have reduced teen childbearing (both married and unmarried) by 10-11 percent between 1991 and 1997. The actual decline in unmarried teen childbearing since its peak in 1991 has been approximately 11 percent, implying that the rise in historical abortion can account for the entire decline.[17] Married teen births fell almost 50 percent in the 1990's -- legalized abortion appears to play a much smaller role in accounting for that decline.

Remarkably, for unmarried teens, the historical abortion rate has a larger impact

[15] Although not shown in tabular form, we have also experimented with including state*age, year*age, and state*year interactions simultaneously in the regressions. The state*year interactions absorb all of the variation in every one of our covariates *except* the historical abortion rate, which varies by cohort within a state and year. In these specifications we find a coefficient of -.029 (SE=.005) on the historical abortion coefficient in the unmarried teen birth regression, and a coefficient of .015 (SE=.017) in the married birth regression. Thus, our unmarried results are more robust to removing this additional variation than are the married estimates.

[16] The reduction in cohort size immediately following legalized abortion in the 1970s is estimated to be approximately five percent, although this was likely to be primarily a short-run reduction offset in later years by women who delayed childbearing rather than reduced lifelong fertility. Our estimates on the historical abortion rate variable are thus too large to be explained solely by a reduction in the cohort size.

[17] Note that the current abortion rate actually fell over the 1990's, so that changes in current abortion practices, if anything, would contribute to a rise in teen births in that decade.

of teen childbearing than does the current abortion rate, the coefficients of which are presented in the second row of the table. In other words, controlling for the other factors in the regression, knowing a teenager's state of birth tells you more about her chances of being an unmarried teen mother than knowing where she lives as a teenager. This holds true even though there is a nearly mechanical link between current abortion rates and current birth rates (since a pregnancy is likely to end either in abortion or birth). For married teens, the current abortion rate is a more important predictor of birth rates than is the historical abortion rate. The strong relationship between current abortion and married teen births is surprising to us.

Among the control variables, laws designed to restrict access to abortion yield a mixed bas of coefficients. Prohibitions on medicaid funding of abortions is associated with statistically significant increases in unmarried teen births, but mandatory delays in obtaining abortions are associated with *fewer* teen births (the opposite of what might be expected). Because a high incidence of AIDS may induce greater condom use or abstinence, one might expect a negative relationship between AIDS and teen childbearing. The predicted relationship emerges strongly for married teens, but not for unmarried teens. The Hispanic share of the teen population is correlated with a higher incidence of teen birth (especially for married teens). Increases in the percentage of Black teens are also associated with higher levels of married teen fertility, but have little relationship to unmarried teen childbearing.[18] As would be predicted, generous AFDC

[18] When the socio-economic variables are omitted from the regression (not shown in the table), the coefficient on Black teens becomes positive and significant in the unmarried specification.

benefits are associated with an increase in unmarried teen births, but are not significantly related to married teen births. High unemployment rates are associated with lower unmarried teen births. High poverty is correlated with fewer married teen birth. High beer consumption is positively related to birth types of teen births, but is statistically significant only for married teens.

In Table III we test the sensitivity of our results on the historical abortion rate to a range of alternative specifications and samples. The top row of the table reprints the results of the most fully parameterized specifications of Table II (columns 4 and 8). If we exclude the current abortion rate, our estimates get bigger, reflecting the positive correlation between current and historical abortion rates in a state. Dropping all of the controls except the racial variables also yields larger estimates. Adding squared values of the Black and Hispanic variables to the model somewhat reduces the coefficient on married teen births.

Since the regressions are weighted by population, we experiment with dropping the two largest states – New York and California. In neither instance is the unmarried coefficient affected. The married coefficient rises in one case and falls in the other. Because Washington DC is an outlier on the abortion measure (with a rate that is roughly four times higher than any other state), we also show results dropping it from the sample. The unmarried coefficient is again robust, and the married estimate is larger. When New York, California, and DC are all removed, both coefficients rise.

The remainder of the table analyzes the sensitivity of the results to dropping the racial controls and running estimates not weighted by population. The results are generally quite robust.

**IV. The Impact of Abortion by Single Year of Age**

Our final set of analyses examine the effect of abortion on teen births by the single year of age of the mother. We estimate equation (1) , but interact the abortion variables with a mother's single year of age. In addition, we expand the sample to include not just teenagers, but also women up to age 24.[20] By including women in their twenties, we are able to determine the extent to which abortion is associated with shifting childbearing from the teenage years to later ages.

In Table IV we present the results of our analysis. The first column in the table corresponds to unmarried woman; the second column is for married women. The top panel of the table presents results for the historical abortion rate. Estimates for the current abortion rate are in the bottom panel. The specifications mirror those in columns 4 and 8 of Table 2. As with previous regressions, standard errors are corrected to reflect correlation over time for a given birth cohort.

Focusing first on the historical abortion rate in the top panel of the table, higher historical abortion rates are significantly negatively related to unmarried teen childbearing for all ages 15-19. The impact of the abortion rate appears to grow

[20] ACTUALLY, WE STILL NEED TO DO THIS EXPANSION TO 24 YEAR OLDS. IT IS THE NEXT THING ON OUR LIST TO DO.

somewhat in importance as women age. For married teens, the effects are greatest among 18-19 year olds. It is important to note, however, that the rate of married teen childbearing among 15 and 16 year olds is extremely low.

Turning our attention to the current abortion rates in the bottom panel of the table, the patterns observed are quite different. The current abortion rate is strongly negatively related to very young teen births (ages 15 and 16), but is actually positively related to unmarried births among 19 year-olds. That result on current abortion rates suggests that the reduction in early teen births is partly compensated by increased childbearing a few years later in life.

**VI. Conclusion**

Parents who are least able or willing to begin caring for a newborn are most likely to make use of abortion. The abortion rates for teens, the unmarried, and the poor are substantially higher than for the general population. Children who are born unwanted are subjected to poorer care both during pregnancy and the early years of life. With the legalization of abortion, mothers with unwanted pregnancies suddenly had a new recourse. Consequently, the number of children raised in adverse environments dropped substantially. Donohue and Levitt [2001] showed how this change reduced crime among the subsequent generation by 15-25 percent. As teen childbearing is a closely associate

social pathogen, the magnitude of the drop should be similar.

Our empirical evidence suggests that birth rates as teens are strongly negatively associated with being born in a state and time period in which abortion rates were high. Our results suggest that teen birth rates today may be 20 percent lower as a consequence of legalized abortion in the 1970's. This is substantially greater than the 5 percent reduction one would have expected on the basis of smaller cohort sizes alone (Levine, et al., 1996). Indeed, our work suggests that legalized abortion may explain half of the overall decline in teen birth rates in the 1990's and all of the decline in unmarried teen births.

