The Effect of Young Men's Education and Labor Market Outcomes on Fertility in the United States

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Abstract

We hypothesize that young men's socioeconomic standing has a positive impact on the timing of first births within the U.S. This paper investigates the effects of socioeconomic variables – education, employment, and income – and marriage on the fertility of young men. Previous research indicates that the socioeconomic standing of young men impacts union formation, but little research has investigated the link between their socioeconomic standing and first births. Using discrete time event history techniques we find that education negatively impacts timing of first births, but employment and income increases the probability of having a child. While marriage also has a strong positive effect on first births for young men, it does not mediate the observed relationship between socioeconomic standing and fertility. We also find very few racial differences in these effects. Overall, this paper contributes to our growing understanding of men's role in the fertility process and delayed fertility within developed countries by showing that the socioeconomic conditions experienced by young men in the U.S. have important effects on their fertility.

The Effect of Young Men's Education and Labor Market Outcomes on Fertility in the United States

The sub-replacement-level fertility rates currently found in most developed countries have become a concern to demographers and politicians alike. Demographers have shown that much of the recent decline in fertility rates can be attributed to the delayed fertility of young people (Bongaarts and Feeney 1998). Research has also shown a marked increase in the age at marriage in most developed countries. Even though these two trends – delayed fertility and marriage formation – are often linked in discussions of fertility, they have seldom been studied concurrently.

In this paper we will move beyond the "home economics" theory of fertility by extending theories of marriage formation and economic theories of fertility to study the effects of early socioeconomic outcomes such as education, enrollment status, employment stability, and income on both the marital and non-marital fertility of young men. We will also study how the effects of socioeconomic factors differ between racial/ethnic groups within the U.S.

The majority of micro-level fertility research has utilized economic models that focus on the labor market outcomes of married females (see Pollak and Watkins 1993 for a review). Little of this research sees males as more than exogenous factors (Macunovich 1996) or studies nonmarital childbearing (for an exception see Willis 1999). An advantage of studying the relationship between economic factors and young men's fertility is that the economic outcomes of males can be treated more safely as exogenous to the decisions to marry or have a child. And given the increasing proportion of births

taking place outside of marriage in many developed countries, it is important to begin incorporating non-marital fertility in our models.

Research on socioeconomic determinants of marriage formation in the United States has always explicitly included men. This research has been dominated by Becker's (1981) "new home economics" and Oppenheimer's (1988) "marriage market" theory. Oppenheimer's theory has received the most support in recent research (Oppenheimer 1988; Oppenheimer 1994; Oppenheimer, Kalmijn, and Lim 1997; Xie, Raymo, Goyette, and Thornton 2003), and has been extended to look at the effect of economic standing on cohabitation as well as marriage (Thornton, Axinn, and Teachman 1995; Oppenheimer 2003; Xie et al. 2003). Socioeconomic factors are generally found to have a positive impact on marriage formation and a positive or non-significant effect on entering a cohabitating union.

There is also a small body of literature that attempts to disentangle the effects of marital status on fertility. Rindfuss and Parnell (1989) use 1980 Current Population Survey data to examine the probability of a birth to married and unmarried women. They find that while marriage is important to childbearing, it is by no means the only determining factor. In fact, they argue that this affect is small relative to popular notions of the causal ordering of marriage and fertility. Since socioeconomic factors are known to impact marriage formation and marriage effects fertility behaviors, marriage can be viewed as a logical mediating variable between young men's socioeconomic characteristics and the timing of their first births.

The focus on young men allows us to incorporate two of the most interesting sociodemographic trends in developed countries over the last few decades – the declining fertility rate and the increasing difficulty youth face in establishing a career. Few studies have attempted to link these trends. The fertility behavior of young people is of extreme importance in understanding the future of fertility in all countries. Indeed, Morgan (1996) emphasizes that the most important factor in both period fertility rates and eventual completed fertility is the timing of the first birth, which usually occurs during the 20s.

Figure 1 provides a simple conceptual framework for our paper. We expect that economic and educational factors will directly affect the probability of a conception as well as operate indirectly through marriage. One line of reasoning would suggest that those with a disorderly transition to adulthood, or with low educational attainment and economic stability would be more likely to experience a conception. Such an argument would suppose that those with less certain life trajectories may be more careless in preventing a conception or see little point in postponing a birth to a time of stability that may never come.

