A Cross-Cohort Examination of Nonmarital Teenage Childbearing*

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ABSTRACT

The current paper looks at the nonmarital teenage childbearing behavior of two cohorts of NLSY women. It constructs a monthly panel of information for the teens from the time they are twelve years old until they have a nonmarital birth, reach the end of their third survey without giving birth, get married, or reach age 18. The research attempts to identify the factors that have contributed to the differences in teenage childbearing behavior that we observe across the cohorts of women by estimating a Cox proportional hazard model, stratified on race, age of mother at the birth of her first child, and the rate of marriage in the state. The model identifies education, living situations, religion, and welfare policy as factors. Specifically, for the youths of the 1990s, the introduction of restrictions on living conditions, the so-called minor parent provisions, act as a retardant to nonmarital childbearing. The model also shows that higher education for the youth and her mother delay childbearing for both cohorts of women. Finally, living with one's biological father at age 14 is linked with delayed childbearing, with hazard rates nearly 60 and 40 percent lower for teens of the two cohorts.

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1. Introduction

While the overall birthrate among teenaged women has fallen, over the past half-century we have witnessed a marked increase in nonmarital teenage childbearing. In 1940, there were fewer than 10 births per thousand unmarried women aged 15 to 19. The rate increased rapidly up until 1994 when the birth rate for unmarried teenagers was over 46 per thousand (Ventura and Bachrach 2000—see Figure 1). Although the birthrate has been declining since 1994, the rate is still quite high, nearly double that of any other industrialized country (Alan Guttmacher Institute (AGI)1998).

Teenage childbearing has been shown to be linked with substantial adverse effects, not only for the mother but also for the child. Teenage mothers are much less likely to get prenatal care than other mothers (McCauley and Salter 1995). Lack of prenatal care, in turn, leads to pregnancy related complications that may have been preventable. It has been shown that children of young mothers are more likely to be of below average weight, have childhood health problems and be hospitalized more than the children of older mothers (AGI 1994). Sullivan et al (1994) found that the risk of the child dying within a year of birth is 30 percent higher when the mother is 15 to 19 compared to children of mothers 20 to 29[1]. Unfortunately, the risks for children of teenage mothers are not limited to their health status. Children of teenage mothers are themselves more likely to become teenage parents (Kahn and Anderson 1992; Bane and Ellwood 1986), perpetuating all the problems associated with teenage childbearing.

Among teenage mothers, there are both health and economic consequences. The risk of death during childbirth is 2 to 4 times greater for a mother aged 17 or less than it is for mothers

20 or older (McCauley and Salter). While the size of the impact on human capital accumulation and later socioeconomic status has been debated (Geronimus and Korenman 1992; Geronimus and Korenman 1993), the economics literature finds that beginning childbearing early does lead to lower levels of investment in education and labor market experience, which in turn leads to depressed socioeconomic status (Klepinger et al 1998; Ribar 1998; Geronimus and Korenman 1993; Hoffman et al 1993; Geronimus and Korenman 1994).

Finally, teenage childbearing is costly to society. Recent findings of a US GAO (1998) report indicate that nearly 70 percent of all teen births are paid for by Medicaid. The report estimates that almost one-half of teenage mothers receive some type of welfare assistance within five years of giving birth, with the fraction rising to nearly three-quarters among unmarried teens. In 1995 alone, teenaged mothers and their children received an estimated $39 billion in federal assistance.

Due to the adverse socioeconomic and health effects of teenage childbearing, preventing nonmarital teen births is a high priority for policymakers. However, in order to prevent them, determinants of teenage childbearing must first be examined. Only after the determinants are well understood is it possible to prescribe policies that might be successful in reducing out-of-wedlock teenage childbearing.

What is different about the country today as compared to earlier this century that has caused nonmarital teen childbearing to increase so dramatically? Why have they begun to decline? Has it become less socially acceptable during the latter part of the 1990s? What are the circumstances that induce some women to become teenage mothers, but not others? How important are economic surroundings compared to the social environment? Previous literature

[1] While a complete review of the literature is precluded here in the interest of space, Hayes (1987) provides a nice summary of the health effects of early childbearing.

has shown that certain socio-demographic characteristics are more prevalent among teen mothers than others. Teenage mothers are more likely to be high school dropouts and less likely to attend college (Hoffman et al 1993). Additionally, the rates of nonmarital teenage childbearing are substantially higher among black and Hispanic teens than among white teens.

How large of a role have policies specifically targeted at teenage childbearing behavior played in the changing fertility rates? Because so many teen mothers turn to welfare programs for aid in raising their children, special provisions have often been made for them. Under the Personal Responsibility and Work Opportunity Act (PRWORA) of 1996, many states have implemented family cap provisions and minor parent provisions designed to inhibit childbearing among welfare recipients. The family caps limit the size of the grant available to mothers who conceive children while receiving federal monies. Horvath-Rose and Peters (2000) and Mach (2001) both find evidence that family cap provisions reduce childbearing. The minor parent provisions regulate where teenaged parents are allowed to live in order to receive aid. Horvath-Rose and Peters additionally find slight evidence that the minor parent provisions have also had limited success.

The current paper addresses these questions using data from the two youth cohorts of the National Longitudinal Surveys (NLS). These two groups of women faced substantially different social and economic situations during their teenage years, with very different outcomes. This paper uses these environmental differences to identify the characteristics that increased or decreased the rates of nonmarital childbearing among teens.