In 1990, the Center for Population Options conservatively estimated an annual cost of $25 billion dollars in aid to families started with a teen birth (this estimate did not include housing subsidies, foster care, special education, and other social service programs). The organization estimated that this cost would be reduced by 40 percent all teens postponed birth until their twenties [Center for Population Options 1992]. If these numbers are correct, we would estimate a social benefit of around $3-5 billion dollars annually as a consequence of reduced teen births due to legalized abortion.

Our findings should not be mistaken for an endorsement of abortion or an appeal for state action on fertility decisions. While abortion led to a reduction in teen births, similar decreases could be achieved through a variety of alternative strategies including a greater allocation of resources to assist those most at risk of becoming teen parents.

## Data Appendix

Teen Birth

The teen birth data used in our analysis is from the National Center for Health Statistics publication, Vital Statistics of the United States, Volume I, Natality [annual], except for the historical data in Figures 1 and 2, which are from Ventura et al. (2001).

Abortion

All abortion data is state of residence data provided by The Alan Guttmacher Institute.

Population By Age

These data are from Estimates for the United States, Regions, Divisions, and States by 5 Year Age Groups and Sex: Annual Time Series Estimates, U.S. Census Bureau [annual].

Demographic Components of Population by Age

Data is from the U.S. Census Bureau's online archive: "1990 to 1999 Annual Time Series of State Population Estimates By Single Year of Age and Sex." <http://www.census.gov/population/ www/estimates/st-99-10.html> and "Historical Annual Time Series of State Population Estimates and Demographic Components of Change 1981 to 1989, by Age, Sex, Race, and Hispanic Origin. <http://www.census.gov/population/www/estimates/st_81asrh. html>.

Poverty

Persons Below Poverty Level, by State, taken from the Bureau of the Census United States Statistical Abstract [annual].

Unemployment

Data is used to represent the percent unemployed among the civilian non-institutional population age 16 and older. The source of the figures is the Current Population Survey, taken from the Bureau of the Census United States Statistical Abstract [annual].

Fertility

The number of live births per 1000 population, taken from the Bureau of the Census, United States Statistical Abstract [annual].

Income

Per capita state personal income, converted to 1997 dollars using the Consumer Price Index from the Bureau of the Census, United States Statistical Abstract [annual].

AFDC Generosity

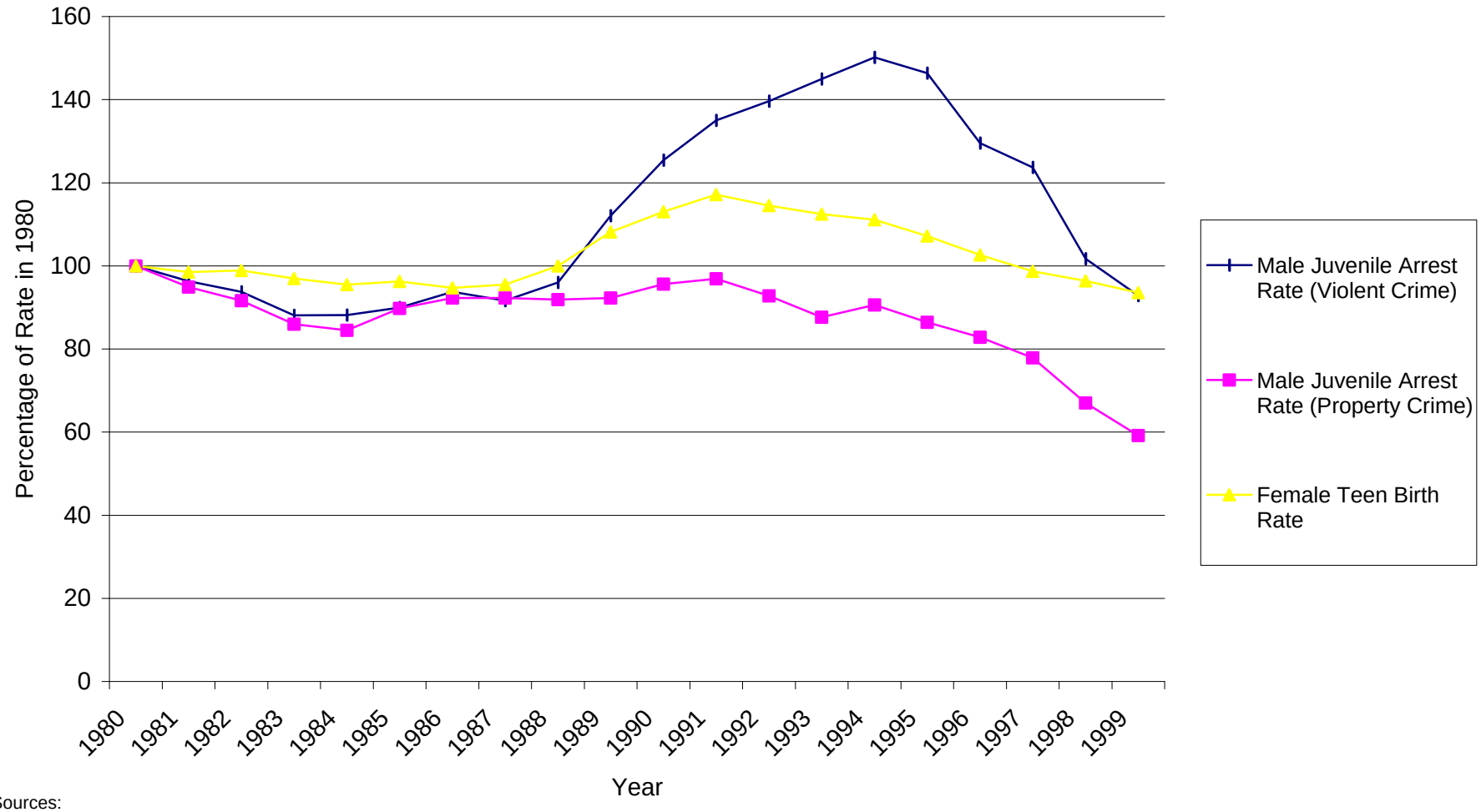
Public Assistance Payments to Families with Dependent Children, from the Bureau of the Census, United States Statistical Abstract [annual]. The data

reported in the Statistical Abstract are the average monthly payment per family receiving aid. That number is multiplied by 12 to obtain the yearly average, and then converted into 1997 dollars using the Consumer Price Index.