FIGURE 1 ABOUT HERE

However, we argue that individuals are more conscious in their planning of life events. We expect that individuals will postpone a conception until such a time that they can care for a child. Even those "unexpected" births, of which we have no way of differentiating with these data, would still be loosely planned. Individuals have ideal points in their lives in which they can provide for a child, but there is also a period that

may not be ideal, but is acceptable if such an event "accidentally" occurred. Also, individuals may not wait for the ideal point, but instead a point that seems close to ideal given their current circumstances and expected future. While we know that a difficult career-entry process has a negative effect on marriage formation (Oppenheimer et al. 1997), the effect of similar economic outcomes on fertility is not fully known, but we expect there to be a positive relationship between these outcomes and the timing of the first birth. Thus, we expect that steady employment, and higher income will increase the probability of a birth.

Enrollment in educational institutions is commonly believed to decrease the probability of conception, but most of this research has been concerned with women. Wu and MacNeill (2002) find that enrollment reduces the odds of Canadian women over 30 becoming mothers. Coverdill and Kraft (1996) also found a negative effect of enrollment on premarital pregnancy for women ages 16-28 in the U.S. but found that the enrollment effect decreases as women age. Given the realities of gender roles in the U.S. concerning childrearing, it is logical to assume that enrolled women will find it difficult to combine childbearing and schooling. The possible effects of enrollment for men are less clear. While it is likely that enrollment will have similar effects for men as it does for women, research has also shown that aggregate changes in fertility are unassociated with changes in the education of males (London 1992). This, combined with the fact that it is easier for men to combine school attendance and fatherhood, could lead one to surmise that the effect of enrollment on men's fertility is small or possibly non-existent.

Notable differences have been observed in both entry to marriage and fertility rates among racial/ethnic groups within the U.S. Consequently, we expect the relationship between economic factors, marriage formation, and fertility to be different for whites and blacks. Previously observed differences in fertility and marriage formation have been attributed to "cultural" differences (Forste and Tienda 1996). If possible, we will attempt to solidify some of these "cultural" differences.

Data and Methods

The data used for this paper are from the Panel Study of Income Dynamics (PSID), a longitudinal study of a representative sample of U.S. individuals and family units with a special emphasis on economic and demographic behavior. Data have been collected on more than 65,000 individuals spanning as much as 36 years of their lives. We utilize original PSID data along with the "clean processes" data made available by Lillard and colleagues (Lillard 2001) for the period 1980 to 1992. Our sample is further restricted to men who turned 18 during the period of study.¹ If an individual turned 18 in 1980 and did not experience a failure event – a conception – then the oldest individuals under study by the end of the period would be 32. Since our primary focus is understanding how factors in early adulthood affect the likelihood of a conception, focusing on the late teens and 20s is most appropriate.

¹ The date of birth for a respondent's first-born child and the date last enrolled were not available in the clean processes data and were extracted from the original PSID data. All other variables were taken from the "clean processes" data.

Event

The date of birth of the first-born child was used to construct our dependent variable *conception* date nine months prior to the birth. While there is likely to be some variation around this number, it is a reasonable assumption to use for this analysis. Since our data only measure conceptions that ended in births, we will likely be underestimating the effects of certain socio-demographic variables on conception because of differential abortion rates. Our results should be interpreted as the factors that lead to a conception that is followed by a birth. In these data conceptions occurred for 828 of 2,641 individuals – 31.4% of the sample.

Time-Varying Explanatory Variables

Our main explanatory variables of interest are employment status and income. A respondent's employment status was collected each month; they are coded '1' if *employed* and '0' if unemployed or not in the labor force. Employment status was available from the clean processes data and income was available in both the clean processes data and the original data.² *Income* data were collected on an annual basis. Since only 1% of our sample had incomes greater than \$50,000, we top-coded our income variable at that value. It was then divided by 1000 to create a variable measuring income in thousands to facilitate interpretation. If either variable had missing values, values were imputed from the previous time period.

² Income data were available in both the original PSID and in the clean processes data. We entered them into separate models, and both the coefficients and significance levels were virtually identical, so the measure from the original study was used.

