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VIETNAM ERA FATHERS: THE INTERGENERATIONAL TRANSMISSION OF TERTIARY EDUCATION

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A strong positive correlation between the educational attainment of parents and their children is well documented. Determining whether this relationship is due to nature (selection) or nurture (causal factors) is both a challenge and an important policy issue. We use the Vietnam era draft lottery and educational exemptions as a "natural experiment" to address this issue. Substantially more men attended university during this war, creating a cohort of fathers many members of which would not normally have enrolled in tertiary education (TE). Using US Current Population Survey (CPS) and Study of Income Dynamics (PSID) data on the father's and his children's TE involvement, we find that, for this war cohort, the intergenerational transmission leading their children to enrollment in TE is at least as high (CPS) or even higher (PSID) than that of control cohorts. In the context of university attendance in the US, these findings suggest that nurture plays an important additional role.

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1. Introduction

It is well known that a high correlation exists between the schooling of parents and that of their offspring. For example, the review by Hertz *et al*. (2007) suggests that this correlation is about 0.4. Moreover, higher education plays an important role in social mobility (see Haveman and Smeeding, 2006). There is controversy, however, around the source of this correlation in schooling between generations. Is it due to "selection" (more "academically able" parents have "academically able" children, where "academically able" is shorthand for innate, heritable, traits which promote academic success), or "causality" (more "nurturing" parents promote the factors that lead to tertiary education (TE) and academic success)? Another set of labels that has been used for these extreme positions is nature and nurture. Based on the review of the literature on child attainment by Haveman and Wolfe (1995), Holmlund *et al*. (2011, p. 615) summarize that earlier consensus by stating that "the education of parents is probably the most fundamental factor in explaining the child's success in school." They point out that the *reason* for this association is critical to the formation of policies that aim to increase the educational attainment of future generations. If, through various channels, nurture plays an important role, then policies that lead to a rise in the educational attainment of one generation will have important spillover effects through the intergenerational transmission of education. However, if the correlation of intergenerational attainment is due solely to nature, such policies will not have these valuable external effects.

The determination of the relative importance of nature and nurture will depend on the institutional context. Although IQ is found to be strongly heritable, as Sacerdote (2011, p. 3) notes: "understanding the determinants of IQ is different than understanding the determinants of educational attainment." Postsecondary education systems may place different weights on different assessment instruments, influencing the relative importance of IQ and impacting the assessed importance of nature and nurture on the intergenerational transmission of higher education. In their review article, Holmlund *et al*. (2011) address this concern as well as the important roles of the estimating procedures and data that have been used to address the issue of causality. They review studies based on (1) comparing the educational attainment of twins, (2) assessing the relative importance of biological and adopting parents for the educational attainment of adopted children to compare the relative importance of nature and nurture, and (3) IV methods typically centered on educational reforms. Evidence on the relative importance of nature and nurture is mixed. They conclude that "all these twin, adoption, and IV findings suggest that schooling itself is in part responsible for the intergenerational schooling link: more educated parents get more educated children because of higher education" Holmlund *et al*. (2011, p. 626).[1]

As stated earlier, heritability and nurture are often presented as extreme, nonoverlapping, positions. However, the intergenerational transmission processes are

[1]By relating the educational achievement of adopted children to characteristics of both their adoptive and biological parents, Black and Devereux (2020, p. 1710) find that, though nature exerts a somewhat-stronger influence, both factors are statistically significant. A stronger role for nurture in the intergenerational transmission of wealth is noted.

complex. Nurturing may have a good chance of being documented if an exogenous increase in the education of individuals who have lower inherent academic ability or interest can be shown to be associated with additional educational attainment by their offspring, perhaps comparable to or even exceeding that of individuals who are not affected by the exogenous increase. In terms of the extreme nature/selection position in the first paragraph, such an effect on the children must (in at least some measure) be due to nurturing because this group of parents could not possibly bequeath to its offspring the necessary traits for TE. As the degree and quality of parental nurturing cannot be easily observed, the nexus "parental education-child nurturing-child education" must be investigated indirectly through comparisons between meaningfully constructed cohorts, "treated" and "control," and by ruling out other plausible explanations.

Card and Lemieux (2001) have documented a significant increase in the educational attainment of men subject to conscription during the Vietnam War; a chronology of relevant Vietnam War draft events is provided in Appendix Table A.1.[2] The opportunity to avoid the draft by attending TE led many men (call them "draft avoiders" or DAs), who would otherwise not have been sufficiently interested in and so would not normally have pursued TE, to acquire TE and to obtain an advanced qualification. We discuss this phenomenon in our data in Section 2.3 and in the econometric estimates presented in Section 3.

What, then, was the influence of this unexpectedly further-educated group of parents on the propensity of their offspring to enroll in and obtain TE? With the exception of the works of Goodman and Isen (2015, 2020) to be discussed later, the TE achievements of the children of DAs have, to the best of our knowledge, not been examined in the literature.[3] Yet, it is argued here, their behavior can shed light on the relative importance of nurturing versus the heritability of traits in the intergenerational transference of TE. If this additionally educated group of DAs had children who were less likely to pursue tertiary studies, this would come as no surprise to individuals who espouse an extreme selection point of view. They would think that the opportunistic acquisition of education, by at least some of those enrolled in TE during the draft, is unlikely to stimulate the interest of their children in further education, given that the parents did not have an inherent interest and/or the necessary academic traits for TE themselves. However, if the offspring of the DAs showed an equal or even greater interest in TE, this would be evident that the exogenously induced additional education also stimulated more educational nurturing, leading to greater participation in TE by their children. Such evidence would suggest that nurture plays a significant role in explaining the correlation of education levels across generations, reducing the validity of explanations that rely

[2]For a literature that exploits an exogenous change in the incentives of cohorts affected by various wars on their own educational attainment, see also Angrist and Krueger (1992), Angrist and Chen (2011), Grimard and Parent (2007), Lemieux and Card (2001), Bound and Turner (2002), Stanley (2003), and Moreno (2018).

[3]Different from the majority of literature reviewed in Holmlund *et al*. (2011) and more recently in Dickson *et al*. (2016), only two papers, Maurin and McNally (2008) and Carneiro *et al*. (2013), investigate the transmission rate of parental TE. However, both papers focus on children outcomes until adolescence.

primarily on nature. Shedding light on this issue is one major objective of our study.

To do so convincingly, it is important, second, to show that the econometric framework within which this issue is examined is capable of producing consistent estimates of, inter alia, the coefficient of the intergenerational transmission of education for a variety of correlation settings between paternal education and the error term in the equation determining the educational outcomes of their children.

