

THE DIFFERENTIAL IMPACT OF COLLEGE ON BECOMING A SINGLE PARENT*

EXTENDED ABSTRACT
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ABSTRACT

Individuals from disadvantaged backgrounds are more likely to form single parent families. Single parent family status is associated with a range of disadvantaged life outcomes. Some research suggests that college decreases fertility for students who are unlikely to attend and complete a college education. In this study, we examine the differential effects of college completion on becoming a single parent. Using data from NLSY, we apply machine-learning models to determine which subpopulations experience the largest effects. We find large negative effects of college completion on ever being a single parent and the proportion of time spent as a single parent for students with a low propensity to complete college. Students on the margin are thus those for whom college significantly circumvents family disadvantage.

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Overview

Literature on family inequality shows that family structure is a mechanism through which inequality is reproduced (Cherlin & Chamrathirong 1988; Raley & Bumpass 2003; McLanahan & Percheski 2008; McLanahan 2009). Individuals from disadvantaged backgrounds are more likely to be born into less stable family structures such as single parent families and more likely to experience family transitions than their more affluent peers (Raley & Bumpass 2003; McLanahan & Percheski 2008; McLanahan 2009). While those who are disadvantaged express desire to marry, they are more likely to have non-marital births and less likely to enter marital unions due to both social and economic barriers to marriage (Edin & Reed 2005). Those on the margins who do form unions, however, are simultaneously more susceptible to union dissolution and less likely to be able to afford the costs associated with divorce (Smock, Manning, Gupta 1999). The costs of family instability and single parenthood have also been shown to affect children's non-cognitive outcomes (Fomby & Cherlin 2007; McLanahan 2009). Increases in assortative mating along educational lines exacerbate these inequalities because individuals are more likely to form unions with partners with similar levels of education. This creates social distance between those at the top and the bottom of the educational distribution and increases income inequality at large (Schwartz & Mare 2005; Breen & Salazar 2011). Thus, the consequences of family instability and single parenthood have far reaching implications for individuals, families, and social inequality, and it is important to better understand the factors that may help circumvent these patterns of family inequality. Given evidence that college decreases fertility for those on the margin (Brand & Davis 2011), we examine the effects of college completion on likelihood of experiencing single parenthood.

Brand and Davis (2011) showed through propensity modeling that attending and completing college in a timely manner has stronger effects on decreased fertility for women who have a lower likelihood of completing college than high propensity women. We extend their analysis in order to examine whether the effects of college on one's likelihood for experiencing single parenthood differ by one's propensity to complete college.

Data and Methods

We use data from the National Longitudinal Survey of Youth (NLSY). The NLSY is a nationally representative sample of 12,686 respondents who were 14 to 22 years old when first surveyed in 1979; these individuals were interviewed annually through 1994 and biennially thereafter. Our sample was restricted to individuals who were 14-17 years old at the baseline survey in 1979 ($n = 5,582$) and who had completed at least the 12th grade ($n = 4,548$). These sample restrictions were set to ensure that all variables used to predict college were measured prior to college, particularly ability, and to compare college completers to those who completed at least a high school education. About 22 percent of the sample completed college by age 30. A little less than 29 percent of those who do not complete by age 30 attend some college. Among those who complete college, about 12 percent attend a highly selective school and about one-third obtain a graduate degree.

We estimate propensity scores for each individual in the sample for the probability of college completion by age 30 given a set of observed covariates using a logit regression model.

We invoke an "ignorability" or "selection on observables" strong assumption that conditional on a set of pre-treatment covariates, there are no additional confounders between college and non-college graduates. We use a variety of observed family and personal attributes to predict college completion. Family background characteristics include race, mother's education, father's education, family income in 1979, whether father's occupation was white-collar, whether the respondent grew up with both biological parents, number of siblings, rural and southern residence, and religious affiliation. Indicators of early achievement included a dummy for whether the student was enrolled in a college-preparatory curriculum in high school and results of a cognitive ability test administered to respondents in 1980 (the Armed Services Vocational Aptitude Battery [ASVAB], adjusted for age and standardized following Cawley et al. [1997]). School-level variables include percentage of students classified as disadvantaged, percentage of students who drop out before graduation, percentage of students who are black or Hispanic, and perceived school safety. Social-psychological variables were measured by educational aspirations, educational expectations, friends' educational aspirations, Rotter locus of control, Rosenberg self-esteem, and a scale of delinquency. Indicators of family formation include a scale of traditional family values, marital status at age 18, and whether the respondent had a child by age 18. We imputed missing values based on all available covariates, running a single imputation using the multivariate normal approach (Little and Rubin 1987).

