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PROPENSITY OF PARENTAL DIVORCE AND THE EDUCATIONAL
ATTAINMENT OF CHILDREN

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Abstract

Using data from the National Longitudinal Survey of Youth and survival analysis, this research answers the question “What effect does the propensity of parental divorce have on the educational attainment of children?” To the extent that divorce influences children’s educational attainment, this topic is of interest to economists because of the effect of education on worker productivity. Survival analysis is beneficial because, unlike previous research on the relationship between divorce and children’s education, it allows for the inclusion of right-censored observations. I find that the hazard of parental divorce when looking at a mother’s single spell of marriage is not a significant indicator of children’s educational attainment.

JEL classifications: J12, J13, I20

Keywords: divorce, marriage, mothers, children, education

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I. History of Divorce

Divorce rates and the stigma associated with divorce have changed in the US over time. Strow and Strow (2006) document the history of divorce in the United States. They state that divorce rates first began to rise following the civil war, when roles within households were changing. At the turn of the 19th century, divorce laws tightened, but the US population felt that prohibiting divorce was unfair. Divorce rates increased again around World War II because couples married hastily before the war and spousal infidelities were more common due to increased time apart during the war. The researchers also document that from 1944 until 1946, 50% more marriages ended in divorce or annulment. The rates decreased again during the 1950s, but with the establishment of “no-fault divorce” and “irreconcilable differences” in the 1960s, it was not long before divorce rates were once again growing in the United States. The rise in the female labor force participation rate and the Vietnam War in the 1970s continued to augment divorce rates. Rates slowed again from 1980-1990, but generally have been rising since then. As of 2001, one out of every two marriages results in divorce or separation.

As both the roles of women and the stigma associated with divorce have continued to change, this research analyzes if those changes have affected the relationship between divorce and the educational attainment of children. In this paper, I investigate the propensity of parents to end their marriage, on the educational attainment of children. The analysis of the propensity of parents to end their marriage is more useful than simply analyzing parents’ divorce status alone because it allows for the study of the educational attainment of children from both married and divorced parents. In addition, it permits a more in-depth analysis of the power of parental characteristics over their children’s educational outcomes. This topic is of interest to economists because of the effect of education on productivity. Gaining a better understanding of the

relationship between divorce and educational attainment of children will allow for progress in advancing productivity through the education of our youth. My research differs from previous research in that it uses survival analysis to account for the duration of parents' marriage. By using duration of first marriage and a number of life course characteristics of the mothers, I am able to estimate the hazard of divorce. Life course characteristics are characteristics of an individual that are defining of their life. Some examples include race, gender, education, income, and marital status. A longitudinal data set permits the connection of biological mothers to their children, which in turn allows me to analyze the educational outcomes of children of both divorced and married parents by developing a variable of hazard of divorce for all married couples.

II. Literature Review

Krein and Beller (1988) use National Longitudinal Survey (NLS) data from 1967 to 1980 to study the effect of living in a single-parent family on educational attainment. They analyze when and for how long the children (ages 14 to 24) lived in a single parent family with their mothers, who are observed at ages 30 to 44. To achieve a more reliable measure of long-term achievement, the researchers track the children into adulthood. Krein and Beller (1988) find a significant negative relationship between living with a single parent during preschool years and adult education. Further, they find that this lessening in educational attainment increases with the length of time the child spends in the single-parent household. The researchers determine that the effect is greater for males than for females, and that for white females specifically, the length of time spent in a single-parent family is not significant. They find no significant differences between races.

Following this study, Beller and Chung (1992) analyze how remarriage changes the effect that living in a female-headed family has on children's educational attainment. Using data from the March/April match file of the Current Population Survey (CPS), the researchers are able to examine each mother matched with her eldest child between the ages of 16 and 20. The pairs are surveyed in 1979, 1982, and 1984, obtaining a final sample size of 4,974 children. The children are asked if they have ever lived in a female-headed single-parent family as a result of marital dissolution of an out-of-wedlock birth. The researchers use three dependent variables in their OLS regressions: (1) years of schooling completed among children 16-20 years old, (2) the probability of completion of high school among children 18-20 years old, and (3) the probability of entrance into college among high school graduates ages 18-20. They conclude that for all three of the dependent variables, living in a female-headed family has a negative relationship

with the measures of educational attainment. They also find that remarriage counteracts this negative effect (not only due to the additional income the household gains in remarriage).

