ADOLESECENT MOTHERS AND EDUCATIONAL ACHIEVEMENT: THE FACTORS ASSOCIATED WITH TEENAGE PREGNANCY AND THE EFFECT OF PREGNANCY ON TRUNCATED EDUCATION

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ABSTRACT

Despite a large body of research on teenage pregnancy and its effects on education outcomes, little is known about the differences between teenagers who become adolescent mothers and those who do not. This paper identifies factors that contribute to truncated education. Do individual characteristics play a greater role than family or neighborhood characteristics? In this study I analyze two cohorts, pregnant and non-pregnant female adolescents, using an OLS model. I include additional independent variables and run a Chow test to test for differences in the regression function between the two cohorts. An analysis of the data shows that individual characteristics and views on sex play a significant role in guarding against truncated education; these results diverge from previous research. Results indicate that policy makers need to shift resources away from programs that do not directly address birth control usage and instead focus on programs that address individual characteristics, access to birth control, and views and beliefs surrounding sex.

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Section I. Introduction

In the United States one out of every ten women aged 15-19 becomes pregnant each year (Trussell 1988). Effects of early pregnancy on teenagers' education and life prospects are strongly negative. The Centers for Disease Control estimates that more than $9 billion is spent annually is costs related to increased health care, foster care, incarceration rates among children of teen parents, and lost tax revenue because of lower educational attainment and income among teen mothers (*About Teenage Pregnancy* 2010). Further, the children of teenage mothers continue on this cycle. They are more likely to have lower academic achievement, drop out of school, have more health problems, be incarcerated during their adolescence, and become a mother during adolescence (*About Teenage Pregnancy* 2010).

These negative effects of adolescent parenthood are difficult to solve with policy interventions because there exists no conclusive evidence which sorts out the causes from the effects (Trussell 1988). Despite declines over the past 20 years, teenage pregnancy in the United States continues to be higher than other western industrialized nations (Coley and Chase-Lansdale 1998, Stobbe 2010). What are the causes of teenage pregnancy in the United States? Does access to birth control matter? Do parents' views on sex affect a girl's choice to delay childbirth? How much influence do socioeconomic factors really have on adolescent outcomes in education? Answers to these questions will aid policymakers in crafting the most effective polices to fight truncated education for adolescent mothers.

Causes of and solutions to the problems of teenage pregnancy in the United States are controversial topics. The dispute is fueled by current mixed research findings on the causal relationship between dropout and low educational achievement goals, as well as conflicting

views surrounding sex education, abortion, non-marital births, and health rights for minors (e.g., access to the pill, access to the morning after pill, and parental consent for abortion).

Previous research explores the relationship between abortion and/or birth control and women's educational achievement. This research shows that delayed childbirth, as a consequence of the pill or abortion, positively affects women's educational and labor market outcomes later in life. The literature is mixed, however, on how much of this effect is attributable to access to the pill versus access to abortion. What is clear in the literature is the option to delay childbirth has allowed women to invest more in education or participate in the workforce (Goldin and Katz 2001).

An essential part of the debate over teenage pregnancy surrounds whether it is teenage pregnancy itself or preexisting socioeconomic and environmental circumstances that has a larger impact on adolescents' truncated educational attainment. Some researchers argue that dropping out of high school increases a girl's risk of getting pregnant during adolescence (Mahler 1999, Elfenbein 2003). Other studies argue that adolescents who become pregnant and drop out are more likely to have low returns to education (Moore and Waite 1997, Card and Wise 1978). Yet other research contradicts this theory and supports the idea that pregnancy truncates education and that these adolescent mothers would have completed more education if not for their pregnancies (Moore and Waite 1977, Card and Wise 1978, Manlove 1998). There is no consensus on these topics.

A web of theories also surrounds education outcomes for adolescent mothers. Previous research has been unable to show a direct line of cause and effect between socioeconomic factors and education outcomes (Corcoran 1998). It is a chicken or the egg question: what came first, low educational achievement or low socioeconomic status? The relationship between teenage

pregnancy and low educational achievement may be endogenous, where the cause is the effect. Further research is needed in order to create effective policy.

The players behind policies on sex education generally fall into two categories: conservative and liberal. Conservatives tend to believe that individual characteristics are responsible for teenage pregnancy and education outcomes, whereas liberals argue that socioeconomic/environmental factors explain education outcomes for adolescent mothers.

Studies from either side generally produce results that support their political beliefs. For example, studies that look for individual characteristics as the primary cause of education outcomes for adolescent mothers find that individual characteristics are responsible for education outcomes. In contrast, research that studies the effects of the environment/socioeconomic factors generally produces results that support environmental or socioeconomic factors as the cause. These are the politics of science that create controversy around the effects and causes of education outcomes for adolescent mothers. At the end of the day neither liberals nor conservatives have conclusively proved their respective theories, and this results in varying policies on sex education and adolescent health care throughout the United States.

In order to create effective policy measures it is important to understand how school/neighborhood, family, and individual characteristics influence education choices. This paper studies the relationship between teenage pregnancy and educational achievement by regressing women's educational attainment on individual characteristics, family characteristics, and school background for teenage mothers and for other teenagers. I use an OLS model that uses age, race, gender, household income, living with the mother, mother's education, urban dwelling, and cumulative GPA as explanatory variables.