With these two objectives in mind, we examine the educational attainment of the offspring of DA fathers. Ascertaining the existence and intensity of educational nurturing relies on identifying a group of fathers who may not have had the typical interest/traits/ability for TE *but nevertheless pursued further studies*. For them, taking part in the Vietnam War was so abhorrent as to overturn any present value calculations involving the normal costs and benefits of TE. The Vietnam DA ("treatment") group's participation in TE, reaffirmed in our data, was so unusually high as to provide a useful instrument in a triangular simultaneous equations model involving father and child TE. Contrary to some findings in the literature,[4] our findings for the DA cohort are not consistent with an extreme form of nature; they suggest that nurturing played a significant role in the intergenerational transmission of TE over and above whatever role nature and heritability may offer.

Our data do not allow us to disentangle the many channels through which higher education attainment by the parents improves the nurturing of their children and leads to higher educational attainment by the latter. The term nurturing is broad enough to encompass many other reasons why a child with highly educated parents is more likely to obtain a relatively high level of education. These include increased parental expectations,[5] parents acting as role models, having higher incomes, living near good schools, and encouraging cognitive development through books, computers, tutors, and so on. We recognize that a number of forces might, for the Vietnam DA cohort, fall under the label of nurture.

Section 2 describes the data (the 1981–2014 Current Population Survey or CPS and the 2013 Panel Study of Income Dynamics or PSID) and the econometric specification leading up to the impact of the additional education of the DA cohort on that of their offspring. Section 3.1 presents and discusses the results obtained on the educational transmission coefficient from fathers to their offspring, while Section 3.2 considers some ancillary issues. Section 4 concludes. The Appendix presents supplementary material on various aspects of the paper.

2. Data and Variables of Interest

We use two data sets to study the transmission of the education obtained by DA fathers to their children, viz. the US CPS, which is especially suitable for the

[4]Black *et al*. (2005) explore a natural experiment in Norway and conclude that the high correlation between parental and children's education is primarily due to selection rather than causation.

[5]For reference to work that supports the channel of aspirations and expectations, see Christofides *et al*. (2015a). Corak (2013) provides information on the nurture effect (see especially Figure 6, p. 91).

study of TE enrolments, and the PSID, which is more suited to the study of TE completion. In both cases, we select from the universe of households those with fathers born between 1935 and 1965 and examine the intergenerational transmission of TE to their children. For CPS, these are children aged 19–21, who are present in the household and enrolled in TE. In the case of PSID, these are children in the household or those who can be linked to the household once they have left, aged 25 and over who have graduated from TE. The birth years affected by the Vietnam War are defined to be 1944–1953, inclusive. The reasons for these choices are discussed in the next sections.

2.1. *The CPS*

The 1981–2014 US CPS Annual Social and Economic (ASE) Supplement surveys that are conducted in March of each year contain both educational and personal variables on household members and information on the Vietnam veteran status of the father (King *et al*., 2010). The paper by Heathcote *et al*. (2010) explains how a break in the survey treatment of the education variables in 1992 can be overcome. The TE categories provided in the surveys are: Some Years of College but No Degree (Coll ND), Associate of Arts Program (Assoc), Professional Degree (Prof), Bachelor Degree (Bach), and Graduate Degree that includes master's and doctoral degrees (Grad).

One limitation of CPS in the context of this paper is that it is a household survey. This means that young adults who leave the household cannot be linked to their parents. In Figure A.1 of the Appendix, we comment on and plot the proportion of the children that can be linked to their fathers and those that are missing the link, by age of the child. This information in CPS is only available for the 2007–2014 March Surveys. Note that only three quarters of the children that are only 10 years old can be linked to their father; if we consider this 75 percent benchmark as the very best that CPS can do, then from the bar plot we can see that, relative to this benchmark, the majority of youth aged 19–21 can be linked to their fathers but that this linkage weakens for older children. Accordingly, we restrict our study of the enrolment of children to those aged 19–21. This feature of the CPS data suggests that it is preferable to study TE enrollment, rather than its completion.[6] The latter tends to occur later in life, by which time many more children will have left home without trace in the CPS.

Table A.2 in the Appendix contains the number of observations, means, and standard deviations for the outcome and control variables that we use in this study. On average, 61 percent of 19–21-year-olds have some TE or are enrolled in a TE program at the time of the survey. The average age in our sample is almost 20 years old, 46 percent of the respondents are female, 98 percent are single, 74 percent are White, 8 percent are Black, and 13 percent are Hispanic (mixed races are the omitted category). Given their young age, 97 percent of the responding children do not have any children of their own, but almost 77 percent have at least one sibling. Our estimation sample is restricted to respondents whose fathers were born between 1935 and 1965, thereby preventing the confounding effects of older fathers at risk

[6]While most of our CPS analysis deals with enrolment, in Section 3.2 we take a partial look at TE completion in a smaller sample of children aged 25–35 that can be linked to their fathers' household.

of conscription in previous war periods, especially the Korean War (1950–1953), during which some education deferments were also granted. This means that we do not have any veteran fathers from this period in the groups that we consider. The average father's age in the sample is almost 48 years, and the average mother's age is about 45 years. About 50 percent of the fathers have TE. Around 41 percent of the fathers were born during the Vietnam War risk years of 1944–1953. Among all fathers born between 1935 and 1965, 18 percent are Vietnam Veterans. However, for the sub-sample of fathers born during the risk years, the proportion of Vietnam veterans is 31 percent. In Table A.2, we also present summary statistics by the father's birth year; this is useful because the father's birth year is used in the construction of our instrument in Section 2.4. Table A.2 shows that the composition of the different birth year groups is broadly similar, suggesting that substantial selection issues may not be present. In the econometric work that follows, a maximum of 68,991 observations are available.

2.2. *The PSID*

The PSID offers well-constructed intergenerational dynamics and longer-term outcomes for the younger generation than does CPS. This makes it possible to consider the completion of TE, rather than current enrolment, by the younger generation. The PSID lacks detailed information on the veteran status of participants: We know whether they are war veterans but have no information on the period during which they actually served. However, in conjunction with the father's birth year variable, we can approximate the methodology followed with CPS data. The samples involved in the 2013 survey that we use are much smaller than the CPS ones: at most 1722 observations.

An important feature of the PSID data, which allow us to explore new aspects of the issue at hand, is the ability to link the children who have moved out and set up their own household to their father and his characteristics. We first identify the household head and wife and build a cross-section of these individuals with all the necessary information. Using the Family Identification Mapping System files, we extract the fathers and mothers from the cross-section and merge them with those of their children, thus gathering all available and needed information for both generations. As a result of these procedures, parents and children are, on average, older in the PSID than in the CPS sample.