Couch and Lillard (1997) also examine children of divorce, but in relation to their earnings as adults. Using NLS data (in 1966 for men and 1967 for women), they are able to construct family relationships across the separate survey components. Using regression analysis, they find that men whose families had experienced divorce have a higher correlation in earnings with their mothers and fathers than men whose families have not experienced divorce. This loss of mobility through earnings is significantly explained by the reduced educational attainment of these men.

Keith and Finlay (1988), Boggess (1998), Furstenberg and Kiernan (2001), and Sanz de Galdeano and Vuri (2007) take into account the pre-divorce differences in children and their families within their research. Keith and Finlay (1988) examine how a child's later educational attainment, marital probability, marital timing, and divorce probability are affected by parental marital status during adolescence. Using the National Opinion Research Corporation's General Social Survey from 1972 to 1983, the researchers observe the parents' marital status when the child is 16 years old. Their sample includes 10,659 white children. The three classifications of marital status within the study include: (1) mother and father, (2) mother and stepfather (after divorce), and (3) mother only (after divorce). The researchers also control for variables such as sex, age at first marriage, mother's years of education, respondent's years of education, and respondent's marital status. Their findings suggest that those who have experienced parental divorce have lower relative gains in educational attainment over their mothers and also tend to marry at a younger age than their counterparts who have not experienced parental divorce. Although, for females of any status, having divorced parents increases the probability of being

divorced, for males social class plays a role. Lower income males with divorced parents have a lower probability of getting married, and a higher probability of getting divorced if they do marry. For upper income males, having divorced parents has no effect on educational attainment.

Bogges (1998) also finds that family income acts as a significant determinant of educational attainment. He examines the effect of family structure on high school graduation by race and gender using data from the Panel Study of Income Dynamics (PSID) from the University of Michigan. This data set includes respondents who turned 17 years old between 1969 and 1985 and who were dependent children of panel families at age 17. Using the dependent variable of high school completion, Bogges finds that living with a widowed, divorced, or separated mother has a negative effect on high school graduation rates for black and white females and black males. What is most defining about the researcher's findings is that most of this effect can be explained by lower economic status. Having a stepfather in the picture also has a negative effect on high school graduation rates of white males and females and black females. Lastly, increases in family income are correlated with increases in educational attainment for white males and females, as well as for black males.

Furstenberg and Kiernan (2001) also study the importance of pre-existing factors in their research in which they compare children who experienced parental divorce in childhood with those who experienced it as young adults. The researchers use data from the National Child Development Study (NCDS) from the years 1958-1991. Their findings imply that the negative effects of divorce on educational attainment are most strongly felt by children whose parents divorced when the children were 7 to 16 years old. However, these differences were lessened when Furstenberg and Kiernan controlled for pre-divorce differences. In addition, the researchers

found that partnerships were likely to form earlier and dissolve more quickly for those whose parents divorced at any time.

Most recently, Sanz de Galdeano and Vuri (2007) studied the effects of parental divorce during adolescence on students' standardized test scores. Using data from the National Education Longitudinal Survey in 1998 (NELS:88), the researchers were able to survey 8th graders in 1988 biennially through 2000. They found that teenagers from divorced families performed worse than those whose families were not split, even before the divorce occurred. After controlling for this fact, the researchers determined that parental divorce does not have a negative effect on the cognitive skills of teenagers and between 8th and 12th graders, parental divorce was not more or less affective based on age of the child. Lastly, Sanz de Galdeano and Vuri claim that cross-sectional estimates actually overstate the negative effects of parental divorce on cognitive skills and achievement.

Ginther and Pollak (2004) and Gennetian (2005) further improve on existing research by being more specific on joint family type classifications. Ginther and Pollak (2004) examine relationships between family structure and children's educational outcomes. Using data from the National Longitudinal Survey of Youth (NLSY) (1985-1994), PSID (1985-1997), and NLSY-Child (1986-1994, biennially), the researchers find that even after splitting upblended families (any type of family that does not fit the definition of a traditional nuclear family) into the classifications of families with joint children and families with step children, children from traditional nuclear families still have substantially better educational outcomes. The researchers point out the family structure could be correlated with family resources. Stable blended families' joint children, although they grew up with their biological parents and did not experience

transitions in family structure, still had educational outcomes similar to those of stepchildren and children from single-parent families.