Section II. Literature Review: Determinants of the Effects on Truncated Education for Adolescent Mothers

The United States lags behind most industrialized countries in the delivery of sex education to adolescents (Trussell 1998). The role of the government in sexual reproductive health varies greatly across regions, states, and school districts. This decentralization of sex education has made it difficult to combat teenage pregnancy and its resulting effects, such as truncated education. Sex education policies are driven by changing state and local politics, parents' views, the religious community, and private interest groups like Planned Parenthood. These factors influence a state's autonomy in creating policy around teenage pregnancy and sexual reproductive health. However, this autonomy does not explain or account for the effects of teenage pregnancy on education for adolescent mothers. Instead, the right to choose versus the right to life, and abstinence-only sex education, are often the overriding political factors surrounding these issues. Political agendas prevent any clear research on the topic from being produced.

Why does the U.S. have a Higher Teen Fertility Fate than other Western Countries?

Last year United States health officials released government figures for 2009 showing a decline in teenage pregnancy. These figures place the teenage birth rate in the U.S. at 39 births per 1,000 adolescent females, which is still the highest rate by far among developed countries. Table 1 compares birth rates among adolescent females for the U.S., Europe, and Japan.

Table 1: Adolescent Birth Rates for Industrialized Countries, 2009

Country	Birth rate per 1000 adolescent females
United States	39
United Kingdom	24
Ireland	16
Canada	13
Sweden	8
France	7
Japan	5
Italy	5
Netherlands	4

Source: U.N.-World Bank teen birth data, 2009.
Female adolescents aged 15-19. Figures were rounded
up to whole numbers.

Policies of Other Nations with Low Teenage Fertility Rates

Most of the countries mentioned in the table have low birth rates and relatively

progressive approaches to sex education. This leads to three current theories on why the teenage

fertility rate is lower in other industrialized countries than the United States:

1. There exist dominant social values that discourage sex.

2. Contraceptive use is higher.

3. A larger proportion of pregnant teens have abortions.

First, abstinence-only education programs are not generally considered the source of low birth

rates in these countries. There is no evidence to suggest that teens in European countries with

low birth rates are having less sex than teens in the United States. Second, researchers are

divided on how much of an effect abortion has on the varying birth rates of industrialized

countries. Lastly, consensus seems to form around the higher percentage of contraceptive use

among adolescents in developed European nations than among adolescents in the United States.

For example, approximately 61% of United States adolescent females use contraceptives. This is in contrast to Sweden, where the rate of contraceptive use is 80%, and to England and France, where the rate is and 88% among female adolescents (Stobbe 2010).

In Japan sex education is mandatory from age ten or eleven. Finland distributes condoms and a sex introduction packet at age fifteen; their sex education classes are mandatory. In France schools are expected to pass out condoms in the 8th or 9th grades and teach between 30-40 hours of sex education. Since 1992, sex education has been mandated by law in Germany. Sweden also has mandatory sex education between ages 7 and 10 years old. In the Netherlands half of the primary schools discuss contraception. Additionally, the Dutch health care system guarantees confidentiality for minors ("Sex Education" 2011).

In contrast, England, with one of the highest teenage birth rates in Europe, has non-compulsory sex education, much like the United States, where parents are allowed to opt their children out of classes ("Sex Education" 2011).

The United States has such a rich, diverse culture and range of policies on contraception use by minors that it is difficult to compare causes of teenage pregnancy between the United States and other industrialized nations. States make their own laws regarding adolescent access to contraception, access to abortion, and the curriculum design for sexual reproductive health education. States' autonomy, varying political agendas, and community beliefs make it difficult for researchers to make comparisons between the United States and other Western countries. Thus, there are few comprehensive studies identifying differences in factors affecting teenage pregnancy between different Western countries (Stobbe 2010).

What About the Effects of Race in the United States?

In the United States, many academics and policymakers use race and ethnicity to explain the high teenage pregnancy rates. Table 2 shows that minorities have a larger adolescent birth rate among females aged fifteen to nineteen in the United States. The birth rate among minorities is 70 per 1,000 Hispanic female adolescents and 59 per 1,000 black female adolescents. In contrast, the birth rate among white female adolescents is 26 per 1,000.

Table 2: Teenage Pregnancy Birth Rate in the U.S. by Race, 2009

Race	Birth rate per 1000 adolescent females
White	26
Black	59
Hispanic	70

Source: Source: U.N.-World Bank teen birth data, 2009. Female adolescents aged 15-19. Per 1000 adolescent births of the specified race.

Race alone explains very little because it is highly correlated with other factors driving teenage pregnancy. So although these numbers give us some information, these raw figures do not capture other influences such as socioeconomic factors, education, education aspirations, access to birth control, culture around sexual reproductive health, and views on teenage pregnancy.

The Effects of Delayed Pregnancy on Women's Education

Several studies have documented the relationship between abortion and/or the pill and education. Some of the research shows that delayed pregnancy results in further investment in education and/or the woman's future. For example, Claudia Goldin and L.F. Katz studied the effect of the pill on women's employment, education, and family decisions (2002). They found that the pill allowed women to take control over their educational aspirations and delay

childrearing. It enhanced both the ability and willingness of young women in the United States to enter careers that involved extensive time commitments to education. Given the opportunity, women chose to delay childbearing for more years of schooling or to enter the workforce (Goldin et al. 2002, Goldin & Katz 2002).

Research by Goldin and Katz and others supports the theory that adolescent childbearing is likely to disrupt the normal route to adult educational achievement (Card and Wise 1978, Goldin et al. 2002, Goldin and Katz 2002, Mahler 1999). This research finds that women who have a child at a young age complete fewer years of schooling than women who choose to delay childbearing (Moore 1977, Goldin and Katz 2002, Corcoran 1998).