2. Model and Estimation

Declines in the rates in nonmarital teenage birthrates can mathematically arise in one of two ways. As the nonmarital teen birth rate is defined as the number of births to unmarried teens

divided by the total number of unmarried teens, the decline can come from decreasing the number of births or increasing the number of unmarried teens. Throughout the last half century, the age at first marriage for women has been consistently increasing, from just under 21 in 1970 to 25 by 1998 (U.S. Census Bureau 1999). This would imply that the supply of unmarried teens should also have been increasing. While, theoretically, this could have caused the nonmarital birth rates to decline, it is unlikely to have been the driving factor behind the recent decline. The unmarried teenage population has been increasing gradually over the entire period, but the nonmarital childbearing rate only began to decline in the latter part of the 1990s. Rather, it is more likely that the decreasing numbers of births among teens is causing the decline. As further evidence of this, we can see that the overall birth rate for teens also began falling (see Figure 1). If it were simply changing marital status that caused the decline, we would expect no such change in the overall birth rate. Thus, to explain the decreasing birth rates, this paper will focus on the decrease in the number of births, rather than the decrease in marriage.

One way to think about the decision to become a teenage mother is to think about it in the larger context of the decision to become a mother at all. The childbearing decision can be thought of as waiting for the optimal time to have the first child. If the optimal time is beyond her teenage years, we will not observe a teen become a teen mother. Thus, one way to look at differences in nonmarital teen childbearing is to look at differences in the optimal timing of the first birth. In order to measure how different factors have affected the timing of a youth's childbearing decisions, we then want to measure how the amount of time that a woman chooses to remain childless changes as certain factors change.

Define $F(t, Z_t)$ as the cumulative distribution function of time spent without a child, where Z_t is a time-dependent vector of all characteristics which may affect the decision process.

The survival function, $S(t, Z_t)$, is the percent of the sample still childless at time t; $S(t, Z_t) = 1 - F(t, Z_t)$. The instantaneous probability of giving birth in period $T = t$, conditional on remaining childless up to t, is the hazard rate, $h(t, Z_t)$, where

$$h(t, Z_t) = \frac{f(t, Z_t)}{S(t, Z_t)}.$$

The likelihood that an individual is observed giving birth out of wedlock over an observable spell to time t is given by $f(t, Z_t)$. The probability that the youth does not become an unmarried teenage mother by the time we stop observing her is just the likelihood that the spell is right censored, which is given by the survival function at time T, $S(T, Z_T)$. Then, for a sample of n_1 completed spells and n_2 right-censored spells, the total likelihood is given by

$$L = \prod_{i=1}^{n_1} f_i(t, Z_t) \prod_{i=1}^{n_2} S_i(T, Z_T).$$

Assuming that $h(t, Z_t)$ is proportional, $h(t) = h_0(t)\exp(\beta X_t + \gamma L_t)$, where X represents a vector of individual-specific measures and L are location-specific attributes. The estimated parameters of this model then indicate whether the particular parameter hastens or retards nonmarital childbearing.

In the context of the model described above, the two cohorts of women can be making different decisions about the timing of their childbearing for one of two reasons. Either they were faced with a different set of opportunities, or they valued their opportunities differently. It could also be some combination of both. In order to account for each of these possibilities, each of the regressors are interacted with a dummy variable indicating membership in the older cohort. This then makes the complete proportional hazard model

$$h(t) = h_0(t)\exp(\beta X_t + \gamma L_t + \alpha D + \delta D * X_t + \varphi D * L_t), \qquad (1)$$

where D is the cohort dummy indicating membership in the older cohort.

Due to the differences in birthrates by race and other exogenous characteristics, we might think of modeling these differences as inherent propensities to become unmarried teenage mothers—different baseline hazards—according to these characteristics. This may be done by stratifying the hazard and estimating the following:

$$h(t) = h_{j0}(t)\exp(\beta X_t + \gamma L_t + \alpha D + \delta D * X_t + \varphi D * L_t), \quad (2)$$

where *j* represents race and other exogenous characteristic categories. The model can be estimated via Cox proportional hazards method.

In estimation of either equation (1) or equation (2), if α is significant, it indicates that there is a different underlying propensity of youths in the different cohorts to become teenage mothers. A positive (negative) α indicates that simply being a member of the older cohort hastens (retards) the timing of the first out-of-wedlock birth. If φ or δ are significant, it indicates that the value their surroundings differently. If φ or δ are positive (negative) this indicates that the factors increase (decrease) the timing of the first birth more (less) for the older cohort. Finally, if γ is significant, it indicates that the factor is a significant determinant of the timing of the first birth. The results of estimation will give some insight into why teen birthrates have begun to fall, informing policy makers about the optimal paths to pursue to continue the trend.

3. Data and Descriptives

The individual-level data for the analysis come from the two youth cohorts of the NLS. The elder group (NLSY79) were born between January 1, 1957 and December 31, 1964, making them teenagers during the 1970s and 1980s. The younger group (NLSY97) were born between January 1, 1980 and December 31, 1994, making them teenagers during the late 1990s and early 2000s.

Due to the sampling frameworks, the NLSY79 and NLSY97 cohorts are not directly comparable. While the NLSY79 included youths aged 14 to 21 the first year the survey was conducted (1979), the NLSY97 youths were 12 to 17 the first year of their survey (1997). Although this would seem to restrict analysis to only those women who were 14 to 17 years old as of December 31 of the year prior to the first interview, this loss of sample can be slightly mitigated using the retrospective information collected in the surveys. Thus, the final sample consists of youths aged 12 to 17 years old as of December 31 of 1976 for the older cohort and 1996 for the younger cohort. For the NLSY79, this leaves an eligible sample of 4,689. For the NLSY97, this leaves an eligible sample of 4,385. Furthermore, as there are currently only three rounds of data available from the NLSY97, observations on the NLSY79 women will also be limited to the first three years that they were interviewed. Finally, due to missing information on residence and background information, the sample used to estimate the model is further reduced to 3,501 teens from the NLSY79 sample and 3,572 teens from the NLSY97 sample. Table 1 details the sample selection criteria.