Gennetian (2005) also studies the effects of family structure on children's achievement, but address two sources of potential bias. These potential sources are (1) misclassification of blended families and (2) the omission of with family and individual time-invariant unobserved characteristics. She uses NLS data from 1986-1994 on children ages 5 to 10. To measure their achievement, she uses Peabody Individual Achievement Test (PIAT) scores. The family classifications are based on the mother's marital status at the time of the child's birth and the biological mix of siblings. After controlling for income and other unobserved characteristics, Gennetian finds that family structure when defined by traditional classifications has little effect on young children's test scores and that living in a "non-blended" single mother family has a small and negative effect on PIAT scores. Lastly, children who live in a blended family experience a small negative effect on test scores (though this effect is not always significant).

Gruber (2004) analyzes the long-run implications for children growing up in a unilateral divorce environment. Using data from the Public Use Micro Samples (PUMS) from the US Census matched with data on state divorce regulations, he finds that as unilateral divorce regulations increase, so too does the likelihood of living with divorced parents as a child. As adults, this is associated with a decrease in education and a decrease in family income. Gruber suggests that to fully understand the relationships within the study, it may be necessary to look into grandparent generations as well.

In summary, previous literature shows that parental divorce is a significant determinant of children's education. One question that remains to be answered is how parental characteristics

that affect their likelihood of becoming divorced are correlated with their children's educational attainment. My research aims at answering that question.

III. Data

I will be using two supplementary data sets in the analysis: the National Longitudinal Survey of Youth (NLSY79) and the NLSY79 Child and Young Adult. NLSY79 surveys 12,686 individuals who were between the ages of 14 and 22 when they were first surveyed in 1979. These individuals were surveyed every year from 1979 to 1994 and biennially from 1994 to 2008. Those men and women surveyed in NLSY79 were asked questions ranging from topics about their labor force participation to those about their marital statuses and financial and environmental characteristics. The NLSY79 Child and Young Adult surveys the biological children of the women surveyed in NLSY79. This survey has a sample size of 11,495. Beginning in 1988, these children (ages 10 and older) were surveyed biennially until 2008 and asked questions modeled on the NLSY79 questionnaire in addition to those expanding on child-specific information such as parent interaction, schooling, dating and friendship patterns, work experiences, and marital and fertility histories. The two data sets can be used in conjunction with one another by connecting them through the mothers' identification code which is present in both surveys. The data set helps to make this research valuable by allowing for the connection of mother and child, and therefore allowing for the analysis of family specific trends.

In my analysis, I do not include respondents who were never married as they are unable to experience a divorce. I also do not include male respondents in my analysis since it would not be possible to connect them with their biological children, which is key to the successful completion of this study. Lastly, I study only the first marriage of all respondents.

Table 1. Variable Definitions

Variable Name	Definition	Source	Year
<i>Black</i>	Race is black (1=yes, 0=otherwise)	NLSY79	1979
<i>Hispanic</i>	Ethnicity is Hispanic (1=yes, 0=otherwise)	NLSY79	1979
<i>Age_M</i>	Age at first marriage	NLSY79	XRND
<i>Education_M</i>	Highest grade completed by mother	NLSY79	XRND
<i>AFQT</i>	Percentile ranking on Armed Forces Qualifying Test (AFQT)	NLSY79	XRND
<i>Income</i>	Total net family income in past calendar year	NLSY79	1979
<i>Catholic</i>	Religion is Catholic (1=yes, 0=otherwise)	NLSY79	1979
<i>Parents</i>	Lived with both biological parents from birth to age 18 (1=no, 0=otherwise)	NLSY79	1988
<i>Education_{C_i}</i>	Highest grade completed by child as of last interview date	NLSY79 Child/Young Adult	XRND
<i>Hazard</i>	Predicted hazard rate obtained from duration model		
<i>Age_C</i>	Respondent's year of birth	NLSY79 Child/Young Adult	1979
<i>Male</i>	Sex is male (1=yes, 0=otherwise)	NLSY79 Child/Young Adult	XRND
<i>Black_C</i>	Race is black (1=yes, 0=otherwise)	NLSY79 Child/Young Adult	XRND
<i>Hispanic_C</i>	Ethnicity is Hispanic (1=yes, 0=otherwise)	NLSY79 Child/Young Adult	XRND
<i>Children</i>	Number of children	NLSY79 Child/Young Adult	XRND
<i>Marital</i>	Marital status (1=married, 0=otherwise)	NLSY79 Child/Young Adult	2008
<i>Divorced</i>	Parents divorced (1=yes, 0=otherwise)	NLSY79 Child/Young Adult	2008
<i>Mother</i>	Age of mother at birth of individual	NLSY79 Child/Young Adult	XRND