The Effects of Adolescent Motherhood on Education: Mixed Results

Teenagers who give birth tend to complete fewer years of schooling than those who delay parenthood (Moore and Waite 1977, Card and Wise 1978, Corcoran 1998). Further, every additional year that passes without a live birth positively corresponds with an increase in educational achievement (Moore and Waite 1977). However, other research findings indicate that although the effects of teenage childbearing on high school completion and total educational achievement are significant, they are in fact are much smaller than previous studies have indicated (Coley et al. 1998). In fact, results of past research on the magnitude of the effect of teenage pregnancy on education attainment are mixed.

What Role Does Sex Education Have in Combating Teenage Pregnancy Rates?

One study finds that appropriate sexual education for would-be teenage mothers is likely to have no effect if the education is not accompanied by additional information regarding access

to birth control resources (Trussell 1988). Overall, in the realm of teenage pregnancy research, little work exists on the effect of comprehensive sex education on teenage pregnancy rates, or on the relationship between higher socioeconomic status and the level of sex education taught, or on the relationship between higher socioeconomic status and access to birth control.

Factors Influencing Teenage Pregnancy: Socioeconomic and Individual Characteristics

Research suggests that negative outcomes of adolescent motherhood, such as low educational achievement and poverty, are cyclical and will continue to be both the cause and effect of teenage motherhood (Coley et al. 1998, Moore 1977). Socioeconomic correlates, such as education, family size, and family structure, are endogenous to teenage pregnancy. Research also finds evidence that the mother's age has less of an effect than socioeconomic status on educational achievement (Trussell 1988). Research also finds that pregnancy - and not socioeconomic factors - is the main contributing force behind truncated educational achievement (Card and Wise 1978, Corcoran 1998).

Studies also show that teenage mothers are less likely than their female peers to realize their educational goals at the time of pregnancy. Otherwise, the two groups of females do not differ that much in individual characteristics (Moore and Waite 1977). This suggests that the realization of educational goals is a protective factor and may play a significant role in guarding against truncated education. Additional research suggests that females who get pregnant and drop out perform poorly in school before their pregnancy and subsequent dropout (Elfebein and Felice 2003, Mahler 1999). Both theories of research suggest that individual characteristics of pregnant teenagers are responsible for truncated education.

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Researchers have also considered environmental factors which contribute to teenage pregnancies. Simons et al. (1997) studied the effect of monetary incentives and peer support groups on repeat adolescent pregnancies and concluded that more research needs to be conducted in order to determine if an intervention that produces substantial changes in the daily living environment will eliminate the sexual habits that are responsible for the high rate of repeat pregnancy.

Factors for Teenage Pregnancy

Most studies find that dropping out of high school is a negative effect of teenage pregnancy. Results are mixed on the importance of socioeconomic status and race. Results are also mixed on whether or not adolescent parenthood reduces educational achievement relative to preexisting educational goals. More research needs to be done on these factors and their contributing effect to teenage pregnancy and educational achievement.

Risk factors common among young women with low economic status and high dropout rates include low educational aspirations, problematic behaviors (e.g., alcohol and drug use and early sexual activity), poverty, having single parents, and low parental education (Coley and Chase-Lansdale 1998). Additional risk factors include limited information about birth control (Furstenberg et al. 1969) and low academic performance (Mahler 1999).

Protective factors which help prevent teenage pregnancy include high levels of school engagement (Manlove 1998), high familial interaction and monitoring, a supportive social environment, higher socioeconomic status, maternal education, and success in school (Elfenbein and Felice 2003).

Models of Previous Research

Moore and Waite's model controls for race and dropout the same year as pregnancy. Moore and Waite allow independent variables to explain the effect of early childbearing on educational achievement (1977). Their independent variables include the number of siblings, father and mother's education, whether the family is intact, a home culture index, parent's education goals for child, whether the student took a high school prep class, and the occupation of head breadwinner when the female adolescent was fourteen years old.

Other studies control for socioeconomic status. Card and Wise's, for example, controls for socioeconomic status, race, academic achievement, aptitude, expectations, and age at birth of first child (1978). Their independent variables include current family size and family size expectations. They measure education outcomes as the mean educational score as measured in groups of level achieved. This study investigates whether or not prior differences and not early parenthood are the reasons behind low education outcomes (Card and Wise 1978).

Additional studies include independent variables for frequency of dating, age respondent began sexual intercourse and menstruation, use of birth control, attitudes toward using birth control, knowledge of birth control, time between first intercourse and conception and time between first menstruation and first sex, characteristics of school and classroom, family background (urbanicity, lived with both parents, and family size), family expectations, and school participation of respondent (clubs, sports, and religious groups).

Some studies have teenage pregnancy as the dependent variable, others as a control. Some studies control for socioeconomic factors, while others list them as an independent variable. Finally, some studies account for school and individual characteristics and others do not include them in their models at all.

The Way Forward

This paper will examine the effect of both individual characteristics and socioeconomic factors on truncated education in order to determine which has a greater influence. It will test whether educational aspirations (wanting to go to college and believing it is possible to go to college), high school educational achievement, and participation in school activities have an effect. The goal is to determine whether or not these factors play a significant role in teenage mothers' low educational attainment.

This paper diverges from past studies because it includes a wide range of independent variables, instead of primarily focusing on socioeconomic factors or individual characteristics as driving influences behind truncated education for adolescent mothers. The present study is going to add clarity to the causes of truncated education for adolescent mothers by looking at the individual, family, and neighborhood characteristics which influence the outcomes of education for female adolescents. In order to create effective policy measures it is important to understand how school/neighborhood, family, and individual characteristics influence education choices. This paper studies the relationship between teenage pregnancy and educational achievement by regressing women's educational attainment on individual characteristics, family characteristics, and school background for teenage mothers and for other teenagers.