Beer Consumption

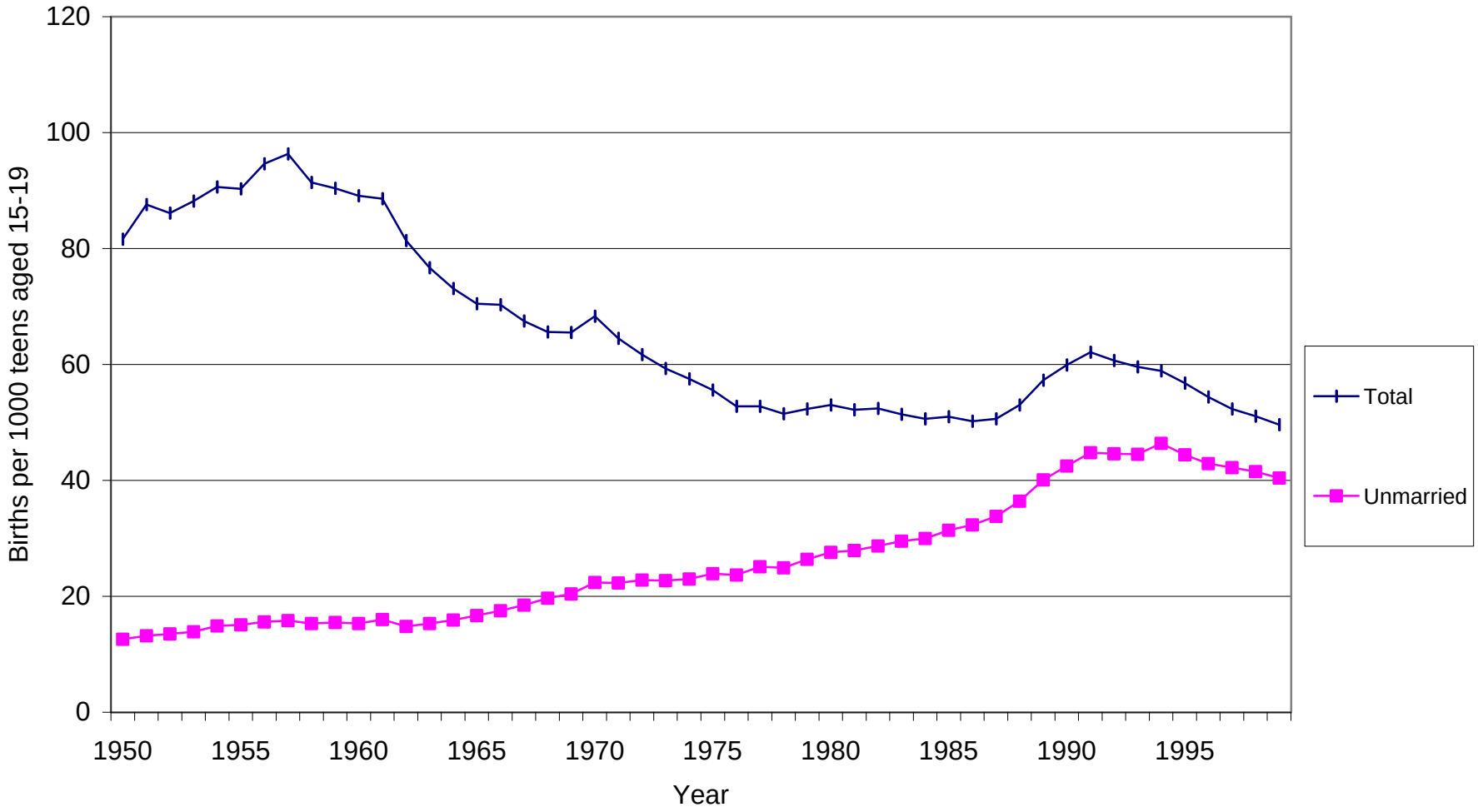
Consumption of Malt Beverages from the Beer Institute's Brewer's Almanac [1995, 1998]. Data is in gallons consumed per capita.

Figure 1
Male Juvenile Arrest Rates (age 10-17) and Female Teen Birth Rates (age 15-19), 1980-1999