XRND: cross-round variable

The table above indicates that a number of the variables studied in this research are cross-round variables. These variables do not change over time (i.e., race or sex) or can be cumulated across years (i.e., number of children). It has been found that race/ethnicity (Cherlin 1992), age at first marriage (Bumpass et al 1991), highest grade completed by mother (Lyngstad 2004), innate ability as measured by AFQT scores (Voydanoff 1991), income (Voydanoff 1991), being Catholic (Thomas and Cornwall 1990), and having parents who are divorced (Bumpass et al 1988) all have significant relationships with divorce. Similarly, previous research also suggests that educational attainment is significantly related to sex (Goldin et al 2006), race/ethnicity (Krein and Beller 1988), having children (Moore and Waite 1978), marital status (DiMaggio and Mohr 1985), parental divorce (Keith and Finlay 1988), and the age of an individual's mother at the time of their birth (Moore and Waite 1977).

Of the final 3002 individuals included in my data set, 30.8% are African American, 21.7% are Hispanic, and 36.5% are Catholic. The average mother's age at first marriage is about 23 years old. The average child's highest grade completed is 12th grade. Additionally, about 44.1% of children's parents divorced.

IV. Model

In order to estimate the effects of propensity of parental divorce on educational attainment of children, I use the two-step procedure of survival analysis. The first equation features a duration model which uses the amount of time an individual (parent) has survived until experiencing divorce to predict the probability of being divorced on the condition that the parent has survived without experiencing divorce until the given point in time. The second part of the

analysis uses the derived duration variable of parents' hazard of divorce along with a number of control variables to explain changes in the individual's educational attainment.

In order to use survival analysis, it is necessary to convert the mothers' panel data obtained from the NLSY79 into duration data format. By definition, this means that the dataset will contain a cross-section of durations of the given event, in this case marriage. For each individual, the duration data observes marital status at time $t_1, t_2, t_3 \dots t_n$. Each duration begins when the individual begins her first marriage and ends when she ends that marriage. If the marriage does not end by 2008 (the last year included in the data), the observation is right-censored because the observed spell is considered incomplete (Greene 2007). An advantage of using duration data is that these right-censored observations can still be included in the analyses. This sets my research apart from previous research studying the effects of timing of divorce on the educational attainment of children since both divorced and married individuals can be studied simultaneously.

Table 2. Marriage Duration Variable Description

Category	total	per subject			
		mean	min	median	max
no. of subjects	2813				
no. of records	2813	1	1	1	1
(first) entry time		0	0	0	0
(final) exit time		190.6506	1	214	347
subjects with gap	0				
time on gap if gap	0				
time at risk	536300	190.6506	1	214	347
failures	1217	.4326342	0	0	1

The dependent variable in the first stage of the analysis is the duration of the parents' marriage. Of the 2813 mothers studied, the mean duration of a marriage was 190.7 months (15.9

years) in length. The longest marriage duration in the dataset was 347 months (28.9 years), where the respondent was married for the entirety of the survey. The shortest marriage duration was one, where the respondent's marriage lasted for only one month. The 1217 failures shown in Table 2 indicate that 43% of the marriages observed ended in divorce. The remaining 1596 observations are therefore right-censored, as the women did not experience a divorce by the last month of the survey.