Marital status is the mediating variable that is of main interest to our study. Marriage beginning and ending dates are contained in the clean processes data and are used to create a *married* variable that is coded '1' for time periods during which the respondent is married and '0' otherwise. The clean processes data resolve many of the inconsistencies found in the original data on marriage dates. Lillard and colleagues created a "best guess" for marriage beginning and ending dates. These dates are either the date reported in the original data, or, if there was an inconsistency with this date, it is an average of the upper and lower dates given to questions asked in other waves of the survey.

Creating a valid measure of enrollment proved to be difficult given the data. The only data we have on enrollment is the date the respondent was last enrolled. From this information we created two different measure of whether or not a respondent was enrolled in each month of observation. The first variable, *enrolled*, considers a respondent to be enrolled for all months prior to the date last enrolled, which likely masks some variation in enrollment since those who leave school and then return at a later date would be coded as enrolled for the entire period. This enrollment variable likely overestimates the effect of enrollment on conception, as some of those coded as enrolled may have experienced a conception while on a break in their education.

The second measure of enrollment is *last year enrolled*. Respondents are coded '1' for twelve months prior to the reported date last enrolled. This is a very conservative measure of enrollment. It assumes that individuals are usually enrolled for at least one academic year before leaving school, but given the data constraints mentioned

previously, it does not make any assumptions about enrollment before that point. Besides models containing each enrollment variable separately, we also include both variables in the same model to see if fertility behavior in the last year of schooling differs from behavior at other times.

Time-Invariant Explanatory Variables

Education dummy variables were created for *less than high school*, *high school* and *more than high school* from the completed education variable; *more than high school* is the omitted category in our analysis. Completed education is collected at the end of the period being studied and is then assigned to all time periods in which the respondent is in the sample. It possible for respondents to still be enrolled when these data are collected, but it should not impact our results since the majority of education completed after age 18 would be classified as *more than high school*.

Race is coded as one for *black* and zero for non-Hispanic whites and is included to test for racial differences in socio-demographic effects on the probability of conception. In the clean processes data blacks make up 38 percent of the sample, however once individuals older than 32 are dropped the percentage increases 44.9 percent of the sample, or 1,186 individuals.

Using these data we create a person-month data set containing monthly measures of each of our measures – employment status, enrollment, level of education, income, marital status, race and fertility – from the time a young man turns 18 until the conception of his first child or the age of 32, whichever comes first. Given the discrete time units in our data we conduct discrete-time event history analyses utilizing logistic

regression. To simplify our initial results, we did not include separate dummy variables for each month of observation but instead entered duration as a continuous variable, thus making the assumption that the underlying risk of an event changes monotonically over time.³ This assumption is not unfounded. Figure 2 shows the baseline hazard rates for black and white men. To smooth the line the hazard rate is calculated for five-month intervals. While there is a great deal of variation in the hazard rate for each interval, overall the trends appear to be fairly monotonic for both groups.

FIGURE 2 ABOUT HERE

Results

The results presented here should be considered a preliminary exploration of the determinates of the fertility behaviors of young men. Table 1 reports results of discretetime event history analyses predicting the probability of conception for our sample of young men ages 18-32 in 1980-1992. In all models the explanatory variables are interacted with the black variable to test for significant racial differences in the effects; the main effect of each variable indicates the effect of that variable for whites while the interaction effect indicates the additional effect for blacks. We begin by looking at the effects of the socioeconomic variables. Model 1 includes the education variables and employment status along with duration. Duration has a non-significant effect for whites in model 1 indicating that the risk of conception is constant over time after controlling for all other covariates, but the effect of duration is negative for blacks. We also see a

³ Our person-month data contains 145 months of observation. Including separate dummy variables for each month would make both computation and interpretation of the model quite tedious.

significant, positive effect of having less than high school and high school education compared to having more than a high school education of both black and white young men, although the effect of having less than a high school education is smaller for blacks than for whites. Model 1 also shows a significant, positive effect for being employed such that being employed increases the odds of conception by 134% for young men compared to being unemployed.⁴

TABLE 1 ABOUT HERE

Model 2 adds income to the analysis and shows that the odds of conception increase by a non-trivial 5.2% for each additional \$1000 of income. The addition of income also affects the coefficients for the other socioeconomic variables. Most importantly, it reduces the effect of employment to non-significance indicating that the positive effect of employment operates through the higher incomes associated with being employed. The effects of the education variables are also slightly larger after controlling for respondents' incomes. Taken together models 1 and 2 show that all of our socioeconomic variables have significant direct effects on the odds of conception, but the effects of employment operate completely through income.