Section III. Conceptual Framework

The object of this study is to isolate the factors that influence education outcomes for adolescent mothers. To do this I measure education outcomes for pregnant and non-pregnant female adolescents. This question presents some issues of endogeneity between education and

teenage pregnancy. For example, when testing whether socioeconomic factors influence education outcomes, researchers must consider whether low education outcomes are causing low socioeconomic status. This leads to some of the guiding questions for this study. Do socioeconomic factors play a significant role in low education outcomes? How much of an influence do views on sex and academic success play in the outcome of education for adolescent females? What about sex education? Is there a correlation between socioeconomic status and sexual reproductive health education?

A review of the current literature and research on truncated education for female adolescents, pregnant and non-pregnant, reveals that there is no consensus around the determinants and effects of truncated education for female adolescents.

It is critical to clarify the determinants of teenage pregnancy and their effect on truncated education if the United States is going to have effective policies against truncated education for adolescents. To accomplish this, the present study will look at information and access to birth control as a means for measuring whether or not individual knowledge and access impact education outcomes. The present study will test this theory by including a variable for access to birth control. It is also important to consider whether adolescents have access to the mechanism that allows them to delay childbirth.

The theory driving my conceptual framework is that comprehensive sex education can be effective against poor educational outcomes for female adolescents. Comprehensive sex education has the power to offer girls a greater investment in their educational and workforce future. Therefore, if we improve sex education in schools, policymakers may be able to break the negative cyclical effects of teenage pregnancy. If we can change sexual reproductive health classroom requirements across the nation, then the United States will be able to make significant

changes against teenage pregnancy and its resulting low education outcomes. Prior research is missing a measure for the comprehensiveness of a school's programs and their long-term effects on education outcomes for adolescent females, both pregnant and non-pregnant. The dataset used does not include a measure for a school's or region's policies on teaching reproductive health and contraceptives to adolescents, so the present study is unable to directly measure how comprehensive a school's program on sexual reproductive health is. However, knowledge is measured by whether or not the respondent has received family planning services or education in the past year and by the respondent's views on birth control. Likewise, access to birth control complements the comprehensive reproductive health education that female adolescents receive.

These two factors may affect teenage pregnancy and truncated education. There are different ways to measure these effects. Access can be measured by how many free clinics are in the radius of the school or by whether confidential services are advertised in the school. In the present study's model, access to birth control is measured by how the respondent perceives access. This gets at two aspects of access: actual access for female adolescents and the effectiveness of health clinics or sexual reproductive health programs in reaching out to adolescents so they are aware these services exist.

This study will compare the education outcomes across two cohorts, therefore enabling me to measure the impact of protective and risk factors of teenage pregnancy on education outcomes. The present study looks at which factors are most important for education outcomes for the pregnancy cohort and which factors are most important for the non-pregnant cohort. After measuring the education outcomes across the cohorts the study will then look at the difference between the two and test if this difference is significantly significant.

Section IV. Dataset and Models

This study merges three waves of data from The National Longitudinal Study of Adolescent Health/Add Health to form one data set of a nationally representative sample of adolescents in grades 7-12 in the United States during the years 1994-2002.

The study uses this dataset to analyze the education outcomes for teenage mothers. Additionally, the study also analyzes the driving factors behind teenage pregnancy and their effect on education outcomes. A total of 4,882 of the original Wave I respondents were re-interviewed between August 2001 and April 2002 for Wave II and Wave III. Wave III respondents were between 18 and 26 years old.

The empirical model is a standard OLS regression equation which measures the impact of the right-hand side variables on women's educational achievement. The dependent variable is educational achievement as measured by any post-high school vocational training or education. For simplicity, I made my dependent variable a dummy and estimate linear probability models. To correct for heteroscedasticity, I use heteroscedasticity-robust standard errors. There are 34 separate regressions for each cohort. These regressions differ in that each one contains a different treatment variable. Each regression is run twice with one additional independent variable accounting for either individual, family, or school characteristics, once for the pregnancy cohort and once again for the non-pregnant cohort. I dropped all males from the sample.

The equations I use to estimate this relationship are of the form

(1): Education = β_0 + β_1 Hispanic + β_2 Black + β_3 White + β_4 HHI + β_5 lives with mother +

β_6 mother's education + β_7 urban + β_8 cumGPA + $\beta_9 X$ +u,

where X represents the added independent variable. For example, in the second set of regressions, the independent variable is measuring the respondent's access to birth control:

(2): Education = β_0 + β_1 Hispanic + β_2 Black + β_3 White + β_4 HHI + β_5 lives with mother +

β_6 mother's education + β_7 urban + β_8 cumGPA + β_9 access to birth control $_+$ u.

A Chow test was then run on the difference between the two cohorts. The Chow test tests whether the coefficients in two separate linear regressions are in fact different from each other. We can look at the coefficients and see that they are different. However, we want to know whether or not these differences are significantly impacting education outcomes. Here, the Chow test measures whether or not the independent variables have different impacts on the two subgroups, pregnant and non-pregnant female adolescents. A Chow test, therefore, allows us to test whether or not individual, family, or neighborhood characteristics significantly impact education outcomes for adolescent mothers differently from other adolescent females.

Controls include family background (household income, mother's education, living with mother), neighborhood characteristics (urbanicity), individual school performance (cumulative GPA), and race. The living with mother variable, urbanicity, and race/ethnicity are dummy variables for the different groups. Mother's education is measured in how many years were completed by the biological mother. For example, a high school graduate has 12 years of education, and vocational training is 14 years of education. If the biological mother attended, but did not complete college, they were assigned 14 years of education. Household income is reported in the 1,000s and cumulative GPA is the reported overall GPA for all courses.