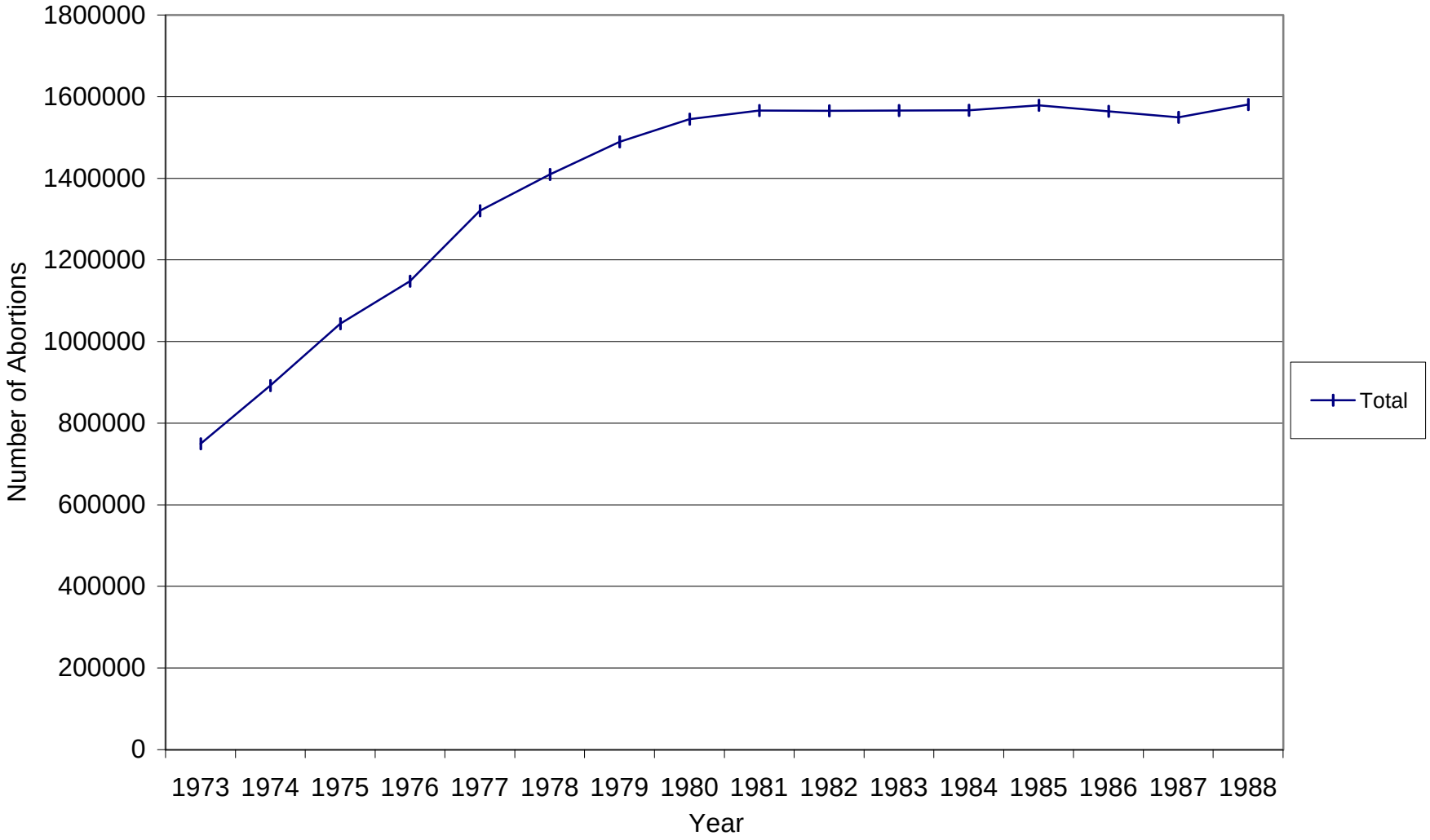

Sources:
(1) OJJDP Statistical Briefing Book, published December, 2000, <http://ojjdp.ncjrs.org/ojstatbb/html/ARRESTS.html>.
(2) Ventura S. J.,T. J. Mathews, and B. E. Hamilton. "Births to Teenagers in the United States,1940 –2000." National Vital Statistics Reports; vol. 49 no 10. (Hyattsville,Maryland: National Center for Health Statistics, 2001).

Figure 2
Teen Birth Rates by Marital Status for the United States, 1950-2000




Source: Ventura S. J.,T. J. Mathews, and B. E. Hamilton. "Births to Teenagers in the United States,1940 –2000." National Vital Statistics Reports; vol. 49 no 10. (Hyattsville,Maryland: National Center for Health Statistics, 2001).

Figure 3
Total Abortions By Year for the United States, 1973-1988




Source: Henshaw, Stanley K. and Jennifer Van Vort eds., Abortion Factbook 1992 Edition (The Alan Guttmacher Institute: New York, 1992).

Figure 4: State Abortion Rates and Changes in Teen Births to Women Born Before and After Legalization