The duration model evaluates the duration of an event and the likelihood that it will end in the next period. In this analysis, duration until divorce can be examined by the likelihood function, which is made up of two parts: the density function and the survivor function. This is illustrated in equation (1). The density function contributes the continuous probability function of t , whereas the survivor function gives the probability that the observed spell is at least t periods long (Greene 2007). In the survivor function t_i^* signifies an incomplete spell, whereas t_i in the density function signifies a completed spell. An incomplete spell simply means that the marriage had not ended by the last year in the survey and, therefore, is right-censored. This allows for the maximization of the likelihood function.

$$L = \prod_{i=1}^s f(t_i) \prod_{i=s+1}^n S(t_i^*) \quad (1)$$

In order to fully understand how the survival analysis works and how the results are interpreted, an understanding of the hazard rate is essential. The hazard rate is the center focus of the duration model in that it answers the fundamental question begged by this unique type of analysis. The hazard rate presents the likelihood that an event will end in the next short time period, given that it has lasted for at least that length of time (Greene 2007). In terms of this research, the hazard rate illustrates the probability that a marriage will end in the next month, conditional on the fact that it has lasted until that time. The hazard rate, $\lambda_i(t_i)$, is shown in

equation (2). It is the product of the baseline hazard, $\lambda_0(t_i)$, and the parameterized individual effects (Kumazawa 2010). As theory suggests that the hazard of divorce increases with time, I use a Weibull hazard model that assumes an increasing baseline hazard (Kumazawa 2010). For a Weibull model, the baseline hazard function is $\lambda_0(t_i) = pt^{p-1}$ where a positive value is anticipated for p , a shape parameter estimated by the data, since the hazard of failure increases with time (Kumazawa 2010). Maximum likelihood is used to estimate the parameters λ_i and p .

$$\lambda_i(t_i) = \lambda_0(t_i) \exp(\beta_1 Age_{M_i} + \beta_2 Education_{M_i} + \beta_3 AFQT_i + \beta_4 Black_i + \beta_5 Hispanic_i + \beta_6 Catholic_i + \beta_7 Income_i + \beta_8 Parents_i) + \varepsilon_i \quad (2)$$

Once the hazard rate is predicted by the duration model, it can be inserted as an independent variable in equation (3) to control for the effects of duration of marriage on the child's educational attainment. This is better than including the actual duration of marriage because it allows an estimation of the propensity of divorce for all couples—married and divorced—based on given life course characteristics. It is powerful in its ability to simultaneously analyze the effects of both married and divorced couples' hazard of divorce on the educational attainment of their children, rather than simply the effects of the length of marriage of divorced couples only.

For the final part of the survival analysis, the predicted hazard rate is included as an independent variable in an OLS regression explaining the educational attainment of children through the additional variables of age, race, gender, income, pregnancy, marital status, and mother's age at the time the individual was born. This equation is tested for multicollinearity and heteroskedasticity. As there is no evidence of multicollinearity, the equation is only corrected for heteroskedasticity.

$$Education_{C_i} = \alpha + \beta_1 Hazard_i + \beta_2 Age_{C_i} + \beta_3 Male_i + \beta_4 Income_i + \beta_5 Black_{C_i} + \beta_6 Hispanic_{C_i} + \beta_7 Marital_i + \beta_8 Mother_i + \beta_8 Children_i + \varepsilon_i \quad (3)$$

V. Results

Table 2. First-stage Regression Results

Variable Name	Hazard Ratio	Coefficient	Standard Error
<i>Age_M</i>	0.943***	-0.058	0.007
<i>Education_M</i>	1.035***	0.034	0.012
<i>AFQT</i>	0.994***	-0.006	0.001
<i>Black</i>	1.159*	0.148	0.094
<i>Hispanic</i>	1.288**	0.253	0.131
<i>Catholic</i>	0.767***	-0.256	0.059
<i>Income</i>	1.006**	0.006	0.003
<i>Parents</i>	1.241***	0.216	0.078
Number of Observations	2704		
Likelihood ratio χ^2	157.06***		
Log Likelihood	-3193.7707		
<i>p</i>	0.8742		
* p-value < 0.10 ** p-value < 0.05 *** p-value < 0.01			