Although the main focus of the NLSY surveys is to collect information on labor market participation and outcomes, the surveys also elicit a great deal of other information on respondents. Most importantly for the purposes of this paper, the data include detailed information on any children of the respondents. Despite the fact that this paper only utilizes three survey years of data, the analysis actually utilizes information on the youths going back to earlier periods. In both of the surveys, retrospective information on the respondents' marital status and childbearing activity is collected allowing for a complete analysis of nonmarital childbearing for all the women in the sample until the women are at least 17 years old.

Both datasets contain large amounts of demographic and family background information as well as the state and county of residence. This latter group of controls is important in order to describe the social and economic environment under which the respondents made any childbearing decisions. Because the two cohorts of women faced notably different environments at this crucial point in their development, it is important to control for these differences. One of the attractive features of using the two NLS cohorts is that their construction is very similar so that most variables are available in both datasets, allowing the researcher to control for a wide variety of characteristics. Thus, the NLSY data are augmented with local level measures describing the social, economic, and institutional environment.

Individual Measures

The NLSY79 and NLSY97 data both contain a substantial amount of information on the individuals and their backgrounds. While teen birthrates have been falling for white and black teens, the opposite is true for Hispanic youth (Ventura and Bachrach). This fact makes controlling for race and ethnicity essential. Statistics also suggest that age is an important determinant. Of the teens who gave birth during the 1990s, 60 percent were 18 to 19 years old (US GAO).

The data also include rich measures of family background information that have been shown to be linked with early childbearing (US GAO; Kahn and Anderson). Measures that are included in the analysis include: mother's educational background, mother's age at birth of first child, whether or not the youth lived with both parents at age 14, and religious beliefs. Additionally, there are measures of the youth's educational success as measured by the highest grade completed at each survey point.

Local Area Measures

Information on the youth's residence is used to augment the NLS data and capture differences in the social and economic environment. Because the social and economic environment differ not only across cohorts, but also within cohort across locations, it is essential to control for these differences. Important local level measures include the unemployment rate, per capita income, and the marriage rate.

Additionally, measures of the youth's access to abortion provide an important measure of the likelihood that a teen will give birth, given that she becomes pregnant. One measure of access is simply the count of abortions performed in an area. These data are taken from the Alan Guttmacher Abortion Provider Survey. The survey gives a measure of how many abortions are performed within each county, which is merged into the NLS data by the youth's county of residence. A second measure that is included in the analysis is whether or not there are restrictions imposed on youths seeking abortions, such as parental notification laws. These restrictions are another measure of the youth's access.

In previous economics literature, much attention has been focused on the effect that variation in welfare benefit levels across states has on the total number of children born to recipients[2]. Results of these studies typically indicate that maximum benefit levels provide significant positive incentives for nonblacks, and small or no effects for blacks. To capture these different opportunities, measures of the state's maximum payment standards are also included in the analysis. Recently, there has also been much emphasis focused on teens and welfare participation, particularly following the implementation of PRWORA. Currently the requirements for teen parents receiving welfare vary significantly from state to state. Because

[2] See, for example, Plotnick 1990; Duncan and Hoffman 1990; An, Haveman and Wolfe 1993; Lundberg and Plotnick 1995.

more stringent requirements are likely to make teenage motherhood less attractive, it is important to capture these differences as well. Table 2 provides a summary of the variables used in the analysis, as well as their sources.

Once the data are all merged together, a complete monthly history of the youths is constructed from the time they are 12 years old until the end of their third interview, they reach age 19, or they get married. Information on the time-variant variables is taken ten months prior to the current month. For example, an observation for October 1999 will contain a dependent variable that indicates whether or not a teen became a teen mother in October 1999 and local information from January 1999.

Table 3 provides the average characteristics of both groups. Differences in the two groups of youths' backgrounds are clear from this table. The mothers of the newer cohort have nearly two more years of education on average and delay the birth of their first child roughly two years longer. Youth's from the elder cohort are slightly more likely to be practicing Catholics and live with their biological fathers at age 14. While the elder cohort faces higher unemployment rates and lower per capita incomes, the newer cohort is subject to smaller welfare grants. There are also differences in the relative availability of abortions for the two groups of teens. While the abortion rates are comparable across cohorts, the newer cohort members are more likely to face restrictions in receiving an abortion than the older cohort.

Table 4 looks at the means for the 234 NLSY97 cohort members and the 335 NLSY79 cohort members who do become unwed mothers. Across the cohorts, there are some noticeable differences. The differences in background highlighted in Table 3 are also visible for the mothers; the newer cohort's mothers have more education and are older at the birth of their first child. For both cohorts, the averages are at least a year less than their respective sample

averages. In addition, the elder cohort of mothers is almost twice as likely to be living with their biological fathers at age 14, but both are much less likely than their respective sample averages. While only a quarter of either sample is black, over one-half of the NLSY79 mothers and nearly 46 percent of the NLSY97 mothers are black. Again, the NLSY97 mothers live in more prosperous areas than the NLSY79 mothers, as measured by both unemployment rates and per capita income. In addition, the NLSY97 mothers are less likely than their other cohort members to live in states where a family cap has been implemented or a minor parent provision is in place.