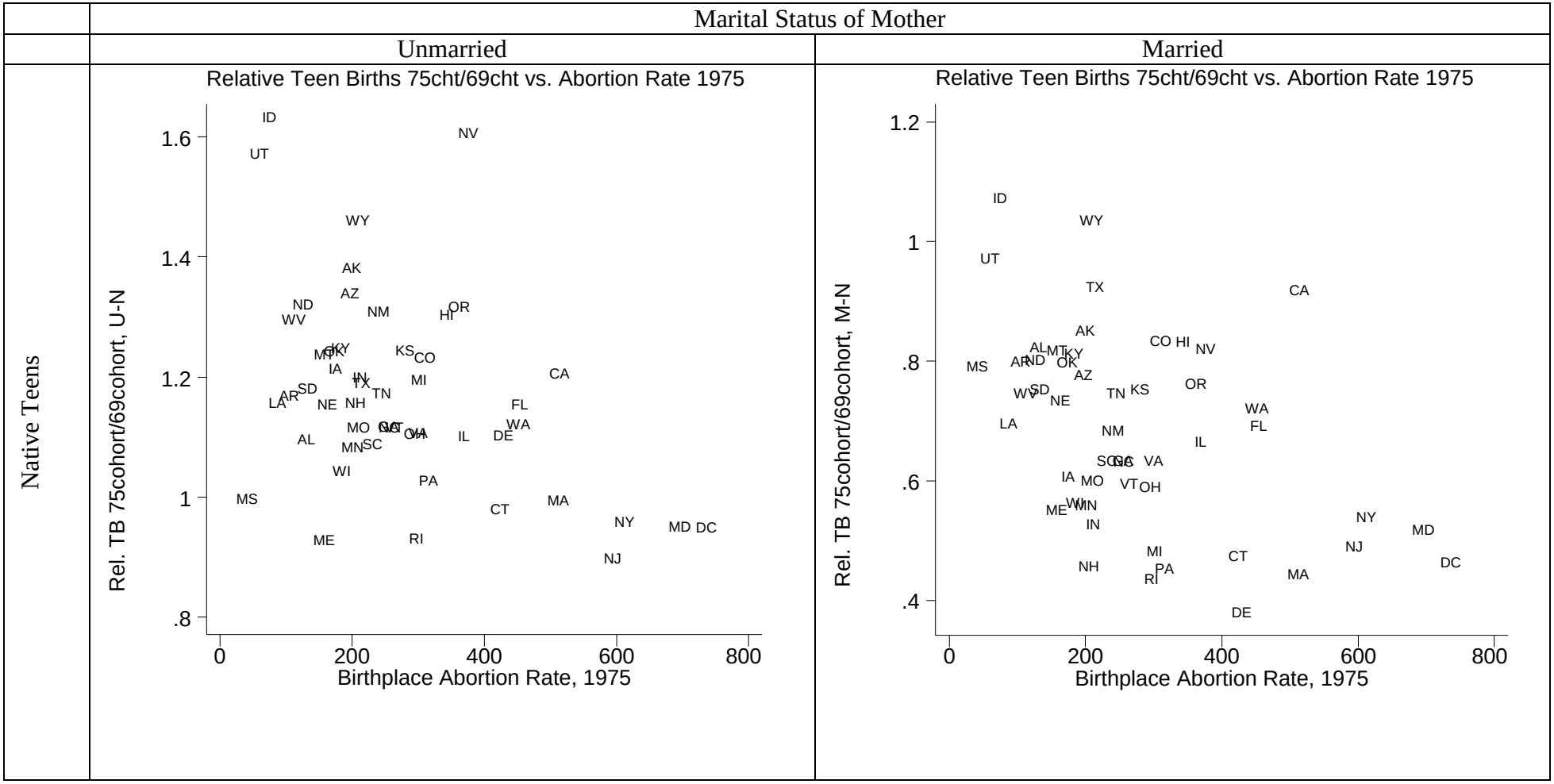
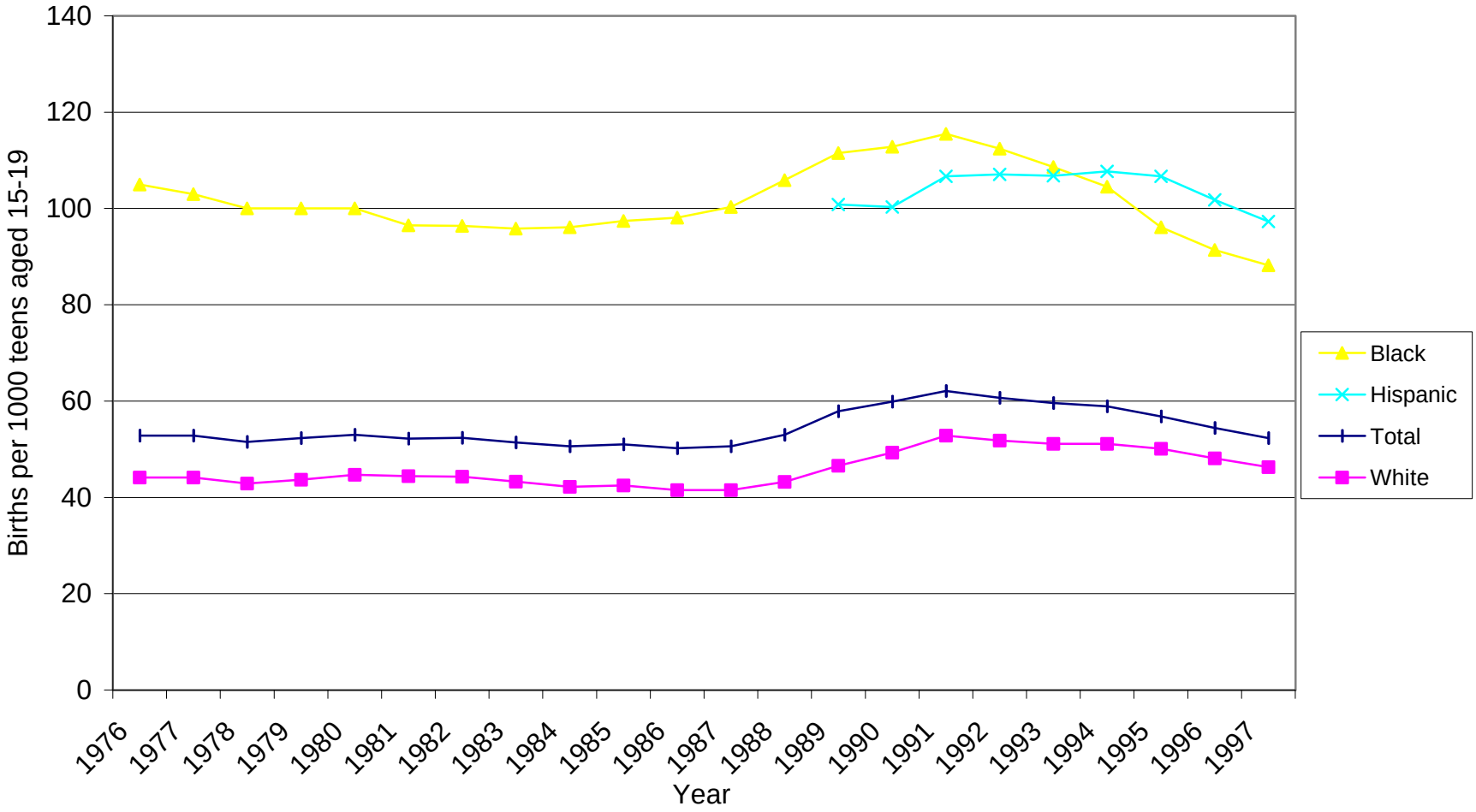
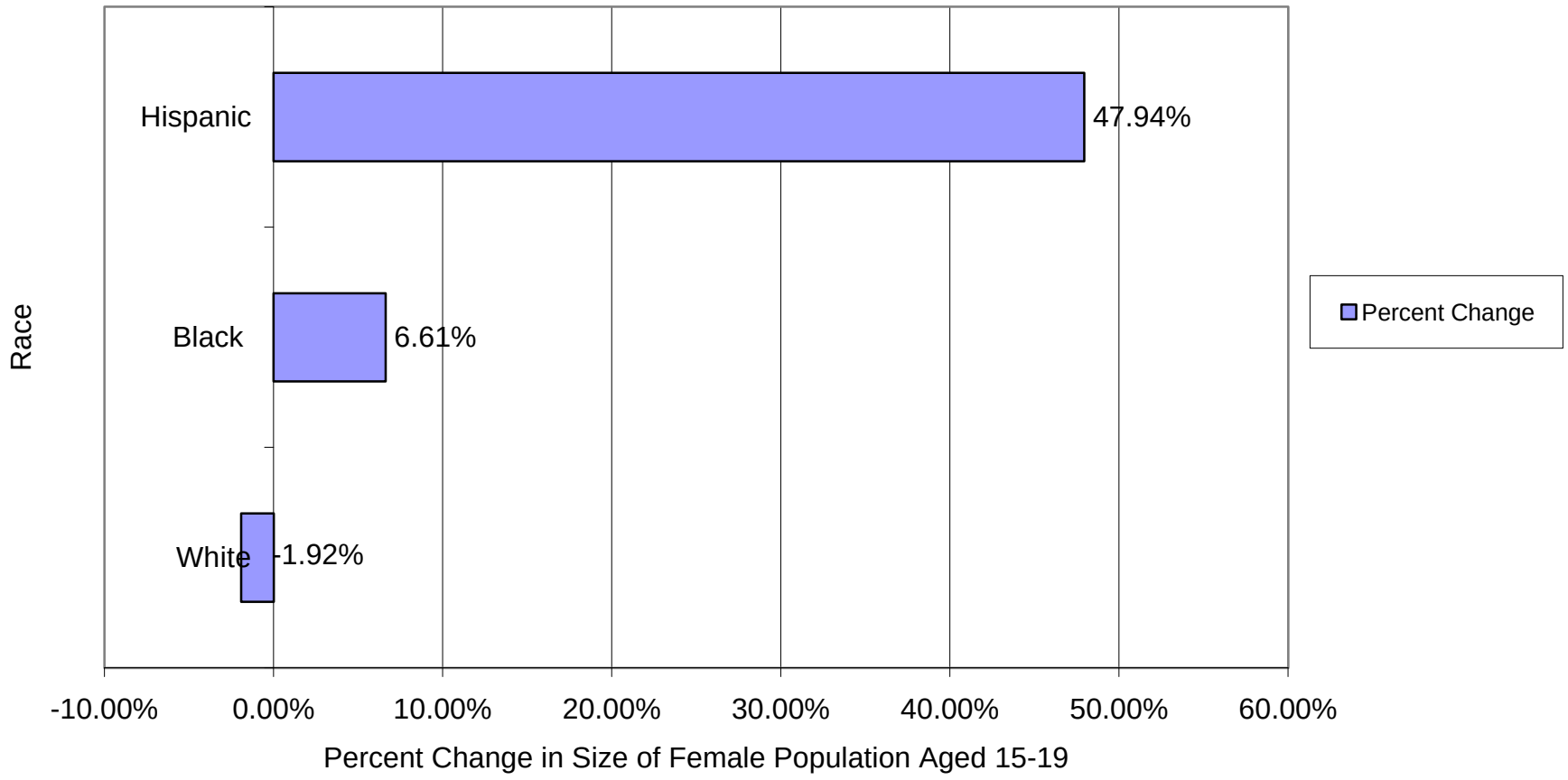


Figure 5
Teen Birth Rates by Race and Hispanic Origin for the United States, 1976-1997