In duration models, coefficients are not marginal effects. For this reason, it is best to use hazard ratios for interpretation of results. A hazard ratio measures the likelihood of a divorcing occurring based on the relationship between marriage duration and the given variable. Having a hazard ratio greater than one indicates that an increase in the value of a given variable increases the likelihood of divorce. Conversely, a hazard ratio that is less than one indicates that an increase in the value of the given variable decreases the likelihood of divorce. The results of the estimated duration model suggest that an older age at marriage makes divorce less likely. In addition, the hazard ratio of 0.783 indicates that being Catholic is also correlated with a decrease in the likelihood of divorce. These results are significant and consistent with expectations based on previous research.

The dummy variable controlling for being black indicates that being an African American increases the hazard of divorce. This result, however, is only significant at the 0.10 level, signifying that the effect of race on divorce may not strongly hold. The results also suggest that being Hispanic increases an individual's likelihood of experiencing divorce in their first marriage. The hazard ratio of 1.288 is greater in value and significance than the dummy variable controlling for being African American. This proposes that Hispanics are more likely than their African American and white counterparts to experience a divorce. AFQT scores, acting as a proxy for innate ability, significantly have no effect on the hazard of divorce. The results imply that having a higher income increases the likelihood of one's marriage ending in divorce. A possible explanation for this finding lies in the idea that having a higher income makes the women studied less financially dependent on their spouses, and therefore creates less of an incentive to remain in the marriage when facing difficult times. Lastly, features of the women's mothers also affect their hazard of divorce. Having a mother who completed more formal education increases the respondent's likelihood of divorce, as does not living with one's biological parents from birth to the age of 18.

As previously mentioned, p is a shape parameter of the baseline hazard function estimated by the data. The positive value of p obtained is consistent with the Weibull model and the expectation of the hazard of divorce increasing with time. The value of p , though positive, is less than one. This implies that the increase of hazard of divorce with time does not occur at a substantially fast rate. The effects of this can be examined through taking the median value of t , 214 months, as constant and analyzing the effects of having a value of p greater than one versus p being less than one. A change in p from 0.8742 to a value slightly greater than one, say 1.05 yields a change from 0.445 to 1.373 in the baseline hazard. Any value of p greater than one

causes the baseline hazard to be greater than one also. Similarly, values of p less than one cause the baseline hazard to be less than one. This highlights the idea that the individuals observed have a baseline hazard suggesting they are less likely to experience a divorce.

Table 4. Second-stage Regression Results (Ordinary Least Squares)

Variable Name	Coefficient	Robust Standard Error
<i>Constant</i>	1.263	0.692
<i>Hazard</i>	-1.31e ⁻⁶	2.15e ⁻⁶
<i>Age_C</i>	0.455***	0.017
<i>Male</i>	-0.591***	0.061
<i>Income_C</i>	0.013***	0.003
<i>Black_C</i>	-0.138*	0.079
<i>Hispanic_C</i>	-0.163**	0.082
<i>Marital</i>	0.225*	0.127
<i>Mother</i>	0.050***	0.015
<i>Children</i>	-0.953***	0.050
Number of Observations	3002	
R²	0.4591	
Root MSE	1.6611	
F statistic	216.11***	
* p-value < 0.10 ** p-value < 0.05 *** p-value < 0.01		

OLS with Robust Heteroskedasticity-Corrected Standard Errors

The second regression shows that the predicted hazard of parental divorce is not a significant indicator of educational attainment of children. This result is not consistent with most previous research. Furstenberg and Kiernan (2001) find that differences in education between children of divorced and children on non-divorced parents are attenuated after controlling for pre-divorce differences in the children's circumstances. Perhaps the insignificance of hazard of parental divorce stems from the use of only the first marriage when, in reality, some women may have experienced multiple spells of marriage.

Other results of the second regression show that being male decreases educational attainment by about 0.6 years and an increase in age is also correlated with a decrease in education. The result that being male has a negative effect on educational attainment shows that

for men in the NLSY Child and Young Adult, their sex actually inhibits their education. This is consistent with the more recent observations of more women graduating college than men (Goldin et al 2006). The result that education increases with age is consistent with theory in that as an individual becomes older, they are able to complete more education. Income of the child's mother is directly related to the education of the child. As the mother's income increases by \$1,000, the child's educational attainment increases by 0.013 years.