Models 3 & 4 add the enrollment variables to the model and tests the direct effects of socioeconomic variables on the probability of conception controlling for enrollment status. Models 5 & 6 then test their indirect effects through marriage. Models 3 and 5 include our first measure of enrollment, which considers a respondent enrolled

⁴ The percentage increase in the odds of conception were calculated using the following formula: $(\exp(\beta)-1)*100$. The coefficient (β) for blacks is simply the main effect of each variable plus the black interaction with that variable (i.e., $\beta_{enrolled for blacks} = \beta_{enrolled} + \beta_{black*enrolled}$).

for all months prior to the date of last enrollment, while models 4 and 6 use the *last year enrolled* variable, which is '1' for the 12 months prior to the date last enrolled.

Observing the effects of the enrollment variables in model 3 reveals a possible range of the effect that enrollment may have on the probability of conception. Enrolled has a non-significant effect on conception in model 3 for both white and black males, which runs counter to the expected negative effect on enrollment. This effect likely represents a high-range estimate of the "true" effect of enrollment because of the manner in which the variable was created. If a respondent takes a break from education to father a child and then re-enrolls, this measure will assume that they were enrolled when the child was conceived. If enough respondents father children while on a break from education, this will result in a non-effect for enrolled. However, there is also a possibility that the observed effect, while unexpected, is legitimate. Since childrearing responsibilities are usually considered the woman's domain it could be much easier for men to combine schooling and fatherhood. As mentioned previously, this assumption could lead us to accept a non-effect of enrollment on men's fertility.

To obtain another estimate of the "true" effect of enrollment on the odds of conception the last year enrolled variable is entered in model 4. If there are a significant number of men taking breaks in their schooling career to father children, then this measure of enrollment likely will produce a more accurate estimate. Even so, the odds of conception are likely to be higher in the last year of schooling than at other times in young men's schooling careers. Model 4 shows that the last year enrolled has a negative effect on conception. Compared to all other respondents, being in the final year of

schooling decreases the odds of conception by 57% for both white and black male. Combining the effects of our two enrollment variables in models 3 & 4 we believe we can safely conclude that the effect of enrollment is negative or non-significant.

While the "true" effect of enrollment remains unclear, it is comforting to see that the coefficients for the socioeconomic variables are relatively invariant to the use of one or the other enrollment variable. In fact, the coefficients shown in model 2 change very little with the addition of the two enrollment variables in models 3 & 4.

Models 5 & 6 use the same approach to entering the enrollment variables as models 3 & 4 but add marital status to the analysis. The previous models show the direct effects of socioeconomic standing on the odds of conception. The addition of marital status allows us to determine the extent to which the effects of the socioeconomic variables are mediated by selection into marriage.

We again see that the coefficients for all variables are similar across models 5 & 6, so our discussion will focus on model 5. Model 5 shows the extremely large positive effect of being married on the odds of conception. Married white men have odds of conception that are 6.2 times higher than unmarried white men, and married black men have almost twice the odds of conception as unmarried black men. Marriage also partially mediates the effect of income on conception. The coefficient of income is reduced by 39% with the addition of marriage to the model (.051 to .031). Income still has a non-trivial effect after controlling for its indirect effect through marriage with each additional \$1000 increasing the odds of conception by 3.1%.

When the married variable is added to model 5 we also see that the duration effect becomes significant and negative for whites such that each additional month spent at risk of conceiving decreases the odds of conception by .5% for whites. The effect of duration for black men remains the same as in earlier models. However, the addition of marriage to the model has no substantive effect on the other variables in our analysis. Overall, marriage does not appear to be a strong mediator of the relationship between young men's socioeconomic standing and their odds of conception, but it does have a strong direct effect on conception. Other notable findings from these models are that only the effects of duration, having less than a high school education, and marriage are differ by race.