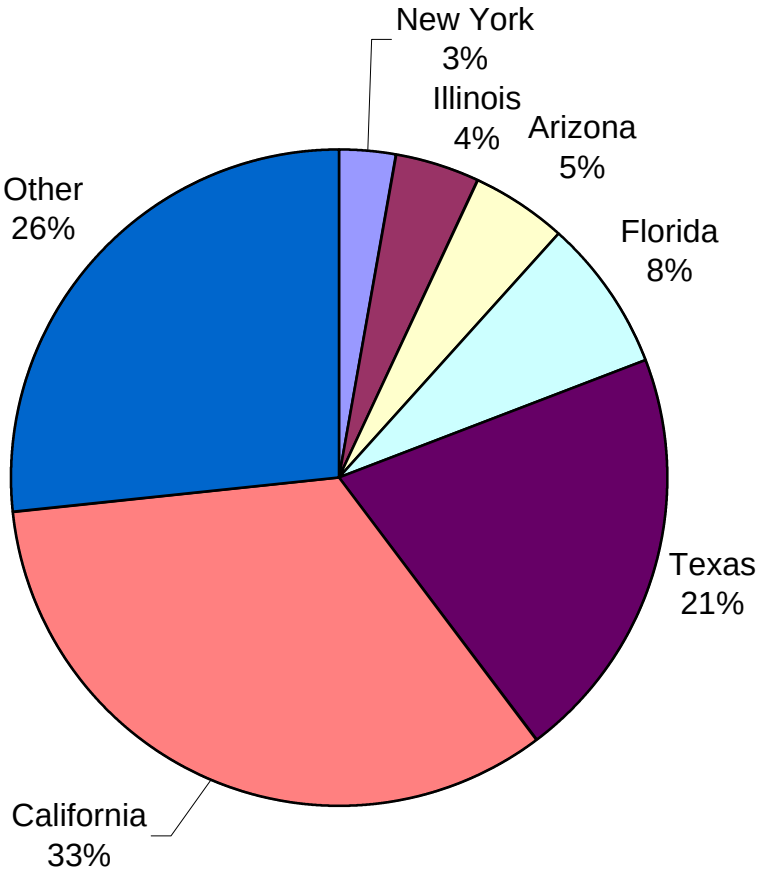

Source: National Center for Health Statistics: Vital Statistics of the Univted States, 1976-1997, Vol. I, Natality. (Washington, DC: U.S. Government Printing Office, 1976-1997).

Figure 6
Teenage Female Population Growth by Race and Hispanic Status for the United States, 1985-1997




Sources:
(1) U.S. Census Bureau: "1990 to 1999 Annual Time Series of State Population Estimates By Single Year of Age and Sex." published November 2, 2000 , <http://www.census.gov/population/www/estimates/st-99-10.html>.
(2) U.S. Census Bureau: "Historical Annual Time Series of State Population Estimates and Demographic Components of Change 1981 to 1989, by Age, Sex, Race, and Hispanic Origin." published November 2, 2000, <http://www.census.gov/population/www/estimates/st_81asrh.html>.

Figure 7
Contribution to Hispanic Teen Population Growth by Each State, 1985-1997




Sources:
(1) U.S. Census Bureau: "1990 to 1999 Annual Time Series of State Population Estimates By Single Year of Age and Sex." published November 2, 2000 , <http://www.census.gov/population/www/estimates/st-99-10.html>.
(2) U.S. Census Bureau: "Historical Annual Time Series of State Population Estimates and Demographic Components of Change 1981 to 1989, by Age, Sex, Race, and Hispanic Origin." published November 2, 2000, <http://www.census.gov/population/www/estimates/st_81asrh.html>.

TABLE I
Summary Statistics

| | Mean | Standard Deviation (overall) | Standard Deviation (within state) |
|---|---|---|---|
| Unmarried teen births (age 15-19) | 14740.83 | 12216.81 | 2938.23 |
| Age 15 | 1063.27 | 888.38 | 220.86 |
| Age 16 | 2077.53 | 1742.02 | 414.55 |
| Age 17 | 3122.67 | 2562.04 | 625.93 |
| Age 18 | 4009.64 | 3298.90 | 812.52 |
| Age 19 | 4467.74 | 3757.20 | 916.71 |
| Married teen births (age 15-19) | 6972.11 | 7880.74 | 1812.56 |
| Age 15 | 187.63 | 310.18 | 114.59 |
| Age 16 | 537.97 | 757.73 | 233.36 |
| Age 17 | 1115.16 | 1389.81 | 366.30 |
| Age 18 | 1972.38 | 2213.98 | 519.45 |
| Age 19 | 3158.98 | 3265.82 | 672.75 |
| State of Residence Abortion Rate (x100) | 377.67 | 144.77 | 36.41 |
| Abortion, Parental Notification Dummy | 0.31 | 0.46 | 0.25 |
| Abortion, Mandatory Delay Dummy | 0.05 | 0.22 | 0.19 |
| Abortion, Medicaid Funding Prohibition Dummy | 0.62 | 0.48 | 0.18 |
| AIDS cases per 1,000 population | 0.25 | 0.22 | 0.12 |
| Percentage Hispanic teen females | 0.11 | 0.12 | 0.02 |
| Percentage Black teen females | 0.15 | 0.10 | 0.01 |
| Maximum Monthly AFDC benefit per family (/100) | 5.61 | 2.31 | 0.82 |
| State unemployment rate (percent unemployed) | 0.06 | 0.02 | 0.01 |
| Poverty rate (percent below poverty level) | 13.80 | 3.51 | 1.64 |
| Beer consumption per capita (gallons) | 23.03 | 3.32 | 1.24 |

Notes: All values reported are means of annual, state-level observations for the period 1985-1997. Birth data and abortion data are by state of residence. The values reported in this table are population weighted averages. Data covers all 50 states plus the District of Columbia (a total of 663 observations).