The child's marital status is directly related with educational attainment. This result is not consistent with expectations since married individuals are often observed to have less of a focus on increasing their education and more of a focus on other interests stemming from changes resulting from being married. However, perhaps the increase in income that typically results from becoming married allows for the financing of more education. The results also show that the number of children an individual has is negatively correlated with educational attainment in that with each additional child, educational attainment for their parent is estimated to decrease by 0.95 years. Lastly, the results indicate that both African American and Hispanic children have lower educational attainment than their racial/ethnic counterparts. This suggests that disparities between races, though more attenuated in the aspect of experiencing a divorce, still exist when it comes to education.

In order to check that this data set exhibits the inverse relationship between the event of parental divorce and educational attainment of children that is found in previous research, I replace the mother's hazard rate with a dummy variable controlling for the event of parental divorce. In this case, the results show a significant negative relationship between the parental divorce and educational attainment. This illustrates that the event of divorce has a stronger effect

on a child's educational attainment than a mother's hazard of divorce when looking at a single spell of marriage.

There is not a strong relationship (-0.2424) between the hazard rate and the dummy variable for divorce. This suggests that, when looking at a single spell of marriage, women whose characteristics make them more likely to experience a divorce in their marriage do not often experience a divorce. Similarly, women with lower hazards of divorce may not often have marriages that last. This low correlation between the two would most likely increase when accounting for multiple spells because looking at a single spell of marriage does not account for some of the children in the survey who are products of a second or third union. It is important to note the low correlation between hazard of divorce and actual divorce in order to more wholly understand the differing results when running the OLS regression with each of the variables. This does not discount the advantages of analyzing a mother's hazard of divorce because doing so allows for the analysis of individuals with information prior to becoming divorced. Simply studying individuals after the divorce has occurred permits study only after the fact. Accounting for multiple spells will probably give a more accurate picture of a mother's true hazard of divorce, thereby increasing the correlation between the hazard and dummy variables while still permitting study with only information prior to the occurrence of divorce.

Table 4. Second-stage Regression Results with Dummy Variable Replacement

Variable Name	Coefficient	Robust Standard Error
<i>Constant</i>	1.582	0.699
<i>Divorced</i>	-0.199***	0.062
<i>Age_C</i>	0.452***	0.017
<i>Male</i>	-0.594***	0.061
<i>Income_C</i>	0.013***	0.003
<i>Black_C</i>	-0.148***	0.079
<i>Hispanic_C</i>	-0.171**	0.082
<i>Marital</i>	0.235**	0.127
<i>Mother</i>	0.042***	0.015
<i>Children</i>	-0.954***	0.050
Number of Observations	3002	
R²	0.4609	
Root MSE	1.6583	
F statistic	213.79***	
* p-value < 0.10 ** p-value < 0.05 *** p-value < 0.01		

The results from running the second-stage regression reveal that having parents who have divorced reduces educational attainment by about 0.2 years. This result is significant and consistent with previous research. These results suggest that the event of divorce is a significant determinant of educational attainment of children, although the propensity of divorce is not. It is noteworthy that after replacing the hazard variable with a dummy variable accounting for having parents who are divorced, none of the other coefficients dramatically change in magnitude or sign.

VI. Conclusion

The purpose of this analysis was to analyze the effects of a mother's propensity of divorce on the educational attainment of her children. Motivated by interest in how changes in divorce within the United States affect the nation's human capital, I have found that the hazard of divorce is not a significant indicator of children's educational attainment. This suggests that a

mother's possession of characteristics that would make her more likely to experience a divorce does not have a significant impact of the number of grades her child completes. Most of the previous research that has studied the relationship between divorce and the educational attainment of children has found that the two are inversely related. This research adds to the body of knowledge on the topic by distinguishing between the effects of divorce and those of the propensity of divorce. In other words, it is arguable that the actual event of divorce is more traumatic than having parents whose characteristics makes them more likely to divorce. From this difference may stem the cause of insignificance of the hazard of divorce, compared to significance of the event of divorce.