We adopt a propensity score specification technique recommended by Imbens and Rubin (2015). We begin with a base set of covariates used in several papers by Heckman and colleagues. Each additional theoretically-motivated possible covariate is considered in turn. We considered non-cognitive skills, school characteristics, and family formation. The covariate with the highest improvement in model fit was added to the model, and the process repeats. Once all possible linear terms were added that crossed a threshold value of model improvement, we generated all possible higher order and interaction terms (in this case, 276 possibilities). Each of those terms was considered in the same way. This procedure involved several thousand regression models. The resulting model includes 22 linear terms, 1 higher order term, and 12 interaction terms. We then trimmed the sample at the ends, deleting treated cases with values higher than the highest propensity score among the controls and deleting cases with values lower than the lowest propensity score among the treated. In other words, cases with no common support. Once we determined the final set of variables, we ran a machine learning model, a boosted regression tree. This specification produced propensity scores with a 98 percent correlation with the scores obtained using this procedure. Imbens and Rubin (2015) argue that this procedure outperforms the machine learning model in simulations.

Descriptive statistics on our pre-college covariates were consistent with well-documented socioeconomic differences in educational attainment. With few exceptions, these differences were statistically significant at the $p < .05$ level. Those who completed college were more likely to come from families with highly educated parents, high incomes, both parents present, and fewer siblings. They also have higher average cognitive test scores and are more likely to have had college-preparatory classes. They attend more advantaged high school. College graduates had higher educational expectations and friends with higher educational expectations. College graduates are also less likely to have begun families during adolescence.

We employ machine learning methods described in Athey and Imbens (2015) to detect effect heterogeneity. We also use propensity-based methods described in Xie, Brand, and Jann (2012) to understand the pattern in effects. We match individuals who completed college to those who did not but had the same observed propensity to complete college. We then estimate how

effects differ by the propensity score. We compare this approach to that based on the machine-learning models, as well as to those based on regression-based difference in average treatment effects and covariate interactions by race, income, and other key covariates.

Preliminary Results

With the use of machine learning methods, we are able to determine which subpopulations experience the largest effects. We find evidence that students on the margin are those for whom college significantly circumvents family disadvantage. We find that students on the margin, those with a low propensity to complete college, benefit the most from college completion in terms of avoiding single parenthood. We explore two outcomes: ever single parent in 1990-2014 and proportion of time single parent in 1990-2014. The effects of college completion on experiencing these forms of family structure is more negative for those with a lower propensity to complete college. See Figures 1 and 2.

Our initial results suggest that college completion does mitigate the likelihood of experiencing single parenthood for those on the margin of school continuation, i.e. those with a low likelihood of attending college.