4. Estimation Results

As a beginning, equation (1) is estimated for the entire sample using all of the controls. These results are presented in Table 5. The results are presented in terms of hazard ratios as opposed to coefficients in order to facilitate interpretation. Hazard ratios greater than one indicate that a one-unit increase in the variable increases the instantaneous likelihood of nonmarital childbearing in each period, while hazard ratios less than one indicate the variable decreases the likelihood. The third column of the table provides the overall impact of a change in the variable, taking into account both the variable and the cohort interaction term. The major assumption associated with this model is that the impact of the variables is proportional over time. That is to say that if the model predicts a hazard ratio of 1.25 for being black, the black hazard will always be 25 percent greater than the non-black hazard, all other factors constant. Because this is a questionable assumption for some of the variables in the model, results from proportionality tests are presented in the bottom of Table 5.[3] The tests indicate that the assumption of proportionality is likely to be problematic for these estimates.

[3] Grambsch and Therneau (1994) have shown that many of the tests for proportionality can be generalized to testing for nonzero slopes in a generalized linear regression of the scaled Schoenfeld residuals on time. For more detailed information on the exact test, refer to StataCorp (2001).

Table 6 provides estimates for equation (2), stratifying the baseline hazard by race, the age of the youth's mother when she gave birth to her first child, and the marriage rate. Rather than use continuous variables for the mother's age and the marriage rate, categorical measures are constructed for each, which roughly partition the sample in thirds. Ranges for the age of the teen's mother include less than 17, between 18 and 20, and greater than 20. Ranges for the marriage rate include less than 8 per 1,000, between 8 and 9.5 per 1,000, and greater than 9.5 per 1,000. Again the results for the proportionality are shown in the bottom of Table 6. Results indicate that the overall model does not appear to violate proportionality.

The estimated hazard ratios suggest that both changing environments and changing valuations have played a role in the changing out-of-wedlock childbearing rates. Education plays a strong role in deferring nonmarital childbearing. The model shows that higher education for the youth and her mother delay childbearing for both cohorts of women, with a slightly larger impact of the youth's mothers education for the younger cohort. Each additional year of education obtained by the youth reduces the hazard of a nonmarital birth by 28 percent in each month. The impact is slightly smaller for the youth's mother's educational attainment, with each additional unit reducing the hazard rate by about 7 percent for the elder cohort and about 12 percent for the younger group. Since the time when the NLSY79 youth were teens, average education has risen substantially among women. In 1970, 12.9 percent of women 25 to 29 years old completed college; by 1993, this had risen to 23.9 percent (Adams, 2001). This rise in educational attainment of women combined with the prediction of delayed childbearing potentially helps to explain why teen childbearing rates have begun to fall. However, educational attainment has been gradually increasing over the entire period. Thus, by itself,

increased maternal education does not address why teen childbearing did not begin to decline sooner.

Being Hispanic is linked with a higher risk of becoming an unmarried teen mother for teens in the younger cohort, but a decreased risk for the older cohort. This increased rate of childbearing for the younger cohort is consistent with the observed rates for teen nonmarital childbearing by race and ethnicity. Figure 2 indicates that while Hispanic teens had nonmarital childbearing rates that were much lower than that of black teens in the early 1990s, by the end of the decade, the rates of the two groups were nearly equal. In fact, Hispanic teens are the only group for whom there is actually an increase in rates of nonmarital teen childbearing. While the hazard estimates are picking up this pattern, they do not give any indication as to what might be causing it. It does, however, give policy-makers information on where they need to target policies aimed at decreasing nonmarital childbearing.

Living with one's biological father at age 14 is linked with delayed childbearing, with hazard rates nearly 65 percent lower for teens from the newer cohort and about 40 percent for teens from the older cohort. In 1970, less than 11 percent of all children lived in households without their fathers; by 1996 the incidence had more than doubled, with almost 23 percent of all children living solely with their mothers (U.S. Census Bureau, 2001). This trend toward more and more female-headed households coupled with the positive impact father presence plays on deterring out-of-wedlock teen childbearing suggest that we could see teenage childbearing begin to rise if this impact is not outweighed by some other positive influences.

Being a practicing Catholic played a significant role in teenage childbearing decisions for the older cohort, but none for the younger one. The results indicate that being raised Catholic deters the probability of becoming an unmarried teenage mother by about 40 percent among the

older cohort. It seems that Catholicism played a larger role for youths in the previous cohort than it does now.

Abortion policy also seems to play a role in youth's nonmarital childbearing decisions. Not surprisingly, living in a state that imposes restrictions on youths seeking abortions increases the likelihood of observing a nonmarital teen birth. The impact is much larger for the youths in the newer cohort, where being subject to restrictions increases the probability by over 40 percent, than for the older cohort, where there is only a 5 percent increase in probability. Interestingly, the number of abortions performed in the youth's county of residence does not affect the probability.

Finally, the results indicate that welfare policy does play a role in teenage childbearing, but not the same role for both cohorts. Specifically, increased generosity in welfare payments appears to have no influence on nonmarital childbearing among these cohorts of young women. For the youths of the 1990s, the introduction of restrictions on living conditions, the so-called minor parent provisions, act as a retardant to nonmarital childbearing. Restricting living arrangements of teen parents who receive welfare reduces the probability of becoming a teen mother by nearly 60 percent.[4]

5. Conclusions

The current paper looks at the nonmarital teenage childbearing behavior of two cohorts of NLSY women. It attempts to identify the factors that have contributed to the differences in teenage childbearing behavior that we observe across the cohorts of women. The model

[4] Note that this variable is equal to 1 for all youths after the state in which they live implements its TANF program, with all states having TANF in place by 1998. It might be argued that this variable is capturing the general impact of all welfare waivers and reform and not specifically the minor parent provisions. However, as a test of this, I have rerun the model using an indicator of any waiver activity instead of the minor parent indicator. This variable is insignificant. Notice that the two variables may not be included simultaneously, as the minor parent provision indicator is a subset of any waiver activity.

identifies education, living situations, religion, and welfare policy as factors. However, these factors did not play equal roles for both cohorts.

