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Better Educated, Fewer Divorces: The Impact of College Education Quality on Marriage Outcomes

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Abstract

I investigate the impact of post-secondary college education quality on marriage outcomes. Using NLSY79 data, an instrumental variable strategy is employed to identify the causal effect. Better college education is associated with stable marriage, lower probability of marriage, postponed marriage, and lower likelihood of remarriage. Among people who obtained college degree before age 25, a one unit increase in college education- which corresponds to an increase in average SAT score of freshmen- decreases the likelihood of marriage by 21.1 percentage points, reduces the probability of ever-married before age 40 by 3.8 percentage points, and increases age at first marriage by 3 years. In addition, people with one unit higher quality of college education are 19.3 and 11.4 percentage points less likely to get divorced and divorce before 40, respectively, than those with lower quality of college education. Additionally, better educated people have 16.4 percentage points lower probability of marital disruption in the first 10 years of first marriage and 17% fewer numbers of marriage than their counterparts. Given that numbers of college graduates have been growing up over the time, this article provides a new perspective to understand the trend of marriage and divorce.

1 Introduction

Family structures have changed dramatically in the past half century. Specifically, marriage and fertility rates have fallen, and divorce rates have risen peaking in early 1980s. Both marriage rate and the type of marriage being created have changed. Previous studies have documented different determinants of marital stability, among which education attainment has been well studied. The number of people who have at least a 4-year college degree has increased dramatically, meaning that more and more people now have college education. However, the importance of quality of education has been undervalued and, thus, understudied in the literature. This paper investigates how marriage and divorce are affected by post-secondary education qualities.

As opposed to what have been discussed in the literature, this is the first study that aimed at uncovering the impact of education quality, instead of quantity, on marriage outcomes. College education quality is found to be positively correlated with marital stability, fewer remarriages, and postponed marriage. I find that people who received one unit higher quality of post-secondary college education enter the first marriage 3 years later than those who received lower quality of post-secondary education. Among people who obtained college degree before age 25, one unit increase in college education decreases the likelihood of marriage by 21.1 percentage points, and reduces the probability of ever-married before age 40 by 3.8 percentage points. In addition, people with one unit higher quality of college education are 19.3 and 11.4 percentage points less likely to get divorced and divorce before 40, respectively, than those with lower quality of college education. Furthermore, better educated people have 16.4 percentage points lower probability of marital disruption in the first 10 years of first marriage and have 17% fewer numbers of marriage than their counterparts.

Previous studies have focused on the trend of marriage and divorce, and their driving forces. However, the discussions have been primarily around education attainment. Although education attainment is highly correlated with post-secondary education quality, one should distinguished better educated from longer educated. Literature has been using these two

terms interchangeably, which is not appropriate as noted in this study. Goldin and Katz (2008) studied family and career choices of three cohorts of Harvard female graduates. Their findings shed a light on the fact that better-college-educated graduates may have different family outcomes than the ordinarily educated.

Though many studies have documented the determinants of marital stability and focused on identifying the educational gradient of divorce, few have focus on how quality of post-secondary college education affects marital stability. I primarily focus on the marriage outcomes of college-educated group and on understanding the impact of education quality, as opposed to education quantity, on family structures. In contrast to the less-educated groups, college graduates are found to have more stable career, higher income, be married at older ages, have fewer kids, and have happier and more stable families. However, one should also expect the existence of heterogeneity of career and family outcomes among college graduates (Isen and Stevenson 2010; Martin 2006; Goldin 1995; etc.). For example, college graduates with higher education quality have higher income than their counterparts. Accordingly it is reasonable to postulate that better educated college graduates have different marriage outcomes . Literature on assortative mating would provide similar postulations. Nonetheless, the education quality gradient of marital stability is ambiguous. Therefore, this paper focuses on providing empirical evidence on the effect of education quality on marital outcomes.

Goldin (1995) found that college women, from several different generations, are better at balancing family and career over the time. Esping-Andersen and Bonke (2011) found that educated wives are better at negotiating a balanced division of housework and childcare. Other studies also found that highly educated are more satisfied with their marriages and have higher barriers to divorce (Boertien and Härkönen, 2014; Halliday Hardie and Lucas, 2010; Isen and Stevenson, 2010). Accordingly, it is legitimate to assume that people who are better educated would be more prepared for marriage, more rational at picking spouse, more responsible for family, and have higher satisfaction in a marriage than those with lower education qualities. On the contrary, previous studies also found positive educational

gradient of divorce. Women with higher education are found to have higher risk of divorce in France, Greece, Italy, Poland, and Spain (Härkönen and Dronkers, 2006). Higher scores on openness to experience and higher economic independence contributes to higher marital disruption among highly educated groups (Boertien et al., 2012). In this article, I show that post-secondary college education quality is served as a important predictor of stable marriage.

To do so, I rely primarily on the Nation Longitude Survey of Youth 1979 (NLSY79), restricting the sample to people whose highest grade of completion is at least 16 years. Finishing the 16th grade of education is regarded as obtaining Bachelor's degree. Post-secondary college education qualities of NLSY79 college graduates are assessed based on retention rates, faculty salary, rejection rates, faculty-to-student ratio, and average SAT scores of entry class of Bachelor's degree granting schools. Although there may be an important causal effect of college education quality, there could also be substantial bias coming from the endogeneous choices of marriage and college education. To identify the causality of the relationship, I use geographic proximity of higher quality of post-secondary education as an instrument for college quality. Geographic proximity of higher quality of post-secondary education is measured as the average 4-year college quality within 25 miles of the county of residence at age 14, 15, and 16. This study provides empirical evidence to show that, for people who completed 4-year college education before age 25, geographic proximity of college education is highly correlated with college quality, and that college education have a substantial causal effect on probability of marriage as well as marriage stability.

Section 2 outlines the prior literature on the determinants of marital stability as well as educational gradient of divorce. In Section 3, I describe the data that will be used for the analysis. In Section 4, I provide evidence on the relationship between college education quality and marriage outcome from Ordinary Least Squares (OLS) estimates, and Section 5 discusses the potential biases of this procedure. In Section 6, I employ an instrumental variable strategy to provide evidence regarding the causal effect of post-secondary education quality on marriage outcomes, and in Section 7, I conclude.

2 Literature

Many works have been done to study the trend of marriage and its driving forces (Stevenson and Wolfers, 2008; Isen and Stevenson, 2010; Martin, 2006). Marriage stability is found to be associated with age of first marriage (Booth and Edwards, 1985; Becker et al., 1977; Morgan and Rindfuss, 1985; Rotz, 2011; Goldstein and Kenney, 2001; Schoen, 1975), husband income (Loughran, 2002; Lefgren and McIntyre, 2006), female labor participation (Kalmijn et al., 2004; Lyngstad, 2004; Ono, 2009), husband unemployment (Bracher et al., 1993; South and Spitze, 1986), fertility (Martin, 2004; Isen and Stevenson, 2010) and cohabitation (Härkönen and Dronkers, 2006), and education attainment (De Graaf and Kalmijn, 2006; Mott and Moore, 1979; Moore and Waite, 1981; Bahr and Galligan, 1984; South and Spitze, 1986; Martin, 2004; Goldstein and Kenney, 2001; Isen and Stevenson, 2010; Lyngstad, 2004; Härkönen and Dronkers, 2006; Ono, 2009; Kalmijn et al., 2004). Bracher et al. (1993) find that a woman is more likely to if she married before age 20, if she cohabited with her husband before marriage fewer than six months, if she had pre-marital birth, if she was employed or her husband is unemployed during their marriage. Among all these driving forces, the effect of education attainment is undoubtedly an important determinant of marriage outcomes.