In contrast to the CPS Figure A.1 in the Appendix, the PSID Figure A.2 suggests that the majority of the respondents in the PSID sample are matched to their fathers—these calculations include both the moved-out and co-residing children. A missing link in the PSID data is due to the father not being a PSID sample member[7] for reasons such as death, separation/divorce, and non-response. Figure A.3 provides the proportion of moved-out versus co-residing children by age. Among the 19–20-year-olds, about 20 percent have moved out, and this figure rises to over 40 percent for 21-year-olds. In CPS as well as PSID, of the children who can be linked to their fathers at age 10, about two thirds are still living at home by age

[7]Sample members are individuals who entered the survey after 1968 as a result of creating families or cohabiting with sample members. Once and if couples split up, the non-sample members are not followed but the sample members are.

19–21, while one third have left home. In this sense, the fraction of stayers and leavers is consistent in the two data sets.

The PSID gathers detailed information about the household heads and their wives or cohabiting partners but provides very limited information regarding the other members of the household. It does not provide sufficient information on the educational activities of the children who stay in the parental home. Moreover, the 19–21-year-old PSID sample (comparable to the CPS one used in Table A.2 below) is only just over 100 observations. Therefore, it was not possible to usefully replicate the CPS work with PSID data. Instead, we take advantage of the PSID strengths to analyze TE completion by the younger generation at a later stage in their life (25 years or older), when they are in separate households. Thus, we exploit the strengths of both data sets, that is, (1) stronger linkages between parents and children who left home in PSID and more complete information on TE completion later in life, and (2) the larger CPS samples of children and their parents, along with information on their characteristics and veteran status specific to the Vietnam War.

In Table A.3, we provide summary statistics on the individual and parental characteristics that we use in the empirical analysis. Among young adults, 66 percent have completed a TE degree/diploma/certificate. The average age in the sample (34.5 years) is higher than that of the CPS sample. Almost half of the individuals are female (51 percent), 76 percent are White, and 23 percent are Black. There are 28 percent single respondents, 75 percent of the individuals do not have children, about 44 percent have a sister(s), and 48 percent have a brother(s). In the PSID sample, the parents are older than in the CPS sample; the average age of the father is 62 years and that of the mother is 59 years. In the same table, we also present summary statistics by the father's birth year; this is useful because the father's birth year is used in the construction of an instrument that will, hopefully, not suffer from observable selection issues. Table A.3 shows that the composition of the different birth years is similar. In the econometric results later, a maximum of 1722 PSID observations are available.

2.3. *Trends in Educational Involvement*

In view of the central importance of paternal educational attainment for this paper and to motivate our econometric strategy, this section examines the record of paternal educational attainment by year of birth, gender, TE category, and veteran status; similar procedures were used in Card and Lemieux (2001). In this section, we are solely interested in documenting the prevailing educational trends for all individuals older than 25 years of age; this is the only restriction imposed on the universe of information in CPS until the next sections. In the current section, we rely on the CPS data because (i) the Vietnam War veteran status is available, and (2) the large, annual, samples make meaningful comparisons between the various sub-periods and subgroups of interest possible. A similar review of educational trends using the PSID, a deduced Vietnam War status, and smoothing techniques to avoid the noise inherent in small samples was carried out in Christofides *et al*. (2015b); the conclusions reached were comparable and are not reported here for space reasons.

Figure 1 shows the proportion of CPS respondents by birth year, gender, and TE category (Coll ND, Assoc, Bach, Prof, and Grad, see Figure notes for

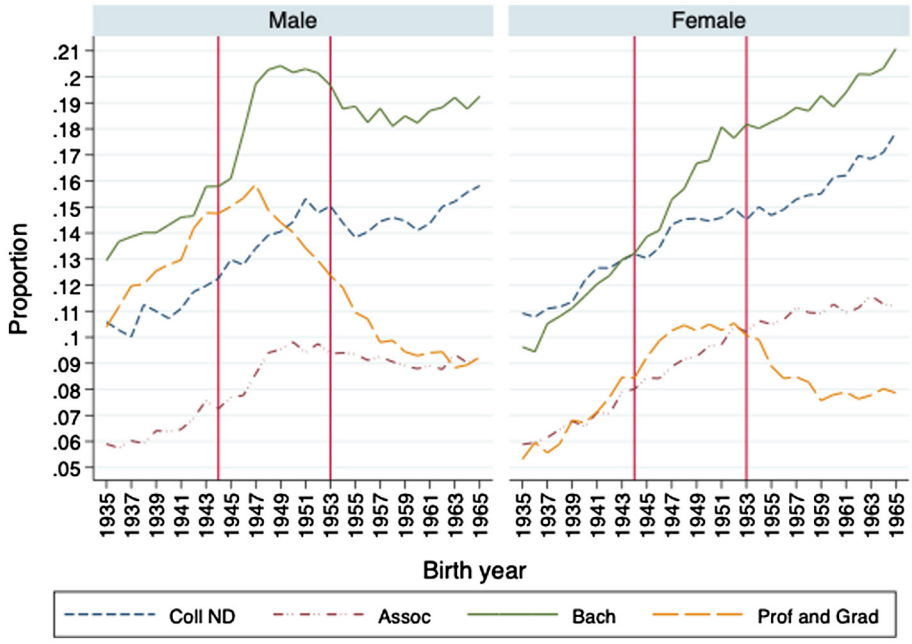

Figure 1. Tertiary Education Attainment by Birth Year.