It is, however, important to note that my research looks only at the hazard of a first divorce. This is a shortcoming because, in reality, mothers may have experienced multiple marriages and the children may be the result of a second or third marriage. In the future, I hope to incorporate multiple marriage spells to capture the hazard of divorce. The true hazard rate with multiple spells will most likely lie somewhere between the results found by using the hazard of a single spell of marriage and those found when using a dummy variable for the event of divorce. I believe this to be the case because looking at a single spell of marriage rather than multiple spells, gives the lower bound for the effect that the mother's hazard rate has on their child's education. Using the actual event of divorce, on the other hand, gives the upper bound for the effect. Looking at propensity of divorce is useful because it allows for analysis before an event of divorce takes place. Studying actual divorce introduces limitations in that it is permits analysis only after the fact. Analyzing the effect of multiple spells will most likely give a more accurate answer while still permitting the analysis of individuals who have not yet experienced a divorce.

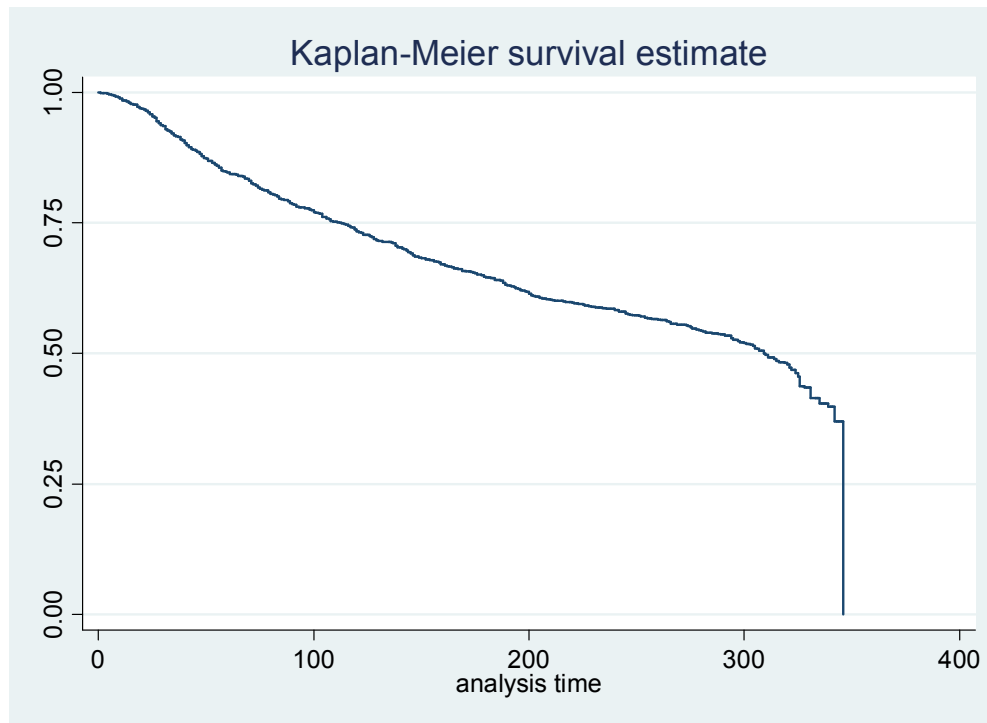
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APPENDICES

Appendix 1: Kaplan-Meier Survival Estimate Graph



Appendix 2: Multicollinearity Correlations Table

Variable	VIF	1/VIF
<i>Mother</i>	5.08	0.196770
<i>Age_c</i>	4.85	0.206369
<i>Children</i>	1.45	0.688683
<i>Black_c</i>	1.45	0.690281
<i>Hispanic_c</i>	1.27	0.789850
<i>Marital</i>	1.24	0.804807
<i>Income_c</i>	1.23	0.812998
<i>Hazard</i>	1.15	0.871053
<i>Male</i>	1.02	0.980415
Mean VIF	2.08	

Appendix 3: Hazard Rate and Divorce Dummy Variable Correlations Table

	<i>Hazard</i>	<i>Divorced</i>
<i>Hazard</i>	1.0000	
<i>Divorced</i>	-0.2424	1.0000