Literature that focused on educational gradient of marriage outcomes made the comparison between college graduates and non-college graduates. The effect of education attainment on divorce are theoretically ambiguous. The findings of educational gradient of divorce is mixed with both positive and negative impacts. Ono (2009) shows that there exists a shift from a pattern in which only husbands' education influences the couples' likelihood of divorce to a pattern in which both spouses' education influences that likelihood. De Graaf and Kalmijn (2006) found that the effect of education on marriage has changed from a positive effect, when divorce was uncommon, to a negative effect. Isen and Stevenson (2010) suggested that marriage and remarriage rates have risen for women with college degrees relative to women with fewer years of education. College educated women are happier in their marriage and are less likely to divorce. College completions is associated with higher probability of

marriage and more stable marriage (Lefgren and McIntyre, 2006). Similarly, Boertien and Härkönen (2014) suggested that educated women have higher barriers to divorce that help to keep marriage intact. Lyngstad (2004) stated that there might be two opposing effects from education on the risk of divorce. One being a direct effect of education, increases the gain from marriage, and the other being an effect working indirectly through reduced specialization, potentially decreases the gain from marriage. In addition, Lyngstad (2004) observed a very strong negative educational gradient in divorce risk. Kalmijn et al. (2004) also found a negative effect of women's education on marriage that the likelihood of divorce is higher when women are employed, have accumulated more paid work experience, and are better educated. On the other side, Kreager et al. (2013) found that education helps women to maintain marital stability as well as dissolve violent ones. South and Spitze (1986) showed that wife's education decreases the probability of divorce at early marital durations but increases it at later durations. Härkönen and Dronkers (2006) showed that educational gradient of divorce is different across countries. They found that women with higher education had a higher risk of divorce in France, Greece, Italy, Poland and Spain, while women from Austria, Lithuania, and United States experience the negative education gradient of divorce.

Given that many studies have related college education to marital stability, few have consider the impact of college quality on marriage outcomes. Though Goldin and Katz (2008) focused on trends of family and career of the educational elites and did not directly compare the best college educated to the other college educated, she found that the educational elites have different career and family life cycles than the average educated college graduates. Female Harvard graduates have higher fractions continuing to professional and graduate school than average female college graduates. For 1970 cohort, within 15 years of college graduation, there were 17 and 18 percent Harvard graduates obtained law and medical degree, respectively, while it is 1 and 0.4 percent for female college graduates in general. In addition, literature on return to college quality provides substantial evidence that people who graduated from more selective colleges have different careers that are associated with higher income than

their counterparts (Black and Smith, 2004; Long, 2008; James et al., 1989; Eide et al., 1998; Weisbrod and Karpoff, 1968). Therefore, people who graduated from selective colleges have higher probability of being employed, earning higher income, and are more open-minded.

As documented in the literature, income and employment will further affect marriage stability. Goldin (1995) found that marriage rate was lower among college women who eventually attained career, and divorce was more common among ever-married employed women than those who were not. She pointed out that it is career that somehow affected marriage. Education as human capital raises the economic benefits from labor market, especially for educational elites. Compare to ordinarily educated, educational elites are more likely to have successful career and earning higher income than their spouse. Thereby better educated people may have higher opportunity costs of getting married than the worse educated, especially for women who are expected to spend more time on home production in a marriage than their husband. According to Becker's economic model of family, successful career increases the utility of options outside marriage (Becker et al. (1977)). Higher income ensures the economic independence, which further reduces the attractiveness of marriage. Previous studies found that college-educated women delayed marriage to older ages than less-educated women due to the high opportunity cost of marriage (Goldin, 2004; Isen and Stevenson, 2010). Therefore it will not be surprising that better-college-educated women tend to have lower marriage rate and delay marriage as oppose to ordinarily college-educated women, while age at first marriage is found to be a important predictor of stable marriages.

Goldin and Katz (2008) also found that the pattern of transition to marriage among Harvard graduates is similar to the national trend, however, fertility has been significantly delayed among educational elites. Previous studies, such as Brines and Joyner (1999) and Coppola et al. (2008), suggested that a birth can increase partners' commitment and is negatively associated with marriage dissolution. Thus, marriage of educational elites who have lower fertility rate are expected to have higher divorce hazard than marriage of general college-educated, *ceteris paribus*. In addition to economic and demographic factors, Boertien

et al. (2012) focused on explaining the educational gradient of divorce by characterizing personality traits of different educational groups. Despite that there is a larger negative educational gradient of divorce after controlling for personality traits, they found that higher educated groups have certain personality traits, such as high scores on openness to experience, that contribute to higher divorce risks.

3 Data

The primary data source is the National Longitude Survey of Youth 79 (NLSY79), which surveyed on 12686 men and women who were born between 1958 and 1965. Respondents are interviewed annually between 1979 and 1993 and biannually since 1994¹. NLSY79 participants are surveyed for detailed marital history, post-secondary education, demographic characteristics, as well as geographical residency at different ages², which allows me to explore the association between college education quality and marriage outcomes with depth and precision. Since all the participants are aged between 47 and 54 in 2012, they are old enough to complete education and have rich history of marriage.

The information of post-secondary institutions is taken from publicly accessible Integrated Post-secondary Education Data System (IPEDS), which provides institutional characteristics and directory information. ³. In addition, I utilize the NBER county-distance database to calculate county-by-distance post-secondary education quality for NLSY79 participants, given their county of residence at age 14, 15 and 16⁴.

In NLSY79, 20.32% respondents completed college education or graduate school. Among

¹NLSY79 did not survey on 1987 and 1991

²Detailed education information, such as bachelor degree-granting institution, and geographical information are only provided in the restricted *geocode* data.

³In the main result, I use mean SAT score of entering class, averaged across 2003-2013, as college quality index. In factor analysis, which discussed in the appendix, I use IPEDS 2003 since it is the earliest survey that contains all institutional characteristics that will be used

⁴The majoriry NLSY79 participants reported the county of residence when asked about the county of residence at age 14 in 1979. A few of them provided invalid county information. Therefore, I replace it with the self-reported county of residence from the survey year when they were 14, 15, and 16.

those who obtained Bachelor’s degree, 74.37% did it before age 25.⁵ For the purpose of this article, I restrict the data to people who obtained Bachelor’s degrees or above, which includes 2577 survey participants. Since people who obtained bachelor degree later in life may have different education, career, and family choices than people who finished before age 26, I focus on people who obtained Bachelor’s degree before age 26, which shrinks the sample to 1831 participants. Dropping respondents without college information leaves the sample with 897 participants. Further exclusion of people who have invalid information of county education reduces the sample to 699 participants. Table 1 reports summary statistics for college-educated participants of NLSY79. There are slightly more college-educated females than males, which is consistent with the fact that female college enrollment grows faster than their male counterpart in the past several decades. 78.25% college educated are white, 16.31% are Black, and 5.44% are Hispanic. Average age in 1979 was about 17 years old, across gender and across race and ethnicity. College-educated males have relatively higher AFQT scores than college-educated females, and AFQT scores for college-educated white’s are higher than for college-educated black and Hispanic. On average, 78% NLSY79 college-educated individuals were living with both biological parents from birth to age 18. However, fewer college-educated Black individuals were living with both biological parents than white and Hispanic people, which is consistent with the fact that Black have higher divorce rate and that Black children are more like to have divorced parents.