Note: Data source are respondents who are 25 years old or more in CPS ASE Supplement files for years 1981–2014. Omitted categories are the educational attainment levels of high school or lower. The TE categories are: Some Years of College but No Degree (Coll ND), Associate of Arts Program (Assoc), Bachelor Degree (Bach), Professional Degree (Prof), and Graduate Degree which includes master's and doctoral degrees (Grad). [Colour figure can be viewed at wileyonlinelibrary.com]

definition). The first vertical line marks the birth year (at 1944) with a lottery risk of conscription in the first Vietnam War lottery held in December 1969. The second vertical line is placed at 1953 to include the last lottery year—see Table A.1. With the exception of Prof and Grad, which declined after 1949, all educational attainment categories for women show strong, consistently upward, trends. However, those for men are more complex. Between the birth years of 1944 and 1950, the proportion of men attaining Bach increased from about 0.155 to about 0.20 (Figure 1). This proportion remained around 0.20 until birth year 1951, declining once educational deferments were rescinded in 1971 (affecting men in birth years 1952 onwards—see Appendix Table A.1). These male birth cohorts would have been eligible for service in the thick of the Vietnam War. The proportions of men attaining Coll ND and Assoc also increased but by somewhat smaller amounts and also declined (Coll ND) or remained stable (Assoc) after educational deferments were rescinded. In total, the average proportion of TE attainments in these three categories increased substantially during the birth years 1944–1953 from about 0.35 to about 0.45, or approximately 29 percent. By contrast, the proportion of men attaining the sometimes non-eligible (see Appendix Table A.1) Prof and Grad category fell after 1947[8] and did so dramatically for a while. The

[8]This proportion increased slightly in 1946 and 1947 when educational deferment for the Prof and Grad category was still in effect, but fell thereafter—see Appendix Table A.1.

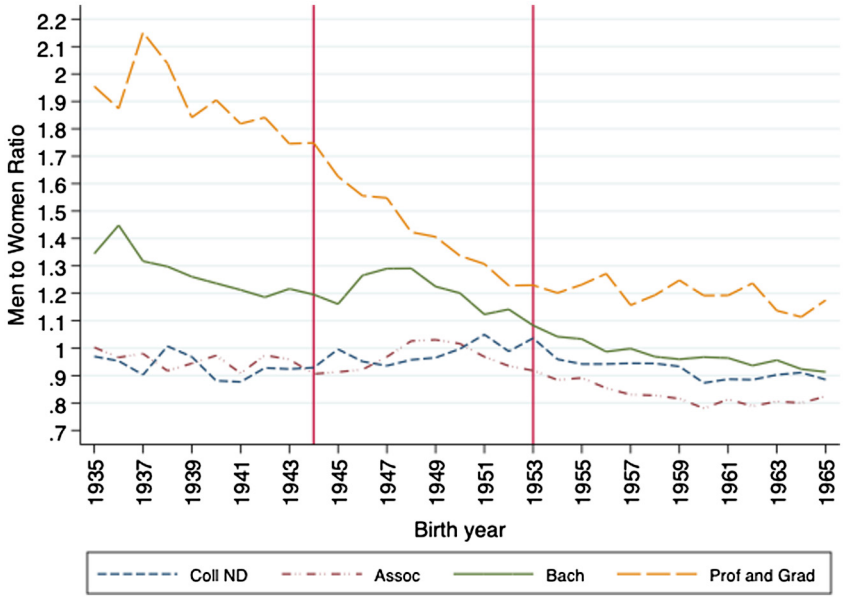

Figure 2. Men to Women Ratio of Tertiary Education Attainment by Birth Year.
Note: Data source are respondents who are 25 years old or more in CPS ASE Supplement files for years 1981–2014. Omitted categories are the educational attainment levels of high school or lower. The TE categories are: Some Years of College but No Degree (Coll ND), Associate of Arts Program (Assoc), Bachelor Degree (Bach), Professional Degree (Prof), and Graduate Degree which includes master's and doctoral degrees (Grad). [Colour figure can be viewed at wileyonlinelibrary.com]

overall increase in the proportion of women in Bach, Coll ND, and Assoc, which is also shown in Figure 1, was almost equal to that of men (0.34–0.43). Contraceptives *et al*. (2002) examine the increase in the participation of women in professional programs during the late 1960s and beyond. The relative behavior of men and women is examined in Figure 2, where the proportions of men to women attending various TE categories are expressed in ratio form. During the birth years 1944–1953, a bulge in this ratio is particularly evident for the category Bach.

Once college deferment eligibility was canceled for birth cohorts 1952 and beyond (see Appendix Table A.1), the proportion of male enrolments in the three categories Bach, Coll ND, and Assoc declined to their trend levels. This Vietnam era experience for men and its contrast with the pre- and post-deferment period trends suggest that draft avoidance through TE swelled substantially the cohort of men who enrolled in TE. This exogenously inflated cohort reflects the influence of the educational deferment mechanism and its impact on the father's TE attainment in a pattern that meets monotonicity (Angrist and Pischke, 2009, p. 155).

Figure 3 contrasts the educational attainment trends of parents who were not Vietnam War veterans and those who were, by birth year. For the latter, Bach and Prof and Grad follow a bumpy downward trend, while College ND and Assoc follow an upward non-smooth trend. By contrast, non-veteran behavior shows the expected bump for Bach particularly, but upward trends also for College ND and Assoc. In addition, the proportion in First Prof and Grad increases substantially

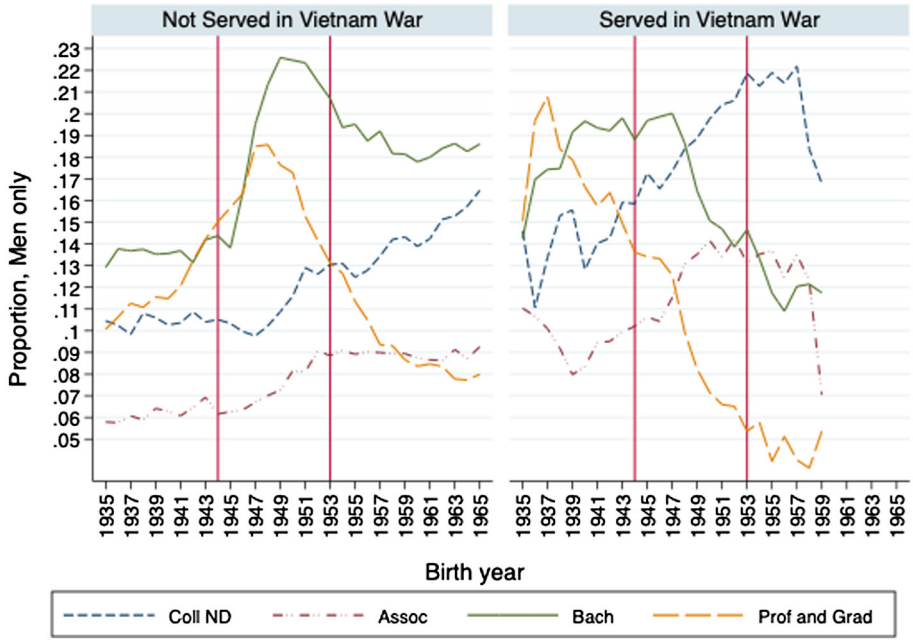

Figure 3. Tertiary Education Attainment by Birth Year and Vietnam-Era Service Status.
Note: Data source are respondents who are 25 years old or more in CPS ASE Supplement files for years 1981–2014. Omitted categories are the educational attainment levels of high school or lower. The TE categories are: Some Years of College but No Degree (Coll ND), Associate of Arts Program (Assoc), Bachelor Degree (Bach), Professional Degree (Prof), and Graduate Degree which includes master's and doctoral degrees (Grad). [Colour figure can be viewed at wileyonlinelibrary.com]

up to birth year 1947 but falls continuously and substantially after deferment eligibility for this category was suspended. Figure 3 is consistent with behavior in Figures 1 and 2.