TABLE II

Panel Data Estimates of the Relationship Between Abortion Rates and Log of Teen Births

| | ln(Unmarried Births) | | | | ln(Married Births) | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Historical abortion rate (x100) | -0.030 | -0.035 | -0.046 | -0.054 | -0.008 | -0.033 | -0.040 | -0.057 |
| | [0.004] | [0.004] | [0.006] | [0.006] | [0.009] | [0.011] | [0.016] | [0.014] |
| Current abortion rate (x100) | -0.007 | -0.024 | -0.024 | -0.022 | -0.101 | -0.149 | -0.150 | -0.145 |
| | [0.014] | [0.014] | [0.014] | [0.011] | [0.030] | [0.036] | [0.036] | [0.024] |
| Abortion, Parental Notification Dummy | -0.012 | -0.011 | -0.006 | -0.005 | -0.006 | -0.005 | 0.000 | 0.004 |
| | [0.011] | [0.012] | [0.012] | [0.009] | [0.033] | [0.036] | [0.036] | [0.025] |
| Abortion, Mandatory Delay Dummy | -0.048 | -0.047 | -0.047 | -0.049 | -0.059 | -0.035 | -0.034 | -0.040 |
| | [0.014] | [0.015] | [0.016] | [0.013] | [0.050] | [0.052] | [0.052] | [0.031] |
| Abortion, Medicaid Funding Prohibition Dummy | 0.042 | 0.044 | 0.045 | 0.047 | -0.065 | -0.048 | -0.048 | -0.043 |
| | [0.016] | [0.017] | [0.017] | [0.015] | [0.043] | [0.050] | [0.049] | [0.037] |
| AIDS cases per 1,000 population | 0.031 | -0.029 | -0.026 | -0.015 | -0.146 | -0.185 | -0.186 | -0.174 |
| | [0.035] | [0.035] | [0.036] | [0.028] | [0.093] | [0.110] | [0.112] | [0.077] |
| Percent Hispanic (Non-Black) Teen Females | 2.939 | 1.825 | 1.181 | 1.132 | 12.479 | 11.975 | 11.391 | 11.425 |
| | [0.711] | [0.697] | [0.670] | [0.533] | [1.150] | [1.293] | [1.274] | [0.810] |
| Percent Black Teen Females | -0.377 | -0.485 | -0.654 | -0.679 | 5.145 | 5.924 | 5.777 | 5.868 |
| | [0.465] | [0.466] | [0.476] | [0.375] | [1.434] | [1.690] | [1.688] | [1.421] |
| AFDC Maximum Monthly Benefit (/100) | 0.030 | 0.027 | 0.031 | 0.031 | -0.014 | -0.009 | -0.005 | -0.003 |
| | [0.007] | [0.007] | [0.007] | [0.006] | [0.016] | [0.020] | [0.020] | [0.012] |
| State Unemployment Rate (% unemployed) | -0.436 | -0.918 | -1.079 | -0.959 | 0.367 | 0.222 | 0.032 | 0.334 |
| | [0.418] | [0.436] | [0.454] | [0.333] | [1.172] | [1.340] | [1.357] | [0.887] |
| Poverty rate (percent below poverty line) | 0.000 | 0.000 | 0.000 | 0.000 | -0.015 | -0.014 | -0.014 | -0.014 |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.004] | [0.005] | [0.005] | [0.003] |
| Beer consumption per capita (gallons) | 0.008 | 0.005 | 0.005 | 0.004 | 0.045 | 0.046 | 0.046 | 0.044 |
| | [0.004] | [0.004] | [0.004] | [0.003] | [0.010] | [0.012] | [0.012] | [0.008] |
| Number of Observations | 3305 | 3305 | 3305 | 3305 | 3275 | 3267 | 3267 | 3267 |
| R-squared | 0.990 | 0.988 | 0.988 | 0.993 | 0.973 | 0.965 | 0.965 | 0.986 |
| Nativity of Teen Mothers | All | U.S. Born Only | U.S. Born Only | U.S. Born Only | All | U.S. Born Only | U.S. Born Only | U.S. Born Only |
| Controls for Unobservables | Year*Age | Year*Age | Year*Age | Year*Age, State*Age | Year*Age | Year*Age | Year*Age | Year*Age, State*Age |
| Historical abortions by residence or birthplace? | Residence | Residence | Birthplace | Birthplace | Residence | Residence | Birthplace | Birthplace |

Notes: The dependent variable is the log of the number of teen births (marital status named at the top of each set of columns). The unit of observation in the regression is annual teen births by single year of age. The historical abortion rate for a cohort of age a residing in state s in year y is the weighted average number of abortions per 1,000 live births these mothers faced in their states of birth in year y-a-l. The sample contains annual state-level observations (including the District of Columbia) for ages 15-19 for the period 1985-1997. If data were available for all states, years, and ages, the total number of observations would be 3315. Due to missing birth data and occasional zero values, the actual number of observations for married births is somewhat smaller. Estimation is weighted least squares, with weights determined by total state population. Standard errors have been corrected to account for correlation over time within a given birth cohort in a particular state. Such a correction is necessary because the abortion rate for any given cohort is fixed over time, but multiple observations corresponding to different years of age are included in the regression.

TABLE III

Sensitivity Abortion Coefficients to Alternative Specifications

| | ln(Unmarried Births) | | ln(Married Births) | |
|---|---|---|---|---|
| Baseline | -0.054 | [0.006] | -0.057 | [0.014] |
| Exclude current rate | -0.056 | [0.006] | -0.067 | [0.014] |
| Include only Black and Hispanic controls | -0.064 | [0.006] | -0.092 | [0.013] |
| Use squared Black and Hispanic controls | -0.054 | [0.006] | -0.040 | [0.013] |
| Exclude New York | -0.057 | [0.006] | -0.073 | [0.016] |
| Exclude California | -0.055 | [0.006] | -0.037 | [0.012] |
| Exclude District of Columbia | -0.053 | [0.007] | -0.074 | [0.016] |
| Exclude New York, California, and District of Columbia | -0.061 | [0.008] | -0.065 | [0.017] |
| Exclude Black control | -0.054 | [0.006] | -0.058 | [0.014] |
| Exclude Hispanic control | -0.057 | [0.006] | -0.079 | [0.016] |
| Exclude Black and Hispanic control | -0.057 | [0.006] | -0.079 | [0.016] |
| Exclude Black and Hispanic controls and exclude California | -0.056 | [0.007] | -0.046 | [0.014] |
| Exclude Black and Hispanic controls and exclude New York, California, and D.C. | -0.062 | [0.008] | -0.068 | [0.018] |
| Unweighted | -0.047 | [0.005] | -0.047 | [0.012] |
| Unweighted, exclude District of Columbia | -0.045 | [0.006] | -0.071 | [0.016] |
| Unweighted, exclude New York, California, and District of Columbia | -0.046 | [0.006] | -0.071 | [0.017] |

Notes: Results in this table are variations on the specifications in columns (4) and (8) of Table II. The top row of the current table is the baseline specification that is presented in Table II. The sample covers the period 1985-97 for ages 15-19, just as in Table II. A complete set of year-birth cohort interactions and state-age interactions are also included. Estimation is weighted least squares, with weights determined by total state population. Except where noted regressions are all weighted by state population. Standard errors (in brackets) have been corrected to account for correlation over time within a given birth cohort in a particular state.