3.1 Marital Outcomes

NLSY79 surveyed people for detailed marital history, including the begin year of the first, second, and third marriage (if applicable), the end year of first and second marriage (if applicable), as well as age at first marriage. An individual is coded as ever-married if the year of the first, second, or third marriage, or the end year of the first or second marriage is provided. Similarly, an individual is coded as ever-divorced if the year of second or third

⁵There are 95.54% NLSY79 college graduates reported age obtained bachelor degree.

Table 1 Summary Statistics: College Educated in NLSY79

Variables	n	ToTal	Sex		Race		
			Female	Male	White	Black	Hispanic
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sample	699	100%	52.93%	47.07%	78.25%	16.31%	5.44%
Age 1979	699	17.62	17.80	17.39	17.69	17.44	17.25
AFQT	682	70.43	69.17	71.09	75.94	46.59	64.03
Lived With Parents	633	78.28%	78.10%	78.48%	82.63%	55.34%	80.56%
County Median HH Inc	591	17406.45	17485.12	17315.43	17679.74	16212.05	16588.58
<i>Education</i>							
Age Baccalaureate	699	22.65	22.5	22.82	22.59	22.91	22.74
Highest Grade Completed	699	16.89	16.87	16.92	16.85	16.91	17.34
College Quality	699	0.32	0.29	0.35	0.38	0.04	0.37
Average Quality in 25miles	699	0.06	0.08	0.03	0.03	0.07	0.41
<i>Marriage Outcomes</i>							
Ever Married	699	84.54%	85.68%	83.28%	86.47%	76.32%	81.58%
<i>Among Ever Married</i>							
Married before 40	588	98.40%	98.73%	98.53%	98.51%	100%	96.77%
Age at 1st Marriage	587	26.47	26.14	26.86	26.44	26.45	27.09
Number of Marriages	591	1.17	1.17	1.18	1.16	1.26	1.23
Duration of 1st Marriage	580	20.92	21.22	20.56	21.60	17.90	18.87
Ever Divorced	591	27.92%	29.02%	26.64%	24.52%	43.68%	35.48%
Divorced before 40	588	21.60%	21.90%	21.25%	19.11%	34.88%	22.58%
Number of Divorces	591	0.32	0.33	0.32	0.29	0.48	0.42
Divorced 10th Anniversary	582	16.49%	16.61%	16.36%	14.38%	28.24%	16.13%

Notes: add table notes

marriage, or the end year of first or second marriage is reported. In addition, given beginning and ending year of each marriage and the age of each respondent, I can thus measure the numbers of marriage and divorce, age at first divorce, and the duration of first marriage for each participant. Furthermore, it also allows me to measure whether marriage dissolution happened before the 10th anniversary of first marriage, as well as whether one was married or divorced before age 40.

Table 1 contains summary statistics for marital outcomes among college-educated people in NLSY79. 84.54% college-educated individuals of NLSY79 have at least married once. Among the ever-married participants, 98.40% were married before age 40. The average age at first marriage is 26 years old. The average number of marriage and divorce are 1.17 and 0.32, respectively. It is worth noting that number of marriage and divorce are potentially top-coded, since the end of third marriage and the begin of forth and higher order marriages are not surveyed in NLSY79.⁶ However, since higher order of marriages are rarely observed, as in the sample only 2.91% participants married three times, and 5.7% divorced two times, the measurement error caused by top-coding can be trivial. Furthermore, the average duration of first marriage is about 20 years. Nearly 28% ever-married college graduates at least divorced once, 22% did before age 40 and 16% did before the 10th anniversary of first marriage.

College-educated female and male have similar marital outcomes. College-educated females have slightly higher marriage rates than college-educate males, 85.68% and 83.28% respectively. 99% of college-educated female and of male married before age 40. The average age at first marriage for both female and male was 26 years old, and the average duration of first marriage for both gender was about 21 years. College-educated women and men have the same numbers of marriage and divorce on average. 29% college-educated women divorced at least once, compared to 27% of college-educate men. And both genders have

⁶The reason that average number of divorce is smaller than average number of divorce is because those who divorced n times could have n marriages or $n+1$ marriages. Similarly, people who married n times may divorce for $n-1$ or n times. But since NLSY79 only surveyed the first three marriages and first 2 divorces, information about higher order marriages and divorces is not collected. Thus, average number of marriage and divorce could be top-coded.

similar likelihood of divorce before 40 years old as well as before the 10th anniversary of first marriage. College-educated white sampled in NLSY79 have higher marriage rates and lower divorce rates than Black and Hispanic respondents, 86% and 25% respectively. On average, Black and Hispanic respondents have two to three years shorter first marriages than white respondents. Black respondents also have higher probability of marriage dissolution than white and Black before age 40 and in the first 10 years of first marriage.

3.2 College Quality

Starting from 1984, NLSY79 surveyed respondents for the most recent attended colleges. These responses were recorded using the institution's FICE code. I only investigate people who attended 4-year colleges and has completed 16 grades of education or above. The university reported in or reported closest to the year of receiving Bachelor's degree, given that the highest grade completed in the corresponding year is 16th grade, is identified as the Bachelor's degree-granting school. However, if the university of completing the 16th grade is missing, I coded the Bachelor's degree-granting school as the school of completing the 15th grade, which is reported in the year that is closest to the year of completing the 16th grade. This process will provide the most accurate information of degree-granting schools and minimize measurement errors caused by missing data.

Following Zhang (2005), I use the mean SAT scores of entering freshman class as college quality index. Black and Smith (2006) and Black and Smith (2004) use a principle component factor analysis to measure college quality. However, due to data limitation in this study, using SAT score helps to reduce errors caused by missing data. Results using factor analysis are discussed in Appendix.

3.3 Geographic Proximity of High Quality of College Education

In order to identify the causal impact of college education quality on marital outcomes, I employ a traditional instrumental variable technique. To be a valid instrument, the variable

must have a significant direct impact on college quality, while having no effect on marital outcomes except through its effect on college quality. In the return-to-education literature beginning with Card (1993), college proximity has been used as instrument for education attainment. The idea was that having a nearby college lowers the cost of college attendance and thereby encourage students to obtain additional years of education. Following this logic, Long (2008) modify the definition of simple geographic college proximity as geographic accessibility to the quality of college education. He uses the average quality of colleges within a certain radius of an individual as an instrument for the quality of the college at which the individual attends. Similar to Long (2008), I use geographic proximity of higher quality of college education as an instrument for college education quality. Geographic proximity of higher quality of post-secondary education is measured as the quality of the best 4-year colleges within 50 miles of the county of residence of NLSY79 respondents at age 14, 15, and 16. Because there is a cost to attend schools far away from home, students are more likely to attend a school nearby. Therefore, nearby high-quality colleges may reduce the cost of attending a college with high-quality education. Higher geographic proximity to high-quality colleges may influence the decision of some students to attend a high-quality college who otherwise would not. As a result, the geographic proximity to high-quality colleges is likely to be correlated with the quality of the actually degree-granting colleges.⁷

I group individual college in IPEDS into county-level to measure the average 4-year college quality in a county. I then combine the county-level quality data with NLSY79 data by matching counties within certain radius of the county of residence at age 14, 15, and 16 of NLSY79 individuals. Thereby I can calculate the best, as well as the average, college quality within certain radius of one's residential county. Ideally, this approach should be done by zipcode-to-zipcode distance. Unfortunately, NLSY79 restricted geocode data only provide county of residence, which only allows me to calculate for county-to-county distance. The

⁷I also define the geographic proximity to college education within different radius of the residential county, and with different definition, such as the quality of the best 4-year colleges and the average quality of 4-year colleges within 25 miles, as well as the average college quality of 4-year schools within 50 miles. Similar methods are used in factor analysis. Robustness results can be found in Appendix or at request.

data used to calculate county-to-county distance is from the National Bureau of Economic Research (NBER) data collection of county distance database.