Thus, similar to the evidence presented in Card and Lemieux (2001), the plots suggest that DA men, under risk of being drafted in the Vietnam War, resorted to the educational deferments (prolonged their studies or enrolled in a TE program) to avoid the draft. It is conceivable that even men who were not chosen in the draft lottery may have opted for TE as an insurance policy against future developments. This is the source of exogenous variation that we use to identify the estimates of intergenerational transmission of TE attainment in the next sections. In Section 3.1.1 we examine the econometric support for this visual evidence of a TE bulge in CPS during the period 1944–1953, as well as the intergenerational implications for the TE of the children. As we do that, we condition on individual survey year dummy variables and the other available controls, thus capturing the overall trends in the TE status of the fathers (attainment) and children (enrolment) in the model. The increased, additional, TE mass for the fathers during 1944–1953 will be captured by a *Father DA* variable and its influence on the education of the children traced out.

2.4. *"Treated" and "Control" Groups*

Our sample includes fathers born between 1935 and 1965. Those born between 1944 and 1953 would have been especially liable to be sent to Vietnam if no effort to avoid the draft was taken on their part.[9] The first important criterion for inclusion in the treated group is, therefore, the exogenous year of birth; based on the information in Table A.1, we consider 1944–1953 as the relevant catchment period. In an effort to see whether the changing conscription environment influenced parameters of interest over the course of this period, we also examined a number of sub-periods. However, we found no important intra-period differences; and so we report only results for 1944–1953.

A second important criterion in constructing a treatment or DA group of fathers is that they avoided serving in Vietnam through the TE provision. In addition to this first, most purposeful, group of DAs, a second group may include those to whom the lottery was kind, another exogenous act of fate. Once not called up, these individuals may have opted to acquire TE education as an insurance policy against possible changes in drafting procedures. A third group of young men might have planned further studies following high school, regardless of the provisions of the draft process; however, the significance of TE enrolment for their draft status is unlikely to have escaped them. To the extent that this third cohort of "academic" young men behaved like "academic" cohorts before and after 1944–1953, their behavior should be tracked by our equation describing the participation of children in TE.

The motivation for the additional enrolments by future fathers during 1944–1953 may be important for the extent to which the additional (groups 1 and 2) individuals who acquired TE would, in time, influence the behavior of their offspring. Under a pure nature hypothesis, additional, opportunistic, TE should not impact the inherent "nature" of the future children of DAs. By contrast, a pure nurture argument would suggest otherwise. Those in the third group who would have attended TE anyway may well be more prone to pass on heritable traits favorable for TE to their children; however, this transmission should not be qualitatively different from that of future fathers born before or after 1944–1953. The large bulge of additional enrolments in Figure 1, confirmed econometrically later, suggests that an influence from the other two groups in the "treated" will be felt. Suhonen and Karhunen (2019) consider the effect of expansions in the Finnish educational system to include not only the traditional academic types but also a new expanded cohort of students.

Regardless of the initial motivation for enrolment, TE is likely to have been a transformative experience that, for all those engaged in it, had to be continued and brought to a successful conclusion. The CPS and PSID data do not allow us to discern the original motivation of our future fathers for acquiring TE; information such as academic performance in earlier high school studies, previous family TE exposure, and family income, for instance, is not available. We stress, however, that,

[9]Conscription, which began in 1964 and lasted until 1973, was controlled by the president until the lottery system was introduced. The lottery was run for the first time in December 1969 to determine the order of service for men born between 1944 and 1950. Although it lasted until 1975, the lottery numbers drawn in 1972 for those born in 1953 were never used for induction. Some of the men drawn between 1972 and 1975 were only called for physical examinations. See also Table A.1 in the Appendix.

in our econometric equations, we control for the secular trends evident in Figure 1[10] through survey year dummies, some time-related regressors, and other controls. A possible statistical significance for a DA variable will reflect the bulges in TE attainment above the trend in Figure 1 generated by "academic" individuals who would have chosen to attend TE during 1944–1953, as in any other period before or after Vietnam.

Turning to the "control" group, we begin by taking note of the group of men who voluntarily, or through conscription, participated in the Vietnam war and/or other wars and could later have availed themselves of eligible re-integration programs, including financial incentives, to attend TE; we refer to this cohort of men as GIs.[11] If year of birth were the only criterion for membership in the DAs (as in Proxy 1), then GIs would be part of the treated. However, the second criterion of not having served in Vietnam shifts this group into the controls, or comparison group, leaving a more homogeneous group of DAs under Proxy 2. In earlier work, we found that the inclusion of the GIs in the controls was a more appropriate classification.[12] Our results below show that Proxies 1 and 2 result in similar conclusions, but differences between coefficient estimates for Proxies 1 and 2 may be due to the positioning of GIs. We are unlikely to have any Korean War (1950–1953) GIs in our treated sample because we have excluded individuals who were born before 1935.

Beyond the treatment of the GIs in Proxy 2, the control groups for Proxies 1 and 2 include all individuals in the sample who were born outside the 1944–1953 window. The interest of these 1935–1943 and 1954–1965 fathers and their children in TE can be viewed as following a baseline trend that traverses the birth years in Figure 1; this trend should also reflect the behavior of the "academic" third group who are part of the norm at any time. It is against this baseline (the controls in our equations below) that the TE record of the DA children will be measured. The DA fathers and their children may represent a deviation from the TE preference norms.

Because our aim is to study the intergenerational transmission of TE, our treated and control groups are very different from those in the Goodman and Isen (2020) published paper. Their treated fathers (pp. 188–189) were "... those born in 1951 and 1952…and called numbers up to 125 and 95, respectively." Their control

[10]One possible pattern of trends can be seen in Figure 1 by connecting the points of intersection of the vertical lines with the actual attainment by birth year for Bach, Coll ND, and Assoc.