Table 3 lists all variables. Variables are separated into three categories: individual, family, and neighborhood characteristics. Individual characteristics are further separated into three sub-categories: school performance, school participation, and views on birth control and pregnancy. Individual and family characteristics are pertinent to understanding the relationship between pregnancy and educational achievement. The treatment variables are perceived parent's

views on sex and education (support of birth control, approval of sex life, talking about sex), neighborhood characteristics (crime and drugs), family background (food stamps), respondent's views on college, access to drugs and alcohol in the home, respondent's and peers views on sex and birth control use, school involvement (sport, clubs, honor society), academic background (grades, participation, frequency of skipping school), age they first had sex, and access to birth control. Most explanatory variables are coded to be indicator variables.

This paper will study educational aspirations, early sex activity, access to drugs and alcohol, mother's education, household income, urban dwellings, food stamps, cumulative GPA, a failure index, highest math and science class taken, and ability to pay attention in class in order to determine if these risk factors produce a significant difference in education outcomes between adolescent mothers and those who delayed childbirth.

Many of the factors associated with teenage pregnancy and resulting truncated educational achievement are highly correlated, so much so that it becomes difficult to untangle the root causes from the effects. This is a limitation of the present study.

Table 3. Control and Independent Variables Used in Regression Analysis by Individual, Family, and Neighborhood Categories

		CONTROL VARIABLES		
	<u>Individual</u>		<u>Family</u>	<u>Neighborhood</u>
School performance	*School Participation*	*Views on birth control and pregnancy*		
cumulative GPA			lives with mother mother's education	urban dwelling
			household income	
		TREATMENT VARIABLES		
	<u>Individual</u>		<u>Family</u>	<u>Neighborhood</u>
School performance	*School Participation*	*Views on birth control and pregnancy*		
wants college	sports	believes birth control use is not morally wrong	food stamps	neighborhood drug use
believes will go to college	clubs	believes birth control is too much of a bother to use	close with mother	neighborhood crime
highest math grade taken	honor society	believes pregnancy is one of the worst things to happen	close with father	
highest science grade taken	feels part of the school	access to birth control	mother approves of sex life	
failure index	has trouble paying attention in school	age at which they first had sex	father approves of sex life	
	frequency of skipping school	believes birth control is too expensive to use	mom supports birth control usage	
		uses birth control	father supports birth control usage	
		has received family planning services or education in the past year	parent(s) talk about birth control	
		took a pledge to remain a virgin until marriage	access to alcohol in home	
		believes using protection is too much of a hassle	access to drugs in home	
		believes peers will equate using birth control with having sex	mother mad about sex life	

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Section V. Results

I ran a Chow test for the difference between the two cohorts on all added independent variables. The following variables were found to produce significantly different regression lines between the two cohorts: participation in sports, wanting to go to college, being close with the mother/mother-figure, believing that birth control use is not morally wrong (or neutral), believing pregnancy is one of the worst things to happen, access to birth control, feeling like part of the school, and believing that birth control is too bothersome to use.

Table 4 shows the effects of the respondent's views on birth control and pregnancy on educational outcomes. The second column in Table 4 (regression 2a) indicates that access to birth control positively affects educational attainment for the non-pregnant cohort. This is consistent with the findings of Trussell (1998), Goldin and Katz (2001), and Guldi (2008) which support the theory that access to birth control increases women's educational outcomes.

The third and fourth columns in Table 4 (regressions 3 and 3a) indicate that believing birth control is too bothersome to use (which implies that these women are not using birth control) will not further women's educational outcomes. This is consistent with the findings of Trussell (1998), Goldin and Katz (2001), and Guldi (2008).

The fifth and sixth columns in Table 4 (regressions 4 and 4a) show that for the pregnant cohort either being neutral or disagreeing with the statement "It is morally wrong to use birth control" has a statistically significant negative effect at the 5% level on education outcomes. For the non-pregnant cohort this neutrality/disagreement has a positive effect, though the effect is not statistically significant. These results might be explained by the pregnant cohort changing their views regarding the use of birth control after experiencing teenage pregnancy.

The seventh and eighth columns in Table 4 (regressions 5 and 5a) reveal that the respondent's feelings about pregnancy being one of the worst things to happen has different effects on the pregnant and non-pregnant cohorts. Overall, believing that pregnancy is one of the worst things to happen has a stronger positive relationship to education outcomes for the non-pregnant population. These results are consistent with the earlier research and with explanations regarding delayed childbirth and positive outcomes on education.

Table 5 looks at the effects of respondents' school performance and relationships on their educational outcomes. The first and second columns of Table 5 (regressions 6 and 6a) indicate that sports are significant protective factors against truncated education for non-pregnant teenagers. This is consistent with Elfenbein (2003) and with other theories about school involvement preventing teenage pregnancy.

The third and fourth columns (regressions 7 and 7a) indicate that wanting to go to college has a larger effect for the non-pregnant population than the pregnant population.

The last two variables in Table 5 (regression 8 and 8a, and 9 and 9a) have positive coefficients for the pregnant cohort and negative coefficients for the non-pregnant cohort on being close with the mother and feeling part of the school. These findings differ from those of Elfenbein (2003) and Manlove (1998).

Other protective and risk factors (clubs, honor society, trouble paying attention in school, skipping school, failure index, science and math classes taken) do not produce any significant p-values under a Chow test.