The analysis suggests at least a couple of ways that policy-makers can hope to further the downward trend in teenage nonmarital childbearing. First, as education acts to slow nonmarital childbearing, both through youths and their mothers, policies that motivate youths to stay in school should be enacted. Such policies may have larger long-term impacts than may be immediately apparent, as some of the reductions may not be realized until the next cohort. Second, strengthening the minor parent provisions should be considered, as it appears to delay childbearing. However, because the minor parent provisions were implemented at the same time as other welfare reform policies, the effect measured in this paper may be an overstatement. More research in this area would be beneficial.

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Table 1
Sample Inclusion Criteria

Sample Restriction	*NLSY79 Cohort*	*NLSY97 Cohort*
Full Sample	12,686	8,984
Females	6,283	4,385
12-17 years old as of December 31 1976 & 1996, respectively	4,689	4,385
Not in the military	4,449	4,384
No missing data	3,501	3,572

Table 2
Variable Description and Sources

Variable name	*Description*	*Source*[1]	*Level*	*Periodicity*
Nmmother	Gives birth to child out of wedlock	NLSY	Individual	Monthly
Hgc	Years education	NLSY	Individual	Yearly
Moms_hgc	Years of education of youth's mother	NLSY	Individual	One time
Mom_agef	Age of mother at birth of first child	NLSY	Individual	One time
Biodad14	Youth lived with biological father at age 14	NLSY	Individual	One time
Catholic	Youth raised Catholic and attended church at least one time in previous year	NLSY	Individual	One time
Black	Youth black	NLSY	Individual	One time
Hispanic	Youth Hispanic	NLSY	Individual	One time
Afdc	Maximum AFDC/TANF payment for a family of 3 (deflated by monthly CPI)	Green Book	State	Yearly
Capimp	Family cap implemented (only applicable for younger cohort)	Urban Institute	State	Monthly
Minor	Minor parent provision placing restrictions on youth's ability to collect AFDC/TANF (only applicable for younger cohort)	Urban Institute	State	Monthly
Urate	Unemployment rate	REIS	County	Yearly
Per_capita	Average per capita income within county of residence (deflated by monthly CPI)	REIS	County	Yearly
Marrate	Marriage rate per 1,000 women	Statistical Abstract	State	Yearly
Aborts	Number of abortions performed per 1,000 women aged 15-44	AGI	County	Yearly
Res_minr	Restrictions for minors seeking abortions in place in youth's state of residence	AGI	State	Yearly

[1]A complete description of each data source can be found in the data appendix.

Table 3
Average Characteristics

	Sample		*1979 Cohort*		*1997 Cohort*	
Variable	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Hgc	7.785	1.256	7.928	1.074	7.645	1.397
Moms_hgc	11.649	3.127	10.824	3.097	12.457	2.940
Mom_agef	21.502	5.048	20.238	4.931	22.741	4.851
Biodad14	0.629	0.483	0.708	0.455	0.551	0.497
Catholic	0.222	0.415	0.237	0.425	0.207	0.405
Black	0.258	0.438	0.255	0.436	0.261	0.439
Hispanic	0.174	0.379	0.145	0.352	0.202	0.402
Afdc	333.853	153.966	416.835	157.743	252.521	95.867
Capimp	0.184	0.327	0.000	0.000	0.364	0.381
Minor	0.347	0.382	0.000	0.000	0.687	0.237
Urate	6.811	2.622	7.911	2.233	5.734	2.526
Per_capita	13587.720	3808.368	11630.130	2468.131	15506.390	3913.194
Marrate	9.277	2.835	10.255	3.016	8.318	2.269
Aborts	7.901	16.669	7.681	15.841	8.118	17.444
Res_minr	0.543	0.482	0.383	0.473	0.699	0.438
Individuals	7,073		3,501		3,572	

Note: The averages are calculated using the youth's average characteristics over the entire period.

Table 4
Average Characteristics of Teen Mothers

	1979 Cohort		*1997 Cohort*	
Variable	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Hgc	6.793	1.245	7.431	1.806
Moms_hgc	9.504	2.678	11.295	2.628
Mom_agef	18.457	4.397	20.568	4.467
Biodad14	0.513	0.501	0.239	0.428
Catholic	0.110	0.314	0.145	0.353
Black	0.606	0.489	0.457	0.499
Hispanic	0.116	0.321	0.252	0.435
Afdc	401.829	172.023	237.919	104.188
Capimp	0.000	0.000	0.249	0.318
Minor	0.000	0.000	0.409	0.296
Urate	8.470	2.414	6.656	2.645
Per_capita	11222.110	2535.382	14577.950	3200.209
Marrate	10.859	2.960	8.594	2.056
Aborts	8.029	15.761	7.899	15.486
Res_minr	0.386	0.480	0.727	0.437
Individuals	335		234	

Note: The averages are calculated using the youth's average characteristics over the entire period. Mothers are designated as the youths who eventually have a nonmarital birth.