As mentioned earlier, I am interested in marriage and education choices of people who completed college education before 25 years old. In Table 1, average age of obtaining Bachelor's degree is about 23 years old, average highest graded completed is 17th grade, across gender, race, and ethnicity. The average quality of Bachelor's degree-granting school, estimated by principle component factor model, in NLSY79 is 0.32, with a range from -2.20 to 3.87. The average college quality of NLSY79 women is 0.06 points lower than men, 0.29 and 0.36 respectively. It is interesting to notice that Black respondents have much lower average college quality than white and Hispanic. The geographic proximity of college education among NLSY79 respondents is 0.06, with a range from -1.71 to 1.75.

Table 2 reports county-level characteristics and marital outcomes by college education quality of college-educated NLSY79 individuals. People with higher college quality tend to live in richer counties than people with lower quality, as the county median household income is about \$18K for the top 25% and \$17K for the bottom 25%. This indicates the importance of controlling county wealth since people who attended better schools are more likely from richer counties that can provide more educational resources and information than people who attended worse schools. Without controlling for county wealth may result in omitted variable bias.

Geographic proximity of college education varies a lot from lower quartile of education quality to the upper ones. The average college quality within 25 miles of the residential county of the bottom 25% college-educated individuals is 0.4 lower than that of the upper 25%, which indicates that individual college quality may be positively correlated with geographic proximity of college education. Marriage rate is similar across people with different education quality. Around 87% people whose college education quality is between median and the third quartile have married at least once; the upper 25% have the lowest marriage rate among the four groups, which is 82%. However, higher-quality-educated people have lower divorce rate,

are less likely to divorce before age 40, and have fewer numbers of marriage and divorce. The divorce rate of people whose education quality falls into the bottom 25% is around 13% higher than those whose education quality is among the top 25%. The bottom 25% people also have the highest probability of divorce before age 40 and divorce before the 10th anniversary of the first marriage, 27% and 20% respectively.

Table 2 Summary Statistics by Education Quality: College Educated in NLSY79

	College Education Quality			
	Bottom 25 pctile (1)	25-50 pctile (2)	50-75 pctile (3)	Upper 75 pctile (4)
County Median HH Inc	16856.08	16977.8	17599.28	18096.3
Average Quality in 25 miles	-0.14	0	0.12	0.26
Ever Married	85%	84.48%	87.13%	81.61%
<i>Among Ever Married</i>				
Married before 40	99.34%	99.32%	98.6%6	97.16%
Age at 1st Marriage	26.03	26.10	26.17	27.65
Number of Marriages	1.26	1.20	1.15	1.08
Duration of 1st Marriage	20.02	20.98	21.67	21.01
Ever Divorced	33.33%	31.29%	26.17%	20.42%
Divorced before 40	26.97%	23.97%	22.15%	12.77%
Number of Divorces	0.39	0.39	0.29	0.23
Divorced 10th Anniversary	19.87%	15.38%	18.37%	12.06%

Notes: add table notes

4 The Relationship between College Education Quality and Marital Outcomes

I begin the analysis with a simple strategy to describe the relationship between education quality and marriage outcomes. Considering the following regression equation:

$$y = \delta^{OLS} EQ + X\beta + \epsilon_{ols} \quad (1)$$

where y represents one of several measurements of marital outcomes. EQ is the education quality, X represents a vector of control variables, and ϵ_{ols} is a residual. X includes basic demographic characteristics, such as race, gender, and age. I also include whether lived with both biological parents from birth to age 18 to control for the potential impact of parental relationship on children's outcomes. AFQT, the Armed Forces Qualification Test, is included to control for cognitive skills that are not captured by education and education quality. Highest grade complete is included in X as some college graduates attended graduate schools. County-level median household income is included to capture differences in county wealth, which, as mentioned earlier, differs across people with different choice of college. As discussed below, δ^{OLS} is undoubtedly an inconsistent estimator for the causal effect of education quality on marital outcomes. Despite this, it is well suited for illustrating the strong correlation between education quality and marriage.

Table 3 shows the relationship between college education quality and marriage outcomes. The coefficients of college quality reflect the changes in marital outcomes associated with one unit increase of college education quality, which can be interpreted as moving up from Hobart William Smith Colleges to George Washington University. College quality is negatively associated with likelihood of marriage as well as being married before age 40. In addition, people who graduated from better college tend to delay marriage to older ages, and have fewer numbers of marriage. For instance, people who graduated from George Washington University are nearly 0.01 percentage points less likely to be married and married before age 40, have 6% fewer numbers of marriage, and tend to married 0.6 years later than those who graduated from Hobart William Smith College. These are consistent with Lefgren and McIntyre (2006)'s findings that beyond high school, education is associated with reductions in probability of marriage.

Furthermore, I test the relationship between college education quality and characteristics of divorce and report the results in Table 4. College quality have strong correlation with divorce. Table 4 shows that higher college quality is associated with higher marital stability,

Table 3 The Relationship between College Education Quality and Characteristics of Marriage

	Dependent Variable				
	Ever Married (1)	Married before 40 (2)	Age at 1st M (3)	Num. of M (4)	Duration 1st M (5)
College Quality	-0.0115 (0.0152)	-0.0128* (0.00741)	0.684*** (0.202)	-0.0691*** (0.0179)	0.320 (0.397)
Hispanic	-0.00348 (0.0609)	-0.0110 (0.0301)	0.266 (0.898)	0.0585 (0.0765)	-1.732 (1.618)
Black	-0.0980* (0.0539)	0.0258* (0.0146)	-0.640 (0.595)	0.152** (0.0701)	-2.547* (1.375)
Male	0.0177 (0.0282)	0.000569 (0.0103)	-0.584 (0.386)	-0.00362 (0.0372)	0.140 (0.754)
With Parents	-0.000316 (0.0355)	0.0163 (0.0164)	0.745 (0.500)	0.00224 (0.0490)	-0.261 (1.026)
Age	0.205* (0.108)	-0.00537 (0.0376)	1.508 (1.467)	0.0252 (0.138)	-1.937 (2.753)
Age ²	-0.00603** (0.00304)	0.000231 (0.00100)	-0.0473 (0.0407)	-0.000788 (0.00393)	0.0789 (0.0782)
AFQT	0.000867 (0.000844)	0.000307 (0.000333)	-0.0353*** (0.0117)	0.00221* (0.00113)	0.0272 (0.0222)
HGC	0.00640 (0.0102)	-0.00205 (0.00385)	0.276* (0.151)	0.0125 (0.0150)	-0.237 (0.268)
Med HH Inc (log)	0.0348 (0.0740)	-0.0106 (0.0155)	2.347** (0.935)	0.0123 (0.0901)	-2.459 (1.932)
Observations	648	549	548	552	542
Ever-married		✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

and fewer numbers of divorce, which is consistent with findings on numbers of marriage. To understand this relationship intuitively, people who graduated from George Washington University are 0.05 percentage points less likely to divorce and divorce before age 40, are 0.03 percentage points less likely to divorce before the 10th anniversary of first marriage, and have 22% fewer numbers of divorce. While it is hard to ascribe a causal interpretation to the results, the findings from Table 3 and 4 provide evidence that, among all college graduates, marriage outcomes are highly associated with the quality of post-secondary college education.