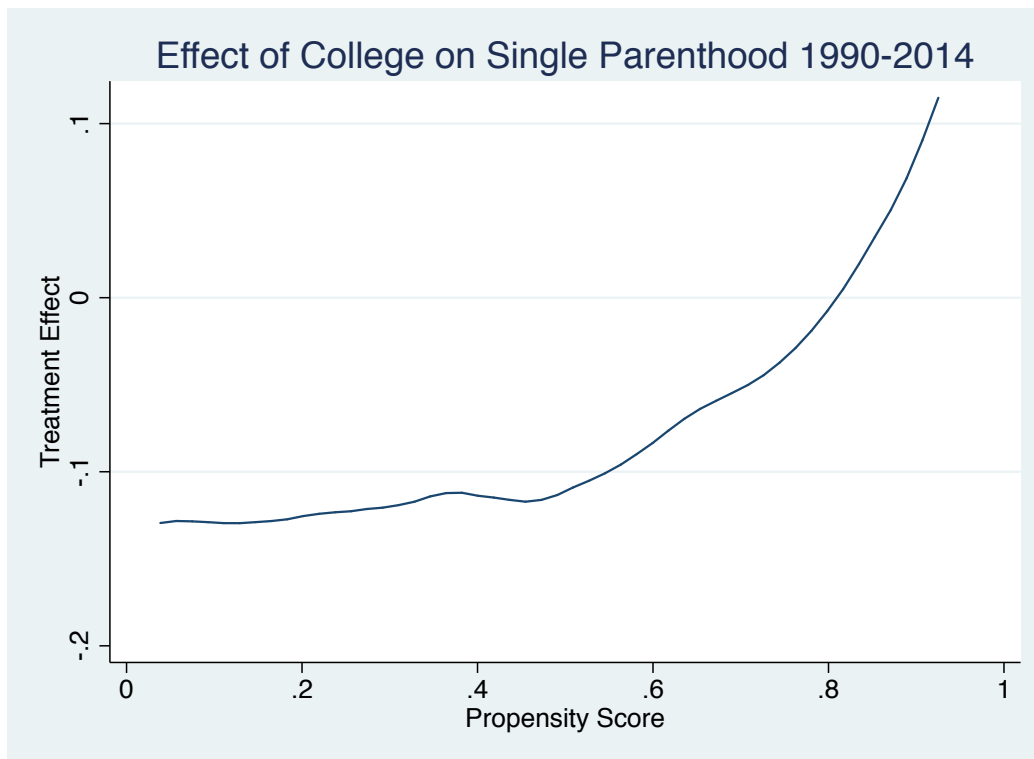


Figure 1. Effect of College Completion on Ever a Single Parent between 1990-2014: Matching-Smoothing Method for Estimating Heterogeneous Treatment Effects by the Propensity of College

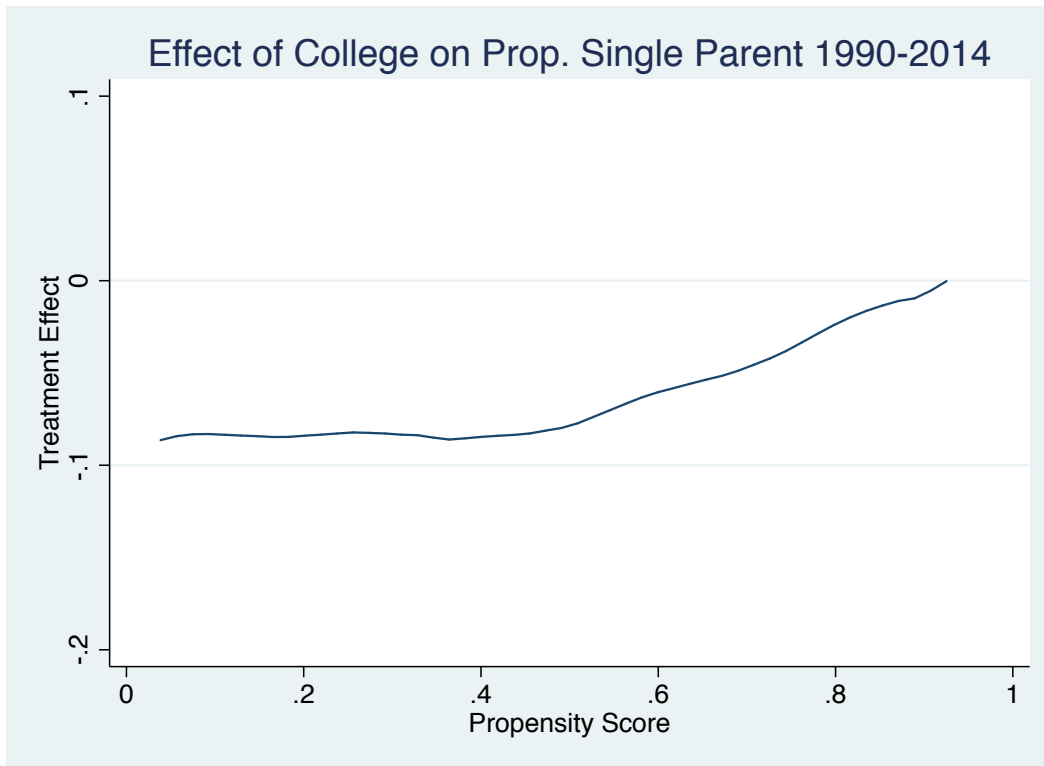


Figure 2. Effect of College Completion on the Proportion of Time Spent as a Single Parent between 1990-2014: Matching-Smoothing Method for Estimating Heterogeneous Treatment Effects by the Propensity of College

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