[11]The term GI initially referred to World War II veterans for whom the "GI Bill" (the Servicemen's Readjustment Act of 1944) provided a range of benefits, including but not limited to, tuition and living expenses to attend university. A number of other such bills with varying provisions were passed in later years, possibly affecting children in our sample by subsidizing the education of their parents. In both CPS and PSID we exclude men born before 1935 (and after 1965), thereby ruling out a possible influence of Korean War GIs on children during the critical Vietnam era that we consider.

[12]The TE experience of returning GIs was often problematic, with some enrolments in ineffective or even bogus programs which did not generate a genuine interest in TE among themselves or their children—Halperin (2016). From Wikipedia.org (2021): "After the GI Bill was instituted in the 1940s, a number of 'fly-by-night' vocational schools were created. Some of these for-profit colleges still target veterans, who are excluded from the 90-10 rule for federal funding. This loophole encourages for-profit colleges to target and aggressively recruit veterans and their families. Legislative efforts to close the 90-10 loophole have failed." See Whitman (2017) for historical analysis of how the GI Bill affected Vietnam veterans and also Schade (2014) for an updated discussion of the general issue and failed policy responses.

fathers were "Men with draft numbers above these thresholds ···." The restriction to two birth years was judged by them to be advisable because of features of the draft lottery and its applicability (p. 188). Draft eligibility was not, in itself, sufficient for our purposes. With our first criterion, we do not rely on the lottery numbers, permitting the inclusion of many more relevant war years. In contrast to our second criterion mentioned in the second paragraph of this section, which requires DAs not to have served in Vietnam, Goodman and Isen (2020) assume (p. 189) the impact of being called for service to occur "··· regardless of whether he served in the military (i.e., intent-to-treat estimates)." This would not be sufficient for our present purpose, which is to study the linkage between the draft avoidance-induced TE attainment by the fathers and that of their offspring. Finally, the father's educational attainment appears not to be known in the Goodman and Isen (2020) data.

In summary, the DA cohort includes those born during 1944–1953 (DA Proxy 1), or those born as in Proxy 1 but who, in addition, did not serve in Vietnam (DA Proxy 2). Proxy 2 excludes Vietnam veterans (with or without TE) who are included in the controls. The control group for both proxies includes fathers born between 1935 and 1965 but outside the 1944–1953 Vietnam window.

An important function of the DA, or treated, cohort is to serve as an instrument for the actual TE attainment of the father, thereby offering an alternative to ordinary least squares (OLS), should the latter be judged to be inconsistent; this instrument should be (i) orthogonal to the error term in the equation determining his children's education, but (ii) "relevant" to the fathers' actual TE attainment. The possible need for an instrument and its overall suitability in estimating the intergenerational transmissibility coefficient of TE consistently are explored in Section 2.5. As noted in the introduction, a second point of interest is the DA's propensity to transmit interest in TE to their offspring. Given that a large proportion of this group attained TE to avoid the draft, without having an inherent interest in further studies, an extreme nature position would suggest that the children of the DA group would on average be less inclined to TE than the children of fathers in the controls. By addressing this question, we are able to consider the extent to which our econometric results shed light on the validity of the extreme positions in the nature/nurture debate.

2.5. *Econometric Specification and (CPS and PSID) Estimation*

The econometric model used consists of the structural equations (1) and (2):

$$\textit{Father TE} = \alpha_0 + \alpha_1 \textit{Father DA} + \alpha_2 X^F + \epsilon, \tag{1}$$

$$\textit{Child TE} = \beta_0 + \beta_1 \textit{Father TE} + \beta_2 X^C + \nu, \tag{2}$$

for the i^{th} child (subscripts are omitted), where the variable *Father TE* equals 1 if the father attained a TE qualification and is zero otherwise. *Father DA* equals 1 if the father meets the DA conditions noted for Proxies 1 and 2 and is zero otherwise. *Child TE* equals 1 if the child is enrolled in (CPS), or has completed (PSID) TE, and is zero otherwise. X^F is a matrix (depending on CPS or PSID) of personal father characteristics and other controls which were listed in Sections 2.1 and 2.2.

X^C is a matrix of child-related and other controls, and ϵ and ν are random error terms with the usual properties. The coefficient vectors α_2 and β_2 are defined conformably with X^F and X^C, determined by the available data in CPS and PSID.

Although equation (1) is a structural equation, it does not contain any endogenous regressors; the child's education does not influence that of the father. The system is, therefore, "causal" and equation (1) can be estimated using OLS. Its predictions can then be substituted in equation (2), taking care to use the appropriate variance–covariance matrix for the standard errors. This was the procedure used here. Equivalently, in this just identified case, Two Stage Least Squares (2SLS) can be used to estimate equation (2). In the case of IV, the two binary DA proxies can be alternately used as an instrument for *Father TE*, provided the standard orthogonality and relevance conditions are met. We test these for each Proxy and data set below. The reduced form equation for *Child TE* is given by equation (3), where X consists of the union of the explanatory variable sets in X^F and X^C with *Father DA* listed separately for emphasis; e is an error term with the usual properties. This equation can also be estimated using OLS.

$$Child\ TE = \lambda_0 + \lambda_1 Father\ DA + \lambda_2 X + e. \tag{3}$$

In the case of CPS and equation (1), which deals with the father's TE attainment, the regressors include *Father DA* and the matrix X^F which contains the father's age, race dummies (White, Black, and Hispanic), and survey year dummy variables. These are the only variables that are available and would have been relevant at the time the father's educational choices were made. Of course, variables that describe the father's familial circumstances would have been very valuable, but these earlier-timed variables are not available in the current surveys. Note that the survey year dummies, time-dependent variables, and other controls in equation (1) effectively capture the secular time patterns that can be discerned in Figure 1; the bulge in TE involvement during 1944–1953 is picked up by the *Father DA* variable with a coefficient that refers to the average annual height of the bulge during 1944–1953. In the case of CPS and equation (2), which deals with the child's TE enrolment, we have the following characteristics available for each offspring in the matrix X^C: an indicator for the mother's TE attainment, the father's and mother's age and age at their child's birth (Dickson *et al.*, 2016, p. 198), race dummies for the child and each parent (White, Black, and Hispanic), a female dummy, a single marital status dummy, a house ownership dummy, income per capita and its square, dummy variables indicating no own children and the number of siblings in the household, metropolitan city center and metropolitan out of city center residence dummies, region dummy variable indicators, child's birth year dummies, and survey year dummy variables.