5 What Explains the Correlation between College Education Quality and Marital Outcomes?

There is reason to believe that at least some of the correlation between education quality and marriage outcomes may be causal. People may meet their future spouses as they attend high school or college (Goldin, 1992; Pencavel, 1999). In addition, education may change their social circles, and allow them to meet high quality candidates of spouse. In this article, every subject has obtained a college degree. Therefore, in both way, people who graduated from better colleges may marry with higher-quality individuals than people who graduated from lower ranked schools. In addition, better college education may prepare students for both labor market and marriage market better than the worse ones. Therefore, better-college-educated people may have some personality traits that make them attractive to their dating partners, may better handle relationships and deal with conflicts, and are capable of optimizing utility in a marriage. Additionally, people who graduated from top-ranked school may be more popular in the marriage market, allowing them to find someone that is the best match.

The impact of college education quality on marital outcomes can be plausibly operated through these channels. There multiple factors driving the relationship between post-secondary college education quality and marriage outcomes obscure the causal relationship. A simple

Table 4 The Relationship between College Education Quality and Characteristics of Divorce

	Dependent Variable			
	Ever Divorced (1)	Divorced before 40 (2)	Num. of D (3)	Divorce before 10 th year (4)
College Quality	-0.0459** (0.0202)	-0.0516*** (0.05)	-0.0655*** (0.0252)	-0.0332* (0.0171)
Hispanic	0.0952 (0.0896)	0.0215 (0.0785)	0.126 (0.115)	0.0347 (0.0717)
Black	0.175** (0.0690)	0.167** (0.0686)	0.198** (0.0872)	0.149** (0.0632)
Man	0.0166 (0.0382)	0.0143 (0.0359)	0.00983 (0.0480)	0.00464 (0.0321)
With Parents	-0.0348 (0.0500)	-0.0407 (0.0490)	-0.0313 (0.0637)	0.00678 (0.0432)
Age	0.150 (0.138)	0.0923 (0.129)	0.169 (0.182)	0.177 (0.119)
Age ²	-0.00410 (0.00389)	-0.00267 (0.00365)	-0.00449 (0.00520)	-0.00496 (0.00337)
AFQT	0.000394 (0.00111)	0.00107 (0.00109)	0.00101 (0.00149)	0.000533 (0.000942)
HGC	0.00400 (0.0152)	-0.00204 (0.0136)	0.00673 (0.0196)	-0.00110 (0.0118)
Med HH Inc (log)	0.0308 (0.0927)	-0.0277 (0.0864)	0.0536 (0.122)	0.0336 (0.0795)
Observations	552	538	552	544
Ever-married	✓		✓	✓
Ever-married before 40		✓		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* add table notes

examination is not enough to truly uncover the causal relationship between education quality and marriage outcomes. Many unobservable factors that affect marriage outcomes as well as educational preference are uncontrollable. As stated in Lefgren and McIntyre (2006), individual's intelligence, appearance, and attractiveness could be correlated with both marriage and education outcomes. A person with high intelligence are more likely to be admitted by higher ranked universities; high intelligence, at the same time, may improve their marriage prospect. The estimated impact of education quality on marriage outcome, without controlling for intelligence, would be upward biased. Individual attractiveness, on the other hand, could reduce the investment in education while increase the popularity in marriage market. Thus, the estimated effect of quality is downward biased. Unfortunately, it is difficult to observe and thereby to fully control one's intelligence and attractiveness. These unobserved factors will bias OLS estimates of the impact in an indeterminate direction. Instrumenting for education quality can attenuate this problem as long as the instrument affects individual's education choice but have no independent impact on marriage outcomes. Oreopoulos (2006), Angrist and Krueger (1990), Pischke and Von Wachter (2008) use changes in compulsory schooling laws as an instrument to estimate the impact of compulsory schooling on earnings. This approach will not work in this context, because I only focus on the post-secondary education, which is not illustrated by these laws. Family background is not a valid instrument since it also affects marriage outcomes. Instead, I include in the analysis whether lived with both biological parents before age 18, as a proxy for family background.⁸ Another popular used strategy is to use birth quarter as instrument. Unfortunately, this is not a appropriate strategy for our purpose since it influences mainly secondary education, according to literature in return-to-education research (Angrist and Krueger, 1990; Lefgren and McIntyre, 2006).

In the rest of this article, following similar strategies that have been used in Card (1993) and Long (2008), I introduce an Instrument Variable(IV) strategy to provide evidence regarding the causal effect between post-secondary college education quality and marriage

⁸Unfortunately, information about parents' income is not available in NLSY79.

outcomes for people whose college education quality are affected by the geographic proximity to college education before they made the choice of college.

6 College Proximity Evidence Regarding the Causal Effect of Post-Secondary Education Quality on Marriage Outcomes

To implement the geographic-proximity-to-college-education identification strategy, I specify the following second stage equation:

$$y = \delta^{IV} EQ + X\beta + \epsilon_{iv} \quad (2)$$

where y represents measurement of marital outcomes, EQ is education quality, and X represents a vector of control variables and ϵ_{iv} is a residual that is distinguished from residual of OLS. In this framework, δ^{IV} represents the causal effect of marginal effect of graduating from college with a unit higher quality on future marriage outcomes. Because the OLS weights observations differently from IV, the resulting coefficients need not be similar.

To deal with correlation between error term and education, I specify the following first-stage equation:

$$EQ = \alpha GPCE + X\beta' + e \quad (3)$$

where $GPCE$ is the geographic proximity of college education and e is the residual term. It is possible that living close to a high quality college increases the probability of attending a better college; meanwhile, a valid IV should not directly affect the marriage stability. Previous studies suggested that potential source of pressure on a marriage may come from the social structure of the community in which the couple resides. However, this should not be a

concern since the geographic location in the context is defined as the place of residency at age 14 to 16, during which subjects of interest were less likely to have married. Nonetheless, counties that have access to better college education may be wealthier than their counterparts. Therefore, people came from these counties may be more likely to come from families with richer parents. However, parents' income is not available in NLSY79. Instead I include county median household income as a proxy for family income.

6.1 Correlation between Geographic Proximity of College Education and Post-Secondary Education Quality

Before describing the IV estimates, I document the relationship between county-level post-secondary college quality and individual college quality in my sample. Table ?? gives a brief description on education quality across states.⁹ People lived in states such as Rhode Island, Massachusetts, and Washington have advantages to access to better post-secondary college education. Particularly, living in Rhode Island is correlated with higher proximity to better college education than other states. States like Oklahoma, Oregon, South Carolina, Georgia and Vermont do not have advantage in post-secondary education. This is consistent with the fact that wealthier states tend to spend more on education and thereby their residents have advantages to access to better education resources.