Conclusion

Overall, our preliminary findings indicate that earning a higher income increases the probability of conceiving, and eventually having, a child for both blacks and whites. Further, this effect remains strong even after controlling for marriage. Employment also has a positive effect on fertility for young men, but it operates indirectly through the higher income associated with being employed. These findings support our assertions that better economic standing of young men results in earlier fertility. Education, however, operates in the opposite direction: Higher levels of education result in a lower probability of having a child. Higher levels of education likely increase the time to conception because college-educated men are concerned with establishing a career before starting a family. Additionally, college-educated men and likely to marry college-educated women

who are also more likely to be concerned with establishing their careers before starting a family. Even though higher education increases the time to conception, our findings still show that the earlier college-educated men are able to establish their career (i.e., become employed and make more money) the earlier they will have a child. This intersection between education and economic factors would be better illuminated in the future through the use of interactions between the two concepts to see how economic factors operate at different levels of education. It should also be noted that these analyses do not address the current debate on the effects of socioeconomic class on early fertility rates since we are not controlling for family background effects. Our results show that as young men, regardless of their social background, find jobs and make more money, they are more likely to have a child.

Our results also show a strong, positive impact of marriage on fertility, but it does not appear to mediate much of the relationship between socioeconomic factors and fertility. With the exception of part of the effect of income, the effects of socioeconomic factors on fertility appear to operate independently of their effect on entry to marriage. Concerning our interest in the differential effects by race, we only found a few significant differences between black and white young men. The positive effects of the level of education and marriage are both significantly weaker for black men, and the probability of having a child increases over time for young black men while remaining constant for young white men. Otherwise, black and white men experience similar effects of the remaining socioeconomic variables.

The results presented in this paper are not able to fully inform the question of whether the sub-replacement level fertility experienced in most industrialized countries can be partly explained by the difficulty youth face in their early labor force experiences. However, these preliminary results do indicate that socioeconomic factors do have a significant effect on the timing of fertility for young men and the better the economic standing of these youth, the earlier they will begin their reproductive lives.

One way to better address this issue is to study other contexts. This paper is part of a larger research project that will look at the direct and indirect effects of young men's economic outcomes on fertility in various countries, specifically Italy and Taiwan. Ahn and Mira (2001) studied the effect of young men's employment on marriage and fertility in Spain and found that employment status only affected fertility through marriage. The authors only accounted for marital fertility, but this approach makes sense in the Spanish context, since only 5% of births are non-marital. By studying other countries we will determine how robust our model is and how important social context is to our understanding of fertility outcomes.

There are drawbacks to some of the measures utilized in these analyses. Many of these result from imperfect data, but we plan on trying to obtain alternative variables for some of our measures to see how robust our results really are. There are also variables that could be added to the model in the future. For instance, instead of only using the respondent's current employment status, we could also include the number of unemployment spells over the past year as a means of capturing the stability of the respondent's employment. This would be a better measure of whether or not the

respondent has established a career path. A measure of occupational status could also be helpful. We also plan on conducting more analyses to try to explain the enrollment effect and to disentangle the effects of education and economic standing.