Table 5
Hazard Ratios for Cox Proportional Hazard

	Hazard Rate for 1997 Cohort	*Cohort Interaction Hazard Rate*	*Hazard Rate for 1979 Cohort*
Hgc	0.842***	0.949	0.800
	(0.045)	(0.055)	
Moms_hgc	0.928***	0.949*	0.881
	(0.023)	(0.029)	
Mom_agef	0.952***	1.013	0.964
	(0.015)	(0.018)	
Biodad14	0.329***	1.805***	0.595
	(0.053)	(0.355)	
Catholic	0.885	0.678	0.600
	(0.181)	(0.189)	
Black	1.795***	2.509***	4.505
	(0.308)	(0.549)	
Hispanic	1.678***	0.662	1.111
	(0.338)	(0.210)	
Afdc	0.999	1.002**	1.001
	(0.001)	(0.001)	
Capimp	1.053		
	(0.156)		
Minor	0.506***		
	(0.108)		
Urate	1.001	1.007	1.008
	(0.024)	(0.035)	
Per_capita	1.000	1.000	1.000
	(0.000)	(0.000)	
Marrate	0.968	1.048	1.015
	(0.041)	(0.045)	
Aborts	1.000	1.000	1.000
	(0.000)	(0.000)	
Res_minr	1.361**	0.792	1.077
	(0.218)	(0.157)	
Cohort79	0.242		
	(0.255)		
No. Of subjects	7,073		
No. Of failures	569		
Number of obs	501,234		
Time at risk	1,527,804		
Wald chi2(29)	565.540		
Log likelihood	-4617.602		
Prob > chi2	0.000		
Test of Proportionality Assumption			
Chi2(29)	37.84	Prob > Chi2	0.126

Notes: Robust standard errors shown in parentheses. *** designates significance at the 5% level, ** designates significance at the 10% level and * designates significance at the 15% level. The net effect for the 1979 cohort is the product of the level effect and the cohort interaction term. The proportionality test tests for nonzero slopes in a generalized linear regression of the scaled Schoenfeld (1982) residuals on time. Rejection of the null hypothesis indicates a violation of the proportionality assumption.

Table 6
Hazard Ratios for Stratified Proportional Hazard

	Hazard Rate for 1997 Cohort	*Cohort Interaction Hazard Rate*	*Hazard Rate for 1979 Cohort*
Hgc	0.842***	0.957	0.806
	(0.045)	(0.056)	
Moms_hgc	0.939***	0.942**	0.884
	(0.024)	(0.029)	
Biodad14	0.364***	1.590***	0.579
	(0.058)	(0.305)	
Catholic	0.989	0.568**	0.562
	(0.205)	(0.157)	
Hispanic	2.085***	0.447***	0.931
	(0.419)	(0.134)	
Afdc	1.001	1.000	1.001
	(0.001)	(0.001)	
Capimp	1.010		
	(0.147)		
Minor	0.544***		
	(0.116)		
Urate	0.988	1.028	1.015
	(0.025)	(0.036)	
Per_capita	1.000*	1.000	1.000
	(0.000)	(0.000)	
Aborts	1.000	1.000	1.000
	(0.000)	(0.000)	
Res_minr	1.422***	0.745*	1.059
	(0.233)	(0.151)	
Cohort79	1.149		
	(0.977)		
No. Of subjects	7,073		
No. Of failures	569		
Number of obs	501,234		
Time at risk	1,527,804		
Wald chi2(23)	263.130		
Log likelihood	-3043.146		
Prob > chi2	0.000		
Test of Proportionality Assumption			
Chi2(23)	22.77	Prob > Chi2	0.475

Notes: Robust standard errors shown in parentheses. Hazards are stratified on black, age of mother at her first birth, and marriage rate. *** designates significance at the 5% level, ** designates significance at the 10% level and * designates significance at the 15% level. The net effect for the 1979 cohort is the product of the level effect and the cohort interaction term. The proportionality test tests for nonzero slopes in a generalized linear regression of the scaled Schoenfeld (1982) residuals on time. Rejection of the null hypothesis indicates a violation of the proportionality assumption.

Data Appendix

National Longitudinal Survey of Youth 1997 (NLSY97)

Description: The NLSY97 consists of a nationally representative sample of 8,984 youths who were 12 to 16 years old as of December 31, 1996. Round 1 of the survey took place in 1997. In that round, both the eligible youth and one of that youth's parents received hour-long personal interviews that generates information about the youths' family background and history. The NLSY97 is designed to document the transition from school to work and into adulthood. It collects extensive information about youths' labor market behavior and educational experiences over time. Educational data include youths' schooling history, performance on standardized tests, course of study, the timing and types of degrees, and a detailed account of progression through post-secondary schooling.

Aside from educational and labor market experiences, the NLSY97 contains detailed information on many other topics. Subject areas in the questionnaire include: Youths' relationships with parents, contact with absent parents, marital and fertility histories, dating, sexual activity, onset of puberty, training, participation in government assistance programs, expectations, time use, criminal behavior, and alcohol and drug use. Areas of the survey that are potentially sensitive, such as sexual activity and criminal behavior, comprise the self-administered portion of the interview.

Variables Used in Analysis: All individual-level characteristics for the younger group of women including: whether or not the youth gives birth to child out of wedlock; number of years of education; number of years education of the youth's mother; the age of the youth's mother at birth of first child; whether or not the youth lived with her biological father at age 14; whether the youth was raised Catholic and attended church at least one time in previous year; and the youths race and ethnicity. In addition, the county and state of the youth's residence are used to merge in other information.

National Longitudinal Survey of Youth 1979 (NLSY79)

Description: The NLSY79 is a nationally representative sample of 12,686 young men and women who were 14-21 years old as of December 31, 1978. These individuals were interviewed annually through 1994 and now interviewed on a biennial basis. Since their first interview, many of the respondents have made both the transitions from school to work, and from their parent's home to becoming parents and homeowners. Data collected yearly chronicle these changes and provide researchers an opportunity to study in great detail the experiences of a large group of young adults who can be considered representative of all American men and women born in the late 1950s and early 1960s.

A key feature of this survey is that it gathers information in an event history format, in which dates are collected for the beginning and ending of important life events. These event histories include: labor force activity, marital status, fertility, and participation in government assistance programs.

Variables Used in Analysis: All individual-level characteristics for the older group of women including: whether or not the youth gives birth to child out of wedlock; number of years of education; number of years education of the youth's mother; the age of the youth's mother at birth of first child; whether or not the youth lived with her biological father at age 14; whether the youth was raised Catholic and attended church at least one time in previous year; and the youths race and ethnicity. In addition, the county and state of the youth's residence are used to merge in other information.