The relationship between county and individual college quality is presented in Table 6. Living in a county that has geographic advantage of accessing to higher quality of college education enhance the likelihood of attending better colleges. For example, a nearby good 4-year college may reduce the cost of attending a good college; it may also provide pre-college courses and other activities for high school students. Student have opportunities to meet professors and scholars. High school may invite speakers from nearest colleges to give a talk. Since they have chance to reach out for resources from universities or colleges nearby, living close to a good college is essential for student's choice of college. Particularly, for those who

⁹North Dakota is omitted since the only observation of ND is missing; Alaska is dropped due to collinearity.

Table 5 College Quality by State

Dependent Variable: College Quality					
AL	1.624*** (0.0965)	LA	0.584** (0.243)	OK	-0.289*** (0.1000)
AZ	-0.136 (0.212)	MD	1.170*** (0.325)	OR	-0.399 (0.487)
AR	0.271 (0.407)	MA	2.043*** (0.170)	PA	1.803*** (0.145)
CA	1.448*** (0.123)	MI	0.918*** (0.249)	RI	3.063*** (0.0965)
CO	0.477* (0.279)	MN	0.657*** (0.221)	SC	-0.262 (0.178)
CT	1.305*** (0.153)	MS	0.566* (0.300)	SD	0.691** (0.287)
DC	1.213*** (0.0965)	MO	0.616*** (0.135)	TN	0.00266 (0.224)
FL	0.275 (0.215)	MT	1.200*** (0.105)	TX	0.709*** (0.148)
GA	-0.0182 (0.205)	NE	1.488*** (0.0965)	UT	0.196 (0.148)
IL	0.951*** (0.191)	NJ	1.132*** (0.154)	VT	-0.220** (0.0965)
IN	0.0988 (0.285)	NM	1.206*** (0.0965)	VA	0.622 (0.724)
IA	0.744** (0.341)	NY	1.510*** (0.131)	WA	1.848*** (0.117)
KS	0.822*** (0.0965)	NC	0.297* (0.170)	WV	0.464** (0.198)
KY	1.258*** (0.129)	OH	0.842*** (0.167)	WI	0.603** (0.0965)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

are indifferent between attending good college or bad college, living close to a good college will encourage these students receiving good college education, whereas otherwise they would not receive. Notice that living with both biological parents from birth to 18 years has no impact on college choices.

Table 6 Correlation between College Education Quality and Geographic Proximity of College Education (First-Stage of IV Estimates)

Dependent Variable: College Education Quality					
Independent Vars:	Geographic Proximity	Med. HH Income (log)	HGC	AFQT	With Parents
	0.3945*** (0.0628)	0.2598 (0.2086)	0.0484 (0.0313)	0.0148*** (0.0019)	0.0354 (0.0952)
Independent Vars:	Age	Age ²	Male	Black	Hispanic
	-0.1892 (0.2463)	0.0037 (0.0069)	-0.0019 (0.0692)	0.0943 (0.1171)	0.0645 (0.1668)

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

6.2 Estimates of the Effect of College Education Quality on Marriage Outcomes

Having shown that geographic proximity to high quality of college education is indeed correlated with one's choice of college, I will next describe the results from the IV estimation strategy. The IV estimates of the effects of college education quality on marital outcomes are reported in Table 7 and 8. The F-statistics of the first stage are above 10, suggesting that the bias due to over-fitting in the first stage is minimal. Results in Table 7 show that people with higher quality of college education are less likely to be married, and tend to delay marriage to older ages. One unit increase in college quality, which intuitively corresponds to moving up from Hobart William Smith Colleges to George Washington University, reduces the likelihood of marriage by 21.1 percentage points, which is equivalent to 25% decreases in the likelihood of marriage on average. One unit increase in college quality also reduces

the likelihood of marriage before age 40 and increases age at first marriage by 3 years. In addition, people with one unit higher quality of college education have 0.2 fewer numbers of marriage, which is 17% reduction in numbers of marriage on average, than people with lower college quality. Higher college quality is associated with more sustainable first marriage—first marriage lasts 1.6 years longer when college quality increases by 1 unit; however, it is not precisely estimated. The negative association between education quality and marriage rate is consistent with the literature. Gary et al. (1981) argued that the gain from marriage market is reduced when women’s labor market participation and earnings increase. Thus, marriage becomes less appealing when income goes up, *ceteris paribus*. As college quality is a reasonable proxy to estimate the gain from labor market, one would predict that marriage is less popular among people with higher quality of college education. Indeed, by studying the marriage patterns of American women, Bloom and Bennett (1990) found that the increasing economic independence of women is associated with postponed marriage as well as lower probability of marriage.

Table 8 presents the estimates of the effect of college quality on divorce. The results show that the increasing college quality, though discourage entry into marriage, leads to an increase in marital stability. One unit increase in college quality leads to a decline in marriage dissolution by 19.3 percentage points, which is equivalent as 69% decrease in the probability of divorce on average. Better college education is also associated with fewer marital disruption before age 40, conditional on ever married before 40, though the estimate is not statistically significant. People who received better education also have 16.2 percentage points lower divorce hazard in the first 10 years of first marriage than people whose quality of college education is one unit lower. Additionally, better education quality decreases numbers of divorce by 27.6 percentage points, which could be attributed to lower likelihood of remarriage. These findings are also consistent with most of the education attainment literature. However, conditional on completing college education, higher education attainment does not affect marriage outcomes. The number of people who have at least a 4-year college degree has

Table 7 The Causal Effect of College Education Quality on Marriage

	Dependent Variable				
	Ever Married (1)	Married before 40 (2)	Age at 1st M (3)	Num. of M (4)	Duration 1st M (5)
College Quality	-0.211*** (0.0772)	-0.0381* (0.0222)	3.060** (1.198)	-0.201* (0.116)	1.570 (2.268)
Hispanic	0.0430 (0.0712)	-0.00497 (0.0318)	-0.298 (1.054)	0.0908 (0.0774)	-2.032 (1.638)
Black	-0.0655 (0.0605)	0.0297* (0.0159)	-1.008 (0.683)	0.178** (0.0713)	-2.739** (1.376)
Male	0.0192 (0.0311)	0.00150 (0.0105)	-0.673 (0.426)	0.0000225 (0.0378)	0.0787 (0.759)
With Parents	0.00365 (0.0412)	0.0155 (0.0161)	0.819 (0.544)	-0.00432 (0.0498)	-0.238 (1.024)
Age	0.183 (0.118)	-0.00584 (0.0385)	1.549 (1.599)	0.0179 (0.142)	-1.927 (2.731)
Age ²	-0.00567* (0.00330)	0.000213 (0.00103)	-0.0457 (0.0446)	-0.000733 (0.00400)	0.0801 (0.0777)
AFQT	0.00400*** (0.00154)	0.000709 (0.000454)	-0.0731*** (0.0223)	0.00437** (0.00216)	0.00749 (0.0416)
HGC	0.0169 (0.0132)	-0.000409 (0.00416)	0.123 (0.183)	0.0207 (0.0173)	-0.315 (0.305)
Med HH Inc (log)	0.154 (0.0995)	0.00835 (0.0204)	0.566 (1.375)	0.114 (0.122)	-3.386 (2.428)
F-statistic of instrument	13.31	11.51	11.51	11.75	11.23
Observations	648	549	548	552	542
Ever-married		✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* add table notes