Family environment variables such as being close with a father/father-figure, a mother/father approving of birth control or sex life, and talking to parents about birth control are not shown to be significantly alter the regression function between the two cohorts. A household

member being on food stamps and access to alcohol and drugs in the home are also not shown to be significant risk factors when a Chow test was run between the two cohorts.

Additionally, neighborhood characteristics, such as neighborhood crime and neighborhood drugs, are not shown to be risk factors producing significant differences between the pregnant and non-pregnant cohort.

Lastly, the following variables on views regarding sex and collegiate future do not produce significant differences between the two cohorts: taking a pledge to remain a virgin, using birth control, age at which respondent first had sex, and believing it is likely that they will go to college.

There are some limitations to using this dataset, namely the sample size. The total female sample size is 3,204, of whom 234 belong to the pregnancy cohort. With a larger sample we would likely see more statistically significant differences between the cohorts, producing more statistically significant protective factors and risk factors associated with teenage pregnancy and their effect on education outcomes. Variables that are likely to have significantly different effects on education outcomes across the pregnancy and non-pregnancy cohorts include club membership/participation, age at first sex, highest science class taken, and being close with the father/father-figure.

Overall, results show that previous academic performance does not produce any statistically significant differences in education outcomes between the two cohorts. Limitations aside, the results of the study show that the main influences driving a teenage female adolescent's educational achievement is her involvement in school, desire to go to college, access to birth control, and views on sex and birth control.

Section VI. Policy Implications

Sexual reproductive health education falls into two categories: abstinence-only and abstinence-plus, or conservative and liberal policies, respectively. In 1999 a study by the Guttmacher Institute found that most sexual reproductive health classes in grades 7-12 in the United States cover puberty, HIV/STIs, and abstinence. Topics that varied widely from program to program include methods of birth control, STI prevention, sexual orientation, sexual abuse, and information on abortion ("Sex education" 2011).

Conservatives often object to any curriculum that teaches anything other than waiting until marriage, or abstinence-only. They believe that teaching abstinence-plus fails to teach this standard of moral behavior. This is further complicated by the federal government's role, as conservative presidents believe in denying funding to schools who teach abstinence-plus programs.

The findings of the study support the theory that individual characteristics play a dominant role in influencing education outcomes for adolescent mothers. The findings of this study are inconsistent with the findings of previous research that identify socioeconomic factors as the dominant force behind the effects of teenage pregnancy on education. My findings suggest that policymakers need to shift their current policy methods and focus resources on addressing individual characteristics. More specifically, these policies should target adolescent views on sex and educational goals, academic performance, school participation (sports, feeling like part of the school), relationship with their mother/father-figure, and access to birth control.

Family Characteristics

Unlike previous research, the present study finds that mother's education is not a significant factor in predicting educational attainment. However, the present study finds household income to be statistically significant and an important socioeconomic factor that past research has identified as contributing to educational attainment.

Being close with the mother/mother figure is also a significant predictor of educational attainment. Past research generally does not test the relationship between mother and daughter, and future research should focus on the relationship between the female adolescent and her family members. Table 6 lists factors that are not statistically significant but may still influence education outcomes. Being close with one's father is one factor that is identified as likely having a significant effect if the sample size is increased. Other factors listed in Table 6 are club participation, highest science class taken, and age at first sex. Policy measures that focus on the relationship between family members, instead of demonstrations on how to use a condom, are likely to be popular among voters who place importance on family values and may be seen by policymakers as an alternative approach to sexual reproductive health education.

Individual Characteristics

Results of the present study indicate that personal characteristics, which include views on sex, education, school participation, and academic achievement, greatly influence education outcomes.

Many politicians and policymakers may be hesitant to craft policy that seeks to change adolescents' views on sex and birth control in a positive manner. Such policy may be viewed as promoting sex and birth control for all youths. However, policymakers should not let messaging challenges deter them from creating policies which have the potential to be life altering.

Focusing on a female adolescent's relationship with their mother (and father) would be a non-controversial method to reduce truncated education that is supported by my analysis.

The problem with sexual reproductive health policy in the United States is that it can vary greatly from state to state. This presents a major obstacle. Planned Parenthood is the most organized vehicle to execute sexual reproductive health policies. However, many parents may not allow their teenagers to participate in programs sponsored by Planned Parenthood. In order to produce effective policy measures against teenage pregnancy and its effects on education outcomes, policymakers will need to overcome controversial obstacles surrounding sex education.

Section VII. Conclusion

This paper answers some of the questions raised in the continuing debate on what factors contribute most to truncating the education of adolescent mothers. Results support individual characteristics as a driving contributor to education outcomes. This is contradictory to the belief of many policymakers and politicians that socioeconomic factors contribute most to education outcomes. Future research may want to explore the relationship between household income and these individual characteristics in order to determine how much socioeconomic factors influence individual views on sex, school participation, and academic performance.

Bibliography

*About Teenage Pregnancy (*2010), Centers for Disease Control. Accessed from:

    http://www.cdc.gov/TeenPregnancy/AboutTeenPreg.htm. 5 November 2010.

Ananat, Elizabeth Oltmans, and Jonathan Gruber and Phillip B. Levine and Douglas Staiger

    (2009), Abortion and selection, *The Review of Economics and Statistics*, MIT Press,

    91(1): pp. 124-136.

 Ananat, Elizabeth Oltmans and Dan Hungerman (2008), The power of the pill for the marginal

    child: oral contraception's effects on fertility, abortion and maternal and child

    characteristics. NBER working paper.