TABLE IV

The Relationship between Abortion Rates and Teen Births, by Single Year of Age

| | ln(Unmarried Births) | ln(Married Births) |
|---|---|---|
| Historical Abortion Rate (x100) interacted with: | | |
| Age=15 | -0.044 | 0.001 |
| | [0.008] | [0.031] |
| Age=16 | -0.043 | -0.024 |
| | [0.007] | [0.018] |
| Age=17 | -0.051 | -0.082 |
| | [0.008] | [0.017] |
| Age=18 | -0.066 | -0.105 |
| | [0.010] | [0.015] |
| Age=19 | -0.079 | -0.112 |
| | [0.011] | [0.016] |
| Current Abortion Rate (x100) interacted with: | | |
| Age=15 | -0.065 | -0.351 |
| | [0.023] | [0.095] |
| Age=16 | -0.037 | -0.188 |
| | [0.017] | [0.061] |
| Age=17 | -0.015 | -0.118 |
| | [0.017] | [0.046] |
| Age=18 | 0.000 | -0.048 |
| | [0.015] | [0.032] |
| Age=19 | 0.023 | 0.017 |
| | [0.014] | [0.030] |
| Number of Observations | 3305 | 3267 |
| R-squared | 0.993 | 0.987 |

Notes: The results in the table are coefficients from estimation of equation (3). The unit of observation in the regression is annual teen births by state of residence by single year of age. The sample covers the period 1985-97 for ages 15-19. The abortion rate for a cohort of age a in state s in year y is the number of abortions per 1,000 live births in the state s in year y-a-l. If data were available for all states, years, and ages, the total number of observations would be 3315. Due to missing birth data and occasional zero values, the actual number of observations for married births is somewhat smaller. A complete set of year-birth cohort interactions and state-age interactions are also included. Estimation is weighted least squares, with weights determined by total state population. Standard errors have been corrected to account for correlation over time within a given birth cohort in a particular state. Such a correction is necessary because the abortion rate for any given cohort is fixed over time, but multiple observations corresponding to different years of age are included in the regression.

## References


Alan Guttmacher Institute, "11 Million Teenagers: What Can Be Done About the Epidemic of Adolescent Pregnancies in the United States." (out of print, The Alan Guttmacher Institute,1976).

Alan Guttmacher Institute, Sex and America's Teenagers, (New York, NY: Alan Guttmacher Institute, 1992).

Abma, Joyce C. and Freya L. Sonenstein. "Sexual Activity and Contraceptive Practices Among Teenagers in the United States, 1988 and 1995." Vital and Health Statistics, XXIII (2001).

An, Chong-Bum, Robert Haveman, Barbara Wolfe. "Teen Out-of-Wedlock Births and Welfare Receipt: The Role of Childhood Events and Economic Circumstances." The Review of Economics and Statistics, LXXV (2) (1993), 195-208.

Bhargava, A., and L. Franzini, et al, "Serial Correlation and the Fixed Effects Model," Review of Economic Studies, XLIX (1982), 533-549.

Boonstra, Healther and Adam Sonfield. "Rights Without Access: Revisiting Public Funding of Abortion for Poor Women." The Guttmacher Report on Public Policy, (April, 2001).

Card, Josefina J. "Long-term Consequences for Children of Teenage Parents." Demography, XVII (1981), 137.

The Center for Population Options (CPO). Teenage Pregnancy and Too-Early Childbearing: Public Costs, Personal Consequences. (Washington, D.C.: CPO, 1992).

Dagg, P.K., "The Psychological Sequelae of Therapeutic Abortion -- Denied and Completed." American Journal of Psychiatry, CXLVIII (5) (1991), 578-575.

David, Henry, Zdenek Dytrych, et al., Born Unwanted: Developmental Effects of Denied Abortion (New York, NY: Springer, 1988).

Donohue, John J. and Steven D. Levitt. "The Impact of Legalized Abortion on Crime." Quarterly Journal of Economics CXVI (2001), 379-420.

Gruber, Jonathan, P.B. Levine, and D. Staiger, "Abortion Legalization and Child Living Circumstances: Who Is the 'Marginal Child?'" Quarterly Journal of Economics CXIV (1999), 263-291.

Hayes, C. D. (Ed.)., Risking the Future: Adolescent sexuality, pregnancy, and Childbearing (Vol. 1), (Washington, DC: National Academy Press, 1987).

Horwitz, Sarah M., Lorraine V. Klerman, H. Sung Kuo, James F. Jekel. "Intergenerational Transmission of School-Age Parenthood." Family Planning Perspectives, XXIII (4) (1991), 168-172+177.

Joyce, Ted, "Did Legalized Abortion Lower Crime?" National Bureau of Economic Research, Working Paper 8319, (Cambridge, MA: National Bureau of Economic Research, June 2001).

Kahn, Joan R., and Kay E. Anderson, "Intergenerational Patterns of Teenage Fertility." Demography, XXIX (1) (2001), 39-57.

Klerman, L. V., Adolescent Parenting and Childhood Poverty. In A. C. Huston (Ed.), Children in Poverty, (New York, NY: Cambridge University Press, 1991), 79-104.

Levine, Phillip B., Douglas Staiger, Thomas J. Kane, and David Zimmerman, "*Roe v.*

*Wade* and American Fertility." National Bureau of Economic Research, Working paper 5615, (Cambridge, MA: National Bureau of Economic Research, June 1996).

Luker, Kristin, Dubious Conceptions: The Politics of Teenage Pregnancy (Cambridge, MA: Harvard University Press, 1996).

Merz, J.F., C. A. Jackson, and J.A. Klerman, "A Review of Abortion Policy: Legality, Medicaid Funding, and Parental Involvement, 1967-1994." Women's Rights Law Reporter. XVII (1-61) (1995).

Michael, Robert, "Abortion Decisions in the U.S.," (Unpublished manuscript: University of Chicago, IL, 1999).

Mohr, James C., Abortion in America: The Origins and Evolution of National Policy, 1800-1900. (New York: Oxford University Press, 1978).

Moore, Kristin A., D. E. Myers, D. R. Morrison, C. W. Nord, B. V. Brown, and B. Edmonston, "Age of First Childbirth and Later Poverty." Journal of Research on Adolescence, III (4) (1993).

Moore, Kristin A. and Linda J. Waite, "Early Childbearing and Educational Attainment." Family Planning Perspectives, IX (5) (1977), 220-225.

Nathan, Richard P., Paola Gentry, and Catherine Lawrence. "Is There a Link Between Welfare Reform and Teen Pregnancy?" Rockefeller Reports (Albany, NY: The Nelson A. Rockefeller Institute of Government, 1999).

Newcomer, Susan F. and J. R. Udry. "Mothers' Influence on the Sexual Behavior of Their Teenage Children." Journal of Marriage and the Family, XLVI (1984), 477.

Piccinino, Linda J. and William D. Mosher. "Trends in Contraceptive Use in the United States: 1982-1995." Family Planning Perspectives, XXX (1) (1998), 4-10+46.

Ventura S. J.,T. J. Mathews, and B. E. Hamilton. "Births to Teenagers in the United States,1940 –2000." National Vital Statistics Reports, vol. 49 no 10. (Hyattsville, MD: National Center for Health Statistics, 2001).