Table 8 The Causal Effect of College Education Quality on Divorce

	Dependent Variable			
	Ever Divorced (1)	Divorced before 40 (2)	Num. of D (3)	Divorce before 10 th year (4)
College Quality	-0.193* (0.116)	-0.114 (0.118)	-0.276* (0.156)	-0.162* (0.0957)
Hispanic	0.131 (0.0934)	0.0358 (0.0799)	0.178 (0.117)	0.0672 (0.0749)
Black	0.205*** (0.0697)	0.178** (0.0692)	0.241*** (0.0863)	0.175*** (0.0650)
Male	0.0206 (0.0393)	0.0187 (0.0366)	0.0157 (0.0502)	0.0101 (0.0333)
With Parents	-0.0421 (0.0518)	-0.0401 (0.0486)	-0.0418 (0.0668)	0.00163 (0.0447)
Age	0.142 (0.139)	0.0902 (0.129)	0.157 (0.184)	0.174 (0.122)
Age ²	-0.00404 (0.00392)	-0.00268 (0.00363)	-0.00440 (0.00520)	-0.00499 (0.00344)
AFQT	0.00280 (0.00217)	0.00205 (0.00210)	0.00447 (0.00285)	0.00264 (0.00183)
HGC	0.0131 (0.0176)	0.00124 (0.0151)	0.0198 (0.0231)	0.00657 (0.0140)
Med HH Inc (log)	0.144 (0.126)	0.0173 (0.117)	0.216 (0.164)	0.133 (0.109)
F-statistic of instrument	11.75	10.65	11.75	11.63
Observations	552	538	552	544
Ever-married	✓		✓	✓
Ever-married before 40		✓		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

increased dramatically, and more and more people now have college education. Therefore, it becomes more important to understand the role played by college education quality in a marriage. Findings in Table 7 and 8 provide substantial evidence of how marriage outcomes are affected by college education quality.

6.3 The Effect of College Quality on Marriage Outcomes by Gender and Race

Many studies have focused on explaining women's education attainment and marriage outcomes (Isen and Stevenson, 2010; Boertien and Härkönen, 2014; Lefgren and McIntyre, 2006). According to Becker's economic model of family, women are more likely to be the one who choose between supply home production and labor production. Thus, education and economic independence are essential for women when making marriage decisions. Previous studies, such as Sweeney and Phillips (2004) and Phillips and Sweeney (2006), have shown the racial and ethnic variation in marital disruption. African-Americans have higher rates of marital dissolution than other racial and ethnic groups. However, after restricting my sample to people who completed college education before age 25, there are only a small number of African-American and Hispanic survey respondents in my sample. Thus, in order to show the gender and racial differences in the impact of college education on marriage outcome, I estimate equation 2 for female, male, and white respondents separately. Results for male and white respondents are presented in Appendix.

In Table 9 and 10, the impact of female college quality on marriage outcomes are close to the main findings. However, due to a smaller sample size, most of them are not precisely estimated. Better educated female have lower probability of marriage, will postpone to enter a marriage, and have more stable marriages. Compare to their male counterparts, whose results are reported in Appendix Table 11 and 12, college education quality appears to have bigger impact on female marriage outcomes than male's, as the point estimates are greater for female than male, though they are not statistically significant for male. The small sample size

of NLSY79 disable me to further investigate the gender differences in college education quality. Admittedly, a larger dataset with enriched marriage and college education information is needed to provide more accurate evidence for this question.

Table 9 The Causal Effect of **Female** College Education Quality on Marriage

	Dependent Variable				
	Ever Married (1)	Married before 40 (2)	Age at 1st M (3)	Num. of M (4)	Duration 1st M (5)
College Quality	-0.286** (0.114)	-0.0122 (0.0112)	4.012** (1.726)	-0.187 (0.159)	1.996 (3.143)
Hispanic	-0.166 (0.113)	0.0205 (0.0131)	-0.445 (1.599)	0.208* (0.122)	-3.303 (2.468)
Black	-0.218** (0.0946)	0.0328 (0.0239)	-0.609 (1.252)	0.0347 (0.0764)	-2.973 (1.867)
With Parents	-0.0163 (0.0594)	0.00276 (0.0187)	0.772 (0.867)	0.000488 (0.0612)	-0.153 (1.443)
Age	0.211 (0.176)	0.00889 (0.0600)	2.829 (2.503)	0.146 (0.185)	-0.190 (3.999)
Age ²	-0.00680 (0.00492)	-0.000114 (0.00161)	-0.0830 (0.0692)	-0.00409 (0.00523)	0.0290 (0.113)
AFQT	0.00363 (0.00226)	0.000411 (0.000455)	-0.0686** (0.0342)	0.00356 (0.00298)	-0.00960 (0.0593)
HGC	0.0150 (0.0208)	0.00990* (0.00539)	-0.170 (0.306)	0.0399* (0.0234)	-0.687 (0.424)
Med HH Inc (log)	0.246* (0.147)	-0.00753 (0.0248)	-0.854 (2.188)	0.0562 (0.176)	-1.922 (3.558)
Observations	341	291	291	292	288
Ever-married		✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

The impact of college quality on marriage outcomes for white respondents are reported in Appendix Table 13 and 14. Similar to what have found in the main result, better educated white people are 26 percentage points less likely to enter a marriage and 5.8 less likely to

Table 10 The Causal Effect of **Female** College Education Quality on Divorce

	Dependent Variable			
	Ever Divorced (1)	Divorced before 40 (2)	Num. of D (3)	Divorce before 10 th year (4)
College Quality	-0.213 (0.166)	-0.161 (0.154)	-0.355 (0.236)	-0.175 (0.138)
Hispanic	0.267* (0.151)	0.150 (0.123)	0.369* (0.197)	0.0718 (0.111)
Black	0.207** (0.0950)	0.129 (0.0956)	0.231** (0.115)	0.180** (0.0856)
With Parents	-0.0395 (0.0716)	-0.0588 (0.0671)	-0.0469 (0.0906)	0.00494 (0.0598)
Age	0.109 (0.204)	0.0461 (0.191)	0.0491 (0.272)	0.0892 (0.180)
Age ²	-0.00271 (0.00572)	-0.00129 (0.00535)	-0.000887 (0.00765)	-0.00247 (0.00509)
AFQT	0.00281 (0.00313)	0.00197 (0.00289)	0.00514 (0.00416)	0.00233 (0.00259)
HGC	0.0504* (0.0257)	0.0210 (0.0231)	0.0790** (0.0353)	0.0255 (0.0202)
Med HH Inc (log)	0.118 (0.184)	-0.0214 (0.169)	0.262 (0.253)	0.142 (0.158)
Observations	292	285	292	289
Ever-married	✓		✓	✓
Ever-married before 40		✓		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

enter before age 40 than their counterparts whose college quality is one unit lower. Better educated white college graduates will delay entering the first marriage by 4 years. And among those who are ever married, college quality is negatively associated with divorce hazard at any point in life, though the point estimates in Table 14 are not precisely estimated due smaller sample size.¹⁰

7 Conclusion

This paper investigates the impact of college education quality on marriage outcomes. Previous studies mainly focused on identifying the educational gradient of marriage and divorce, and ignored the influence of education quality on marriage outcomes. The evidence in this article suggests that better college education is an important predictor for lower probability of marriage, marriage at older ages, and more stable marriage. As more and more people nowadays have completed college education, findings in this article provide helpful insights to understand the trends of marriage and divorce.