Green Book: Background Material and Data on Programs within the Jurisdiction of the Committee on Ways and Means

Description: Since 1981, the Committee on Ways and Means has published the Green Book which presents background material and statistical data on the major entitlement programs and other activities within the Committee's jurisdiction. Information on major social programs outside the Committee's jurisdiction is also included.

Variables Used in Analysis: Maximum AFDC/TANF benefit available to a family of three with no countable income. These figures vary across state and year.

Urban Institute: Assessing the New Federalism Welfare Rules Database

Description: The database is a multi-year Urban Institute research project to analyze the devolution of responsibility for social programs from the federal government to the states. It focuses primarily on health care, cash assistance and other income benefits, family structure, child care, child welfare, immigration, and long-term care. Researchers monitor program changes and fiscal developments. In collaboration with Child Trends, the project is studying the well-being of children and families. Our findings provide timely, nonpartisan information to inform public debate and to assist state and local policy makers in designing new policies and programs.

The Welfare Rules Database (WRD) provides a longitudinal account of the changes in welfare rules in all 50 states and the District of Columbia. The WRD organizes the detailed information on welfare rules across states, time, and geographic areas within states as well as across different types of assistance units. Caseworker manuals and state regulations provide the data from 1997 to the present, while AFDC State Plans and Waiver Terms and Conditions provide the data for years prior to 1997.

Variables Used in Analysis: Data from the Urban Institute provide information on whether or not the youth is subject to a family cap or a minor parent provision, restricting the youth's ability to receive TANF benefits according to the living situation.

Regional Economic Information System (REIS)

Description: Contains information for all counties, States, metropolitan statistical areas, and BEA Economic Areas, 1969-00, for personal income by major source, per capita

personal income, population, earnings by 2-digit Standard Industrial Classification (SIC) industry, full-time and part-time employment by 1-digit SIC industry, regional economic profiles, transfer payments by major program, farm income and expenses, and the BEA Regional Fact Sheet (BEARFACTS).

Variables Used in Analysis: Data taken from the REIS include the county-level unemployment rate and per-capita income.

Statistical Abstract of the United States: Vital Statistics

Description: The vital statistics section presents vital statistics data on births, deaths, abortions, fetal deaths, fertility, life expectancy, marriages, and divorces. Vital statistics are compiled for the country as a whole by the National Center for Health Statistics (NCHS) and published in its annual report, *Vital Statistics of the United States* , in certain reports of the *Vital and Health Statistics* series, and in the *National Vital Statistics Reports* (formerly *Monthly Vital Statistics Report*). Reports in this field are also issued by the various state bureaus of vital statistics.

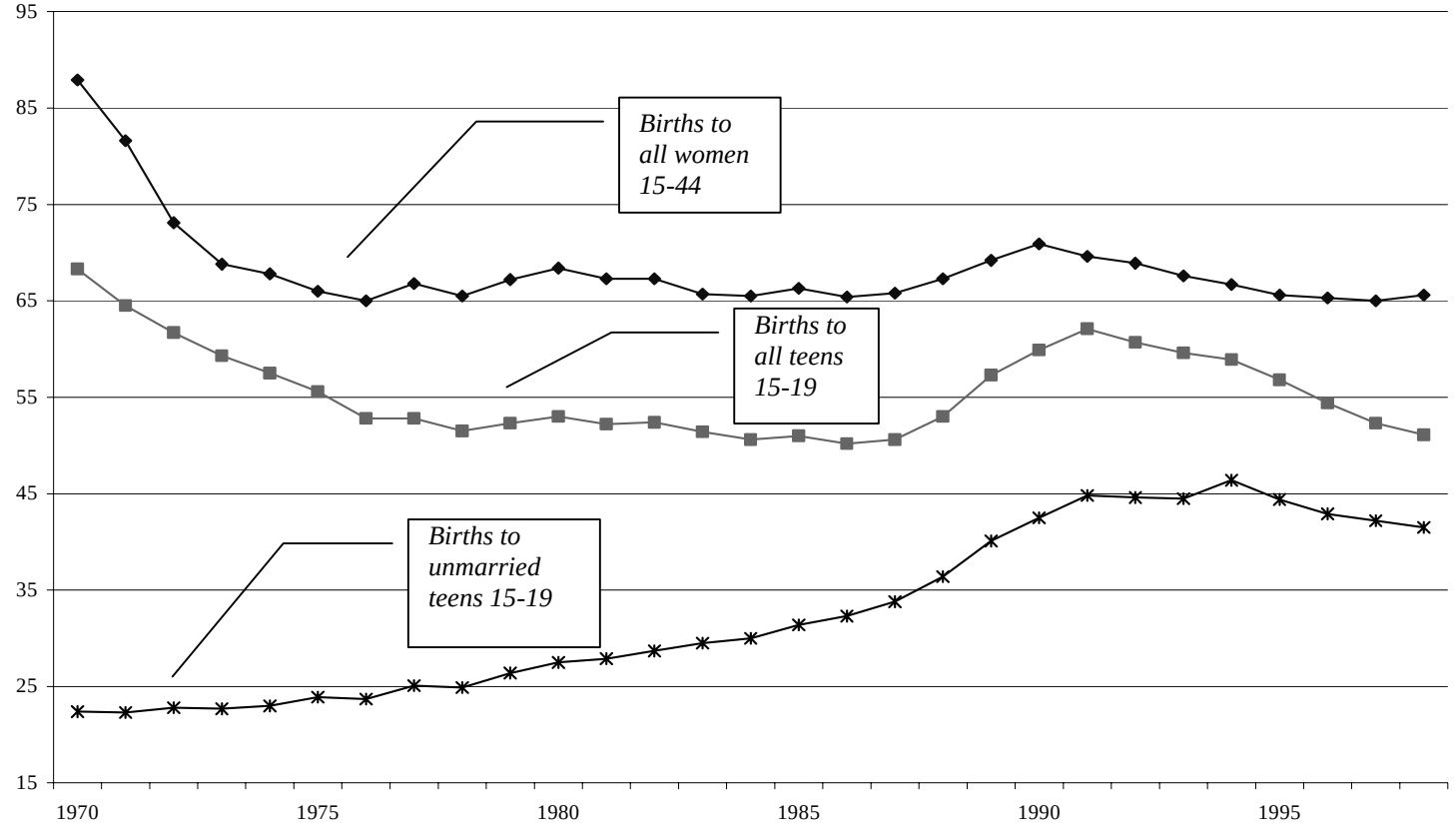
Variables Used in Analysis: The annual marriage rate by state is used for analysis.