In the case of PSID and equation (1), which deals with the father's TE attainment, the matrix X^F contains the father's age and race dummies (White and Black). In the case of PSID and equation (2), we have the following characteristics available for each offspring in the matrix X^C: an indicator for the mother's TE attainment, the father's and mother's age and age at their particular child's birth, race dummies for the child and each parent (White and Black), the mother's and father's income, a female dummy, a single marital status dummy, a dummy variable indicating zero

own children, a dummy variable indicating whether there are sisters and/or brothers, the children's birth year dummies, and resident region dummies at the time of the survey. In PSID, information is also available on the father's TE attainment, age, and veteran status (for any war, the Vietnam War included) which can be used to construct *Father TE* and *Father DA* comparable to those in CPS.

For both CPS and PSID and to make sure that the DA indicator is not capturing a parental age effect, we add the father's and mother's age as covariates in the X^C matrix for equation (2). This is intended to capture the fact that the incentives that parents transmit to their children could depend on the age of the parent. Given that attendance in TE has been increasing for the younger cohorts, we circumvent this potentially confounding effect by adding the children's birth year dummy variables.

A number of methods for dichotomous dependent variables are available,[13] but we report results for the Linear Probability Model (LPM), estimated using OLS, because of the ease of dealing with the possible simultaneity problem. This may arise because an OLS structural equation of *Child TE* on a constant, *Father TE*, and the available controls, could produce an inconsistent estimate of the coefficients, including that on the variable of particular interest, namely the father's TE attainment.[14] For that reason, in addition to OLS, we use instrumental variable methods.

Of particular interest are the coefficients α_1 in equation (1), β_1 in equation (2), and λ_1 in equation (3). The coefficient α_1 indicates the extent to which *Father DA* signals increased TE attainment by the father (relative to the trend values that are captured by the regressors listed earlier). This coefficient is the subject of the important literature that was noted earlier. The discussion of our results in Section 3 suggests that, indeed, α_1 is large positive and statistically significant at the 1 percent level. As noted earlier, *Father DA* is clearly exogenous when birth year is the only criterion used (Proxy 1). When *Father DA* is also conditioned on veteran status, it is important to test for orthogonality between it and the error term in equation (2).

The coefficient β_1, the inter-generational transmissibility coefficient, indicates the extent to which paternal education has an intergenerational influence on the educational attainment of the child. The IV procedure applied to the system of equations (1) and (2) ensures consistency of the β_1 estimator using *Father DA* as the instrument or the exogenous exclusion restriction in equation (2). Later, we test whether *Father DA* has an independent influence on *Child TE* . The coefficient β_1 is critical to the intergenerational transmission of education, and it may not be estimated consistently by the application of OLS to equation (2). We estimate equation (2) with OLS as well as IV, test for the desirability of

[13]Logit specifications have also been explored with similar conclusions. In the interest of economy, these are not reported here.

[14]A large, positive, error term that induces TE participation by the child is likely to be positively correlated with the TE attainment of the father if nature is at all operative or if the father follows familial nurturing practices that he has experienced. The OLS coefficient estimator may be biased and inconsistent, calling for estimation methods appropriate to a simultaneous equations context. The correlation of *Father TE* with the error term v in equation (2) below is the orthogonality condition tested by the Hausman (1978) test.

the latter given the superior efficiency of OLS if it is valid, and compare the results obtained.

The coefficient λ_1 in the reduced form equation (3) for *Child TE* measures the overall, ultimate, impact of paternal DA status on the education of the child, relative to what prevails in the control group (where *Father DA*=0). The coefficient λ_1 consists of the impact of DA status on the education of the father (α_1) multiplied by the impact of paternal education on the education of the child (β_1). Allowing for the stochastic nature of all estimators, λ_1 should be approximately equal to $\alpha_1\beta_1$.

3. Results

Our main results appear in Tables 1 and 2 in the main body of the paper. The Appendix contains supplementary tables and figures.

3.1. *Main Results*

3.1.1. CPS Results

Because of the large number of variables involved in the CPS and PSID matrices of controls, space considerations preclude a full presentation of the results obtained. There is nothing surprising in the behavior of the personal characteristics and other variables that we are able to control for in the CPS and PSID equations. Accordingly, we present the CPS results on the coefficients of interest in Table 1. In the top part of Table 1, under First stage, we report various statistics and the estimate of α_1 in equation (1) for the two alternative DA Proxies 1 and 2, using two separate LPM equations. Under Second stage and equation (2), we present statistics and the estimate of the coefficient β_1 on the intergenerational TE transmission from fathers to their offspring, using OLS (where the actual *Father TE* variable is used, as in column 1) and IV (where *Father TE* is instrumented using Proxy 1 or 2, in columns 2 and 3). The lowest part of Table 1 presents the estimate of the reduced form parameter λ_1 in equation (3) using two separate LPM equations for Proxies 1 and 2. Statistics for validity tests are not included in Table 1 to facilitate its readability, but they are discussed in the body of this section; a similar comment holds for the PSID results in Section 3.1.2.

We note that the coefficient on the draft-avoidance indicator α_1 is positive, large, and statistically significant at the 1 percent level for both DA Proxies. Under the column for Proxy 1, which corresponds very closely to the variables in Figure 1, the estimated coefficient is 0.077 (0.005) or nearly 8 probability points for each survey year. The reported R^2 is reasonable for this cross-sectional application and the *p*-value for the overall equation F statistic indicates significance well below the 1 percent level. There is no doubt that the "relevance" of *Father DA* for *Father TE* is assured. Similar comments hold for the LPM with Proxy 2, except that the absolute size of the estimated α_1 is somewhat lower (0.051) but still significant at the 1 percent level.

TABLE 1
Estimation Results for Equations (1), (2), and (3) Using CPS Data

		LPM (OLS)	
First Stage, Eq. (1), Y = *Father TE*		$\widehat{\alpha}_1^{P1}$	$\widehat{\alpha}_1^{P2}$
Father DA Proxy 1		0.077***	
		(0.005)	
Father DA Proxy 2			0.051***
			(0.005)
R^2		0.077	0.074
F-statistics		144.354	138.251
F-statistics *p*-value		0.000	0.000
Second Stage, Eq. (2), Y = *Child TE*	LPM (OLS)	LPM (IV)	
	$\widehat{\beta}_1$	$\widehat{\beta}_1^{P1}$	$\widehat{\beta}_1^{P2}$
Father TE	0.184***	0.137**	0.329***
	(0.005)	(0.054)	(0.087)
R^2	0.234	0.209	0.209
Hausman test *p*-value		0.886	0.010
Reduced form, Eq. (3), Y = *Child TE*		LPM (OLS)	
		$\widehat{\lambda}_1^{P1}$	$\widehat{\lambda}_1^{P2}$
Father DA Proxy 1		0.010**	
		(0.004)	
Father DA Proxy 2			0.017***
			(0.004)
R^2		0.209	0.209

Notes: Observations equal 68,991 everywhere. Data are from the CPS Annual Social and Economic Supplement (March) surveys for years 1981–2014. "*Father DA*" stands for Father Draft Avoider and these variables are the treatment indicators that are built using these two conditions about the father: (1) born during the risk years 1944–1953, and (2) that was not a Vietnam War Veteran. Proxy 1 satisfies the first condition, Proxy 2 the first and second. The units of analysis are 19–21-year-old individuals that could be linked to their fathers. The sample is restricted to fathers born between 1935 and 1965.