I provide evidence regarding the causal impact of quality of college education on marriage outcomes using a geographic proximity of college education identification strategy. I find that the quality of college education is highly negatively associated with marriage stability. By studying people who completed college education before age 25 in NLSY79, I find that the geographic proximity of college education is correlated with one's college education quality—living in a county where the average college quality within 25 miles is higher is positively associated with higher quality of college education. The IV estimates suggests that higher college quality statistically significantly improves marriage stability and prolong the length of first marriage; however, it also decreases the likelihood of marriage.

While this article presents evidence regarding the importance of college quality on marriage outcomes, there are still shortages of this study. Due to data limitation, the instrumental

¹⁰However, I can not reject the hypothesis that the point estimates in Table 8 and 14 are significantly different from each other.

variable is calculated based on a county-to-county distance, while a city-to-city calculation is preferred. Also, this article can not further investigate the differences by gender and by race and ethnicity. According to the literature, education appears to have larger impact on women's marriage than men's. Further attempts to address the heterogeneity of the impact of college education would be welcome. In addition, whether there are other avenues that connect marriage and college quality needs to be further investigated. In spite of these, this article provides a novel perspective to examine the relationship between college education and marriage outcomes.

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A Appendix

Table 11 The Causal Effect of **Male** College Education Quality on Marriage

	Dependent Variable				
	Ever Married (1)	Married before 40 (2)	Age at 1st M (3)	Num. of M (4)	Duration 1st M (5)
College Quality	-0.152 (0.0996)	-0.0659 (0.0447)	2.199 (1.501)	-0.204 (0.166)	0.990 (3.152)
Hispanic	0.194* (0.100)	0.00153 (0.0577)	-0.191 (1.540)	0.0363 (0.122)	-0.626 (2.568)
Black	0.0975 (0.0731)	0.0239 (0.0193)	-1.458* (0.746)	0.322*** (0.112)	-2.407 (1.950)
With Parents	0.0432 (0.0595)	0.0150 (0.0251)	1.074 (0.715)	-0.0415 (0.0801)	-0.578 (1.441)
Age	0.0887 (0.161)	0.00867 (0.0449)	0.334 (2.046)	-0.111 (0.207)	-3.945 (3.686)
Age ²	-0.00279 (0.00450)	-0.000190 (0.00124)	-0.0118 (0.0574)	0.00274 (0.00578)	0.140 (0.105)
AFQT	0.00436** (0.00208)	0.000779 (0.000748)	-0.0671** (0.0277)	0.00393 (0.00324)	0.0183 (0.0594)
HGC	0.0174 (0.0165)	-0.00977 (0.00648)	0.435* (0.223)	0.00649 (0.0248)	-0.0726 (0.419)
Med HH Inc (log)	0.0478 (0.144)	0.0196 (0.0315)	1.650 (1.585)	0.175 (0.165)	-4.616 (3.175)
Observations	307	258	257	260	254
Ever-married		✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

Table 12 The Causal Effect of **Male** College Education Quality on Divorce

	Dependent Variable			
	Ever Divorced (1)	Divorced before 40 (2)	Num. of D (3)	Divorce before 10 th year (4)
College Quality	-0.167 (0.153)	-0.0591 (0.178)	-0.191 (0.189)	-0.150 (0.131)
Hispanic	0.0432 (0.130)	-0.0816 (0.121)	0.0229 (0.147)	0.0769 (0.119)
Black	0.202** (0.0993)	0.219** (0.0991)	0.247** (0.126)	0.167* (0.0965)
With Parents	-0.0607 (0.0775)	-0.0170 (0.0718)	-0.0445 (0.0998)	-0.0103 (0.0690)
Age	0.205 (0.193)	0.133 (0.182)	0.305 (0.242)	0.277 (0.170)
Age ²	-0.00613 (0.00539)	-0.00403 (0.00512)	-0.00891 (0.00680)	-0.00797* (0.00475)
AFQT	0.00248 (0.00297)	0.00182 (0.00303)	0.00316 (0.00386)	0.00289 (0.00270)
HGC	-0.0168 (0.0226)	-0.00960 (0.0198)	-0.0289 (0.0283)	-0.0119 (0.0188)
Med HH Inc (log)	0.157 (0.169)	0.0615 (0.159)	0.142 (0.205)	0.118 (0.150)
Observations	260	253	260	255
Ever-married	✓		✓	✓
Ever-married before 40		✓		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Notes: add table notes

Table 13 The Causal Effect of **White** College Education Quality on Marriage

	Dependent Variable				
	Ever Married (1)	Married before 40 (2)	Age at 1st M (3)	Num. of M (4)	Duration 1st M (5)
College Quality	-0.260*** (0.0927)	-0.0589* (0.0332)	4.174** (1.642)	-0.281* (0.161)	0.649 (2.889)
Male	0.0662* (0.0360)	-0.00470 (0.0132)	-0.298 (0.551)	0.0334 (0.0456)	-0.0832 (0.890)
With Parents	0.0379 (0.0501)	0.0111 (0.0190)	0.945 (0.664)	0.00826 (0.0623)	-0.769 (1.242)
Age	0.0184 (0.130)	0.00636 (0.0466)	1.144 (1.937)	0.0838 (0.168)	-3.018 (2.967)
Age ²	-0.00114 (0.00365)	-0.0000926 (0.00125)	-0.0383 (0.0537)	-0.00279 (0.00468)	0.114 (0.0841)
AFQT	0.00460*** (0.00164)	0.000785 (0.000621)	-0.0652** (0.0292)	0.00534** (0.00264)	0.0128 (0.0485)
HGC	0.0334* (0.0173)	0.00605 (0.00493)	-0.294 (0.267)	0.0418* (0.0248)	-0.195 (0.412)
Med HH Inc (log)	0.170 (0.112)	0.0242 (0.0305)	0.272 (1.815)	0.0886 (0.151)	-1.772 (2.832)
Observations	510	442	441	444	437
Ever-married		✓	✓	✓	✓

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* add table notes

Table 14 The Causal Effect of **White** College Education Quality on Divorce

	Dependent Variable			
	Ever Divorced (1)	Divorced before 40 (2)	Num. of D (3)	Divorce before 10 th year (4)
College Quality	-0.178 (0.147)	-0.125 (0.159)	-0.300 (0.205)	-0.157 (0.123)
Male	0.00624 (0.0443)	0.00676 (0.0426)	0.00169 (0.0586)	-0.000754 (0.0377)
With Parents	-0.0235 (0.0597)	-0.0406 (0.0573)	-0.0316 (0.0802)	-0.0165 (0.0515)
Age	0.220 (0.154)	0.202 (0.142)	0.243 (0.213)	0.260** (0.131)
Age ²	-0.00626 (0.00432)	-0.00571 (0.00398)	-0.00691 (0.00597)	-0.00735** (0.00368)
AFQT	0.00236 (0.00248)	0.00163 (0.00254)	0.00455 (0.00337)	0.00253 (0.00216)
HGC	0.0307 (0.0234)	0.0166 (0.0212)	0.0402 (0.0324)	0.00778 (0.0188)
Med HH Inc (log)	0.0664 (0.146)	-0.0392 (0.144)	0.109 (0.193)	0.0821 (0.125)
Observations	444	433	444	438
Ever-married	✓		✓	✓
Ever-married before 40		✓		

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ *Notes:* add table notes