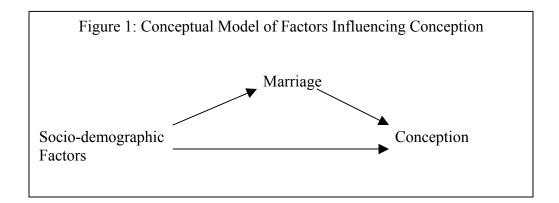
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	1	2	3	4	5	6
Duration	0.004	-0.002	-0.002	-0.003	-0.005 *	-0.007 *
	(.002)	(.002)	(.002)	(.002)	(.003)	(.003)
Black	1.762 ***	1.838 ***	1.877 ***	1.693 ***	1.769 ***	1.644 ***
	(.295)	(.308)	(.338)	(.333)	(.336)	(.333)
Enrolled		X Y	-0.189	× ,	-0.323	x y
			(.450)		(.448)	
Last Year Enrolled			(1.00)	-0.843 *	()	-0.756 *
				(.334)		(.338)
Less Than High School	1.264 ***	1.651 ***	1.635 ***	1.517 ***	1.503 ***	1.413 ***
Less man high School	(.222)	(.239)	(.246)	(.245)	(.254)	(.251)
Lligh appeal	(.222) 0.546 **	0.780 ***	(.240) 0.767 ***	0.696 ***	(.2 . 54) 0.694 ***	0.642 ***
High school						
	(.188)	(.190)	(.195)	(.194)	(.200)	(.200)
Employed	0.852 ***	0.460	0.447	0.384	0.390	0.347
	(.234)	(.245)	(.246)	(.238)	(.250)	(.243)
Income (in thousands)		0.051 ***	0.051 ***	0.049 ***	0.031 ***	0.030 ***
		(.007)	(.007)	(.007)	(.009)	(.009)
Black*Duration	-0.015 ***	-0.012 ***	-0.013 ***	-0.012 **	-0.011 **	-0.010 **
	(.003)	(.003)	(.003)	(.004)	(.004)	(.004)
Black*Enrolled			-0.225 (.574)		-0.117 (.572)	
Black*Last Year Enrolled				0.540		0.456
				(.395)		(.399)
Black*Less Than High School	-0.855 ** (.329)	-1.033 ** (.348)	-1.056 ** (.356)	-0.970 ** (.354)	-0.939 ** (.361)	-0.879 * (.357)
Black*High School	-0.355	-0.526	-0.525	-0.488	-0.469	-0.453
Black High Concor	(.276)	(.278)	(.282)	(.283)	(.286)	(.287)
Black*Employed	-0.345	-0.157	-0.164	-0.124	-0.100	-0.077
	(.283)	(.298)	(.299)	(.292)	(.303)	(.297)
Black*Income (in thousands)		-0.003	-0.004	-0.001	0.009	0.011
		(.010)	(.010)	(.010)	(.012)	(.012)
Married					1.977 ***	1.942 ***
					(.209)	(.206)
Black*Married					-0.978 **	-0.963 *
					(.380)	(.378)
Constant	-7.205 ***	-7.366 ***	-7.327 ***	-7.038 ***	1.977 ***	1.942 ***
Chi Caucad	(.213)	(.225)	(.253)	(.233)	(.209)	(.206)
Chi-Squared Person-Months	124.73 *** 93,132	198.64 ***	205.73 ***	192.02 ***	393.94 ***	369.74 ***
Respondents	93,132 1,479					
Events	317					
*** p<.001 ** p<.01 * p<.05						

Table 1. Discrete Time Estimates of Men's Early Socioeconomic Standing and Educational Enrollment on the Log-Odds of Conception, 1980-1992



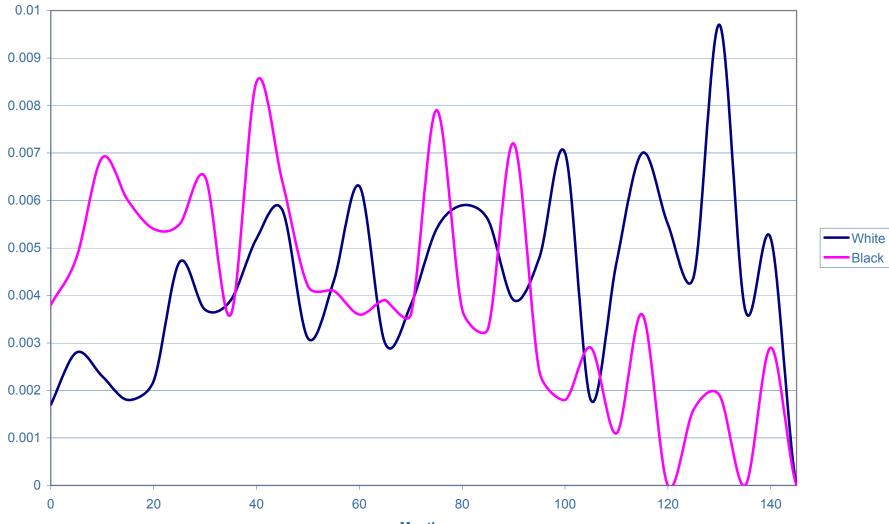


Figure 2. Baseline Hazard Rate of Conception by Race, 5-month intervals

Months