Alan Guttmacher Institute Data

Description: The Alan Guttmacher Institute (AGI) is a non-profit organization focused on sexual and reproductive health research, policy analysis and public education. AGI publishes journals and special reports on sexual and reproductive health and rights. AGI also conducts surveys of all known abortion providers in the United States. The number and location of abortion providers and abortions were tabulated for each county. .

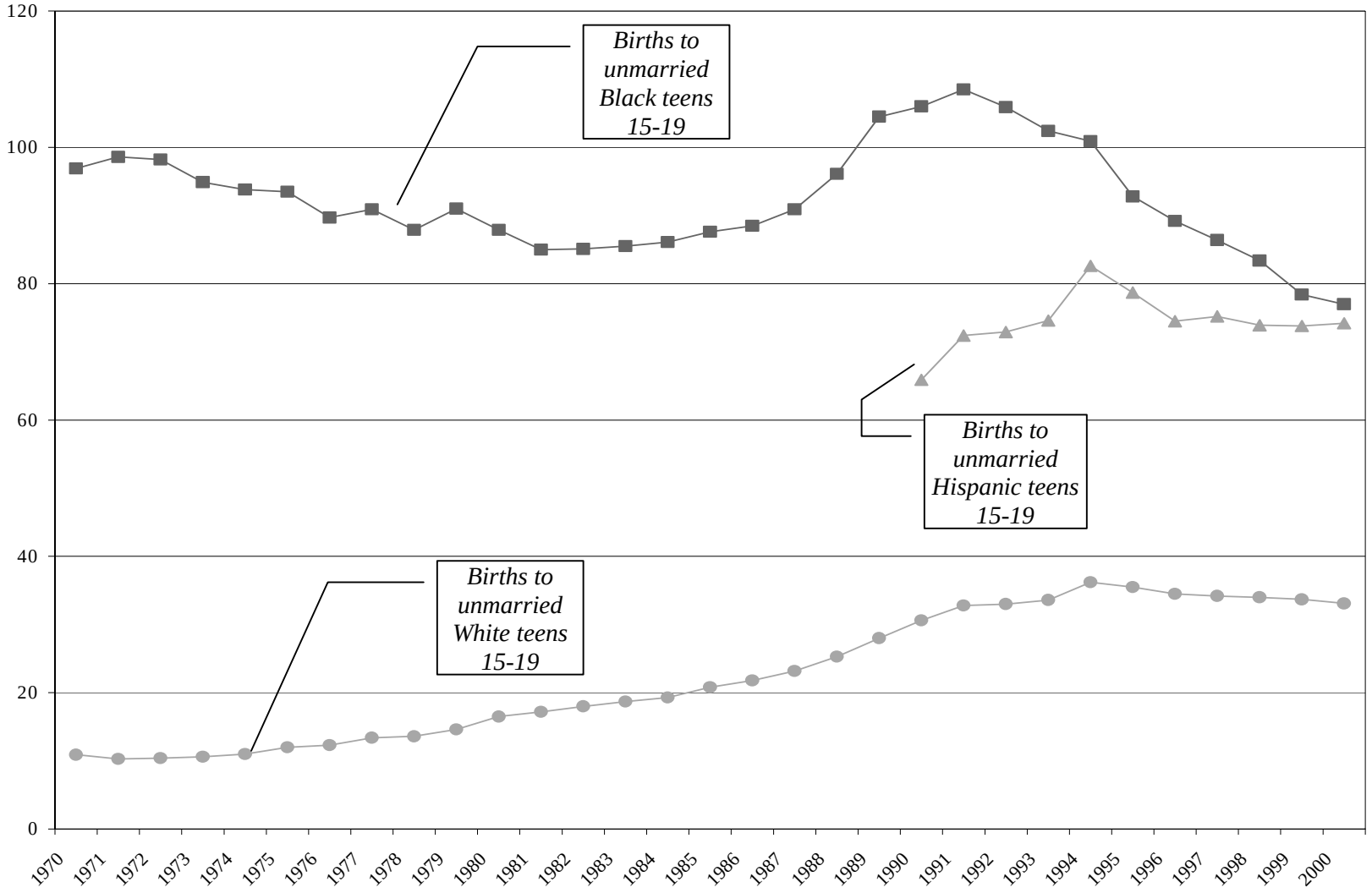
Variables Used in Analysis: The number of abortions performed per 1,000 women of childbearing age as well as a measure of whether or not the state imposes restrictions on minors seeking abortions are used for analysis.

Figure 1
Birth Rates per 1,000 Women: 1970-1998



Source: Ventura and Bachrach (2000).

Figure 2
Teen Nonmarital Birth Rates per 1,000 Women by Race and Ethnicity



Source: Martin, et al (2002).