Card, J.J. and L.L. Wise (1978), Teenage Mothers and Teenage Fathers: The Impact of Early

    Childbearing On the Parents' Personal and Professional Lives*, Family Planning*

    Perspectives, 10(4): pp. 199-205.

Coley, R.L. and P.L. Chase-Lansdale (1998), Adolescent pregnancy and parenthood. Recent

    evidence and future directions, *American Psychology*, 53(2): pp. 152-66.

Corcoran, J. (1998), Consequences of Adolescent Pregnancy/Parenting -- A Review of the

    Literature*, Social Work in Health Care*, 27(2): pp. 49-67.

Elfenbein, Dianne S. and Marianne E. Felice (2003), Adolescent Pregnancy*, The Pediatric*

    Clinics of North America, 50: pp. 781-800.

Furstenberg , Frank, Jr., Leon Gordis and Milton Markowitz (1969), Birth Control Knowledge

    and Attitudes among Unmarried Pregnant Adolescents: A Preliminary Report, *Journal of*

    Marriage and Family, 31(1): pp. 34-42.

Goldin, Claudia (2004), The long road to the fast track: career and family, *Annals of the*

    American Academy of Political and Social Science 596(1): pp. 20-35.

Goldin, Claudia (2006), The quiet revolution that transformed women's employment, education, and family, *American Economic Review, Papers and Proceedings* 96: pp. 1-21.

Goldin, Claudia and Lawrence F. Katz (2001), On the pill: changing the course of women's education, *Milken Institute Review,* 3 (2nd Quarter 2001): pp. 12-21.

Goldin, Claudia and Lawrence F. Katz (2002), The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions*, The Journal of Political Economy*, 110(4): pp. 730-770.

Guldi, Melanie (2008), Fertility Effects of Abortion and Birth Control Pill Access for Minors, *Demography,* 45(4): pp. 817-827.

Mahler, K. (1999), Dropping Out of School Increases Chance of Birth for Whites and Hispanics, *Family Planning Perspectives,* 31(3): pp. 153.

Manlove, Jennifer (1998), The Influence of High School Dropout and School disengagement on the Risk of School-Age Pregnancy*, Child Trends*.

Moore, K.A. and L.J. Waite (1977), Early Childbearing and Educational Attainment*, Family Planning Perspectives,* 9(5): pp. 220-225.

Roosa, Mark W. (1986), Adolescent mothers, school drop-outs and school based intervention programs, *Family Relations,* 35(2): pp. 313-317.

"Sex Education." Accessed from Wikipedia on 20 March 2011. http://en.wikipedia.org/wiki/Sex_education

Simon, S., Dolgan, C., Dolgan, J., Kelly, L. and Singer, D. (1997), The effect of monetary

incentives and peer support groups on repeat adolescent pregnancies, *The Journal of the American Medical Association,* 277(12): pp. 977-982.

Stobbe, Mike (2010), *U.S. teen birth rate still higher than Western Europe.* Associated Press.

Accessed on 23 March 2011 from

http://news.yahoo.com/s/ap/20101231/ap_on_he_me/us_med_teen_births.

Trussell, J. (1988), Teenage Pregnancy in the United States, *Family Planning Perspectives,*

20(6): pp. 262-272.

Zabin, Laurie Schwab and John F. Kantner and Melvin Zalnik (1979), The risk of adolescent

pregnancy in the first months of intercourse, *Family Planning Perspectives*, 11(4): pp.

215, 217-222.

Table 4: Effects of Respondent's Views on Birth Control and Pregnancy

Variables	Easy access to birth control		Believes BC is too bothersome to use		Disagrees with: BC use is morally wrong		Believes pregnancy is one of the worst things to happen at age	
	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort
	(2)	(2a)	(3)	(3a)	(4)	(4a)	(5)	(5a)
HHI (in 1000s)	-0.0271	0.5005	-0.0256	0.0310	-0.0288	0.0318	-0.0247	0.0298
	[0.0166]	[0.0048]***	[0.0160]	[0.0047]***	[0.0167]*	[0.0047]***	[0.0169]	[0.0049]***
Living with Mother	5.5758	2.642	4.034	1.741	5.212	1.506	4.663	2.337
	[4.328]	[1.285]**	[4.832]	[1.152]	[4.188]	[1.173]	[3.705]	[1.230]*
Mom's Education	0.4242	0.1496	0.2804	0.0731	0.3340	0.0541	0.2942	0.1191
	[0.3651]	[0.1141]	[0.4180]	[0.1010]	[0.3871]	[0.1024]	[0.2924]	[0.1135]
Cumulative GPA	1.407	1.706	1.400	1.595	1.407	1.603	1.330	1.498
	[0.2226]***	[0.2540]***	[0.2580]***	[0.0906]***	[0.2470]***	[0.0831]***	[0.2589]***	[0.0877]***
Urban	0.3593	0.3471	0.3417	0.3175	0.3635	0.3024	0.3426	0.3664
	[0.3739]	[0.1167]***	[0.3710]	[0.1267]	[0.1166]***	[0.1166]***	[0.3426]	[0.1191]***
Added variable	-0.0896	0.5946	0.7079	-0.4106	-1.409	0.7571	0.0273	0.7439
	[0.3645]	[0.1204]***	[0.5640]	[0.3086]	[0.3429]	[0.3648]**	[0.4020]	[0.1650]***
N	79	829	79	835	78	835	72	814
R^2	0.4097	0.4578	0.4167	0.4395	0.4581	0.4435	0.4068	0.4434
Chow Test p-value	0.0582		0.0750		0.0001		0.0789	

Notes: This table displays estimates for the education variable, with heteroscedasticity-robust standard errors in brackets. Each column corresponds to a separate regression estimate of equation (1) with the added independent variable listed in the column. Columns measure the pregnant cohort and non-pregnant female population sample, respectively. Rows correspond to control variables. A single asterisk denotes significance at the 10% level, a double asterisk denotes significance at the 5% level, and a triple asterisk denotes significant at the 1% level.

Table 5: Effects of Respondent's School Performance and Relationships

Variables	Respondent participated in high school sports		Respondent wants to go to college		Respondent feels part of school		Respondent feels close with mom	
	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort	Pregnant Cohort	Non-Pregnant Cohort
	(6)	(6a)	(7)	(7a)	(8)	(8a)	(9)	(9a)
HHI (in 1000s)	-0.0141	0.0303	-0.0118	0.0302	-0.0083	0.0299	-0.0111	0.0323
	[0.0132]	[0.0038]***	[0.0135]	[0.0037]***	[0.0147]	[0.0038]***	[0.0140]	[0.0036]***
Living with Mother	4.177	1.962	4.321	1.858	2.799	1.868	3.250	0.5624
	[1.904]**	[0.9701]**	[1.993]**	[1.011]*	[1.419]*	[1.098]*	[1.911]*	[1.461]
Mom's Education	0.3164	0.1166	0.3443	0.1138	0.1723	0.0953	0.2628	0.0231
	[0.1811]*	[0.0919]	[0.1937]*	[0.0925]	[0.1001]*	[0.1009]	[0.1828]	[0.1369]
Cumulative GPA	1.326	1.337	1.259	1.244	1.262	1.453	1.263	1.386
	[0.2120]***	[0.0652]***	[0.2213]***	[0.0681]***	[0.2295]***	[0.0727]***	[0.2074]***	[0.0652]***
Urban	0.2966	0.4766	0.2774	0.4780	0.3712	0.3721	0.1318	0.3745
	[0.3200]	[0.0950]***	[0.3351]	[0.0926]***	[0.3462]	[0.0935]***	[0.3368]	[0.0930]***
Added Variable	-0.3078	0.3353	0.1694	0.5179	0.5662	-0.5426	1.100	-1.824
	[0.2997]	[0.0994]***	[0.1471]	[0.0708]***	[0.3243]*	[0.1167]***	[0.4336]**	[0.2896]***
N	100	1194	100	1193	92	1152	96	1170
R^2	0.4098	0.3723	0.4109	0.3959	0.4303	0.3851	0.4209	0.3976
Chow Test p-value	0.0327		0.0260		0.0007		0.0000	

Notes: This table displays estimates for the education variable, with heteroscedasticity-robust standard errors in brackets. Each column corresponds to a separate regression estimate of equation (1) with the added independent variable listed in the column. Columns measure the pregnant cohort and non-pregnant female population sample, respectively. Rows correspond to control variables. A single asterisk denotes significance at the 10% level, a double asterisk denotes significance at the 5% level, and a triple asterisk denotes significant at the 1% level.

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Table 6: Almost Significant Differences on Chow Test

	Clubs		Age of first sex		Feels close with father		Highest Science Grade Taken	
	Pregnancy Cohort	Non-Pregnant Cohort	Pregnancy Cohort	Non-Pregnant Cohort	Pregnancy Cohort	Non-Pregnant Cohort	Pregnancy Cohort*	Non-Pregnant Cohort***
Variable								
HHI (in 1000s)	-0.0187	0.0326	-0.0166	0.0367	-0.0080	0.0303	-0.0126	0.0296
	[0.0138]	[0.0037]***	[0.01356]	[0.0038]***	[0.0157]	[0.0048]***	[0.0130]	[0.0037]***
Living with Mother	4.124	1.830	4.228	1.976	omitted	2.214	4.014	0.9947
	[2.208]*	[0.9200]**	[2.033]**	[2.305]		[0.9454]**	[1.908]**	[0.9824]
Mom's Education	0.3159	0.1026	0.3153	0.0957	-0.1022	0.1299	0.3042	0.03304
	[0.2167]	[0.0879]	[0.1961]	[0.1892]	[0.0921]	[0.0942]	[0.1828]*	[0.09003]
Cumulative GPA	1.273	1.375	1.258	1.365	1.530	1.432	1.114	1.0201
	[0.2024]***	[0.0742]***	[0.0203]***	[0.0740]***	[0.2738]***	[0.0908]***	[0.2416]***	[0.0709]***
Urban	0.4748	0.4274	0.2986	0.3600	-0.0399	0.4633	0.3262	0.2786
	[0.3207]	[0.0942]***	[0.3041]	[0.1009]***	[0.4376]	[0.1164]***	[0.3038]	[0.0921]***
Added Variable	0.4131	-0.0498	0.0776	-0.0231	0.4912	-0.3577	0.2124	0.4150
	[0.3343]	[0.1246]	[0.0672]	[0.0258]	[0.5755]	[0.2813]	[0.1312]*	[0.0436]***
N	100	1194	99	1031	62	895	100	1192
R2	0.4135	0.3662	0.3944	0.3747	0.4961	0.3511	0.4194	0.4110
Chow Test p-value	0.1733		0.1428		0.1581		0.1250	

Notes: This table displays estimates for the education variable, with heteroscedasticity-robust standard errors in brackets. Each column corresponds to a separate regression estimate of equation (1) with the added independent variable listed in the column. Columns measure the pregnant cohort and non-pregnant female population sample, respectively. Rows correspond to control variables. A single asterisk denotes significance at the 10% level, a double asterisk denotes significance at the 5% level, and a triple asterisk denotes significant at the 1% level.