Each column corresponds to a different regression and displays the coefficients and their robust standard errors (White, 1980). The estimates are weighted using inverse probability weights. First Stage regression's independent variables that are not reported include father's age and race dummies (White, Black, and Hispanic), and survey year dummy variables. Second Stage and Reduced Form regression's independent variables that are not reported include the following: an indicator for mother's TE attainment, father and mother age and age at their child's birth, race dummies for child and each parent (White, Black, and Hispanic), female dummy, single marital status, house ownership dummy, income per capita and its square, dummy variables indicating no own children and the number of siblings in the household, metropolitan city center and metropolitan out of city center residence dummies, region dummy variable indicators, child's birth year dummies, and survey year dummy variables. ** significant at the 5% level, *** significant at the 1% level.

An estimate of the coefficient β_1 in equation (2) appears under Stage 2, in Table 1. It is positive for DA Proxies 1 and 2 (0.137 and 0.329, respectively) and statistically significant at least at the 5 percent level. As the probability of paternal TE increases, so does that of their offspring. The estimate of intergenerational transmission of TE is somewhat higher for Proxy 2, perhaps because the GIs are now included in the controls. The descriptive power of the stage 2 equations is substantially higher than that in stage 1 because, here, a good deal more information about the child's familial life is known and used than was the case for the father in equation (1).

A relevant issue for this part of Table 1 is whether instrumenting *Father TE* is warranted, given the possible loss of efficiency if it is not needed. In column 1, Table 1, an LPM OLS-based version of equation (2) is reported. The Hausman (1978) test suggests that for Proxy 1 the OLS estimates are not significantly different from the IV ones. The estimate of β_1 is somewhat higher (0.184) than that under IV (0.137), likely because OLS would be prone to attribute a greater role to *Father TE* when any amount of endogeneity is present. However, IV appears to be the method of choice for Proxy 2.

As a check on whether *Father DA* may play a direct role in equation (2), rather than act solely through equation (1), *Father DA* was added to the instrumented version of equation (2) but the *p*-value on the estimated coefficient of *Father DA* was 0.197, suggesting no direct role. This was also the case when Proxy 2 was used (*p*-value=0.426). This validity test is consistent with the structural model used for the DA Proxies.[15] We have also considered the possibility that the transmission coefficient β_1 may be higher when *Father DA* = 1. This interaction between (*Father DA* × *Father TE*) was added to an OLS version of equation (2). For Proxy 1, the interaction term was small and not significantly different from zero, leaving the estimate of 0.184 (0.005) in Table 1 intact and β_1 as previously estimated. For Proxy 2, the coefficient on *Father TE* was 0.179 (0.005) and on the interaction (*Father DA* × *Father TE*) it was 0.017(0.005), both significant at the 1 percent level. However, IV would be required in the case of Proxy 2, and this tentative evidence for a heavier transmission coefficient for the DAs is not considered in the next paragraph.

The estimate for λ_1 in the CPS reduced form equation (3) for *Child TE* appears in the lowest part of Table 1, for both definitions of DA. As can be seen from the values in Table 1, these are the approximate product of the estimates of α_1 and β_1 and are statistically significantly different from zero at least at the 5 percent level. They range from 0.010 (Proxy 1) to 0.017 (Proxy 2). For the fathers in the treated group who, absent conscription, would not have chosen to obtain a TE degree, their offspring have a significantly increased probability of TE enrolment relative to those in the controls. Note, again, that the X matrix in Equation (3) includes, inter alia, time-relevant and other variables, so that the coefficient on *Father DA* must reflect to a large extent the influence of groups 1 and 2 in the treated (see Section 2.4); at least some of the trend behavior of the normal "academic" types must be embedded in the trend values for the controls. This must imply some role for nurture well beyond what advantages might flow from heritability, with important implications for the effects of current educational policy on long-term TE attendance.

3.1.2. PSID Results

Turning to the PSID results in Table 2, it should be noted at the outset that they are based on a small cross-sectional sample. We examine this data set to consider whether anything strikingly different stands out with respect to the behavior of children who have left home and could not have been monitored in the CPS data. We believe that, allowing for the fact that these results involve the completion

[15]We are indebted to a referee for suggesting this test.

TABLE 2
ESTIMATION RESULTS FOR EQUATIONS (1), (2), AND (3) USING PSID DATA

		LPM (OLS)	
First Stage, Eq. (1), Y = *Father TE*		$\widehat{\alpha}_1^{P1}$	$\widehat{\alpha}_1^{P2}$
Father DA Proxy 1		0.084***	
		(0.029)	
Father DA Proxy 2			0.100***
			(0.030)
R^2		0.017	0.019
F-statistics		4.768	5.448
F-statistics *p*-value		0.001	0.000
Second Stage, Eq. (2), Y = *Child TE*	**LPM (OLS)**	**LPM (IV)**	
	$\widehat{\beta}_1$	$\widehat{\beta}_1^{P1}$	$\widehat{\beta}_1^{P2}$
Father TE	0.097***	1.184**	0.893**
	(0.028)	(0.595)	(0.406)
R^2	0.148	0.148	0.146
Hausman test *p*-value		0.001	0.003
Reduced form, Eq. (3), Y = *Child TE*		**LPM (OLS)**	
		$\widehat{\lambda}_1^{P1}$	$\widehat{\lambda}_1^{P2}$
Father DA Proxy 1		0.101***	
		(0.03)	
Father DA Proxy 2			0.089***
			(0.03)
R^2		0.15	0.15

Notes: Observations equal 1722 everywhere. Data are from the PSID 2013 survey. "*Father DA*" stands for Father Draft Avoider, and these variables are the treatment indicators that are build using these two conditions about the father: (1) born during the risk years 1944–1953, and (2) that was not a War Veteran. Proxy 1 satisfies the first condition, Proxy 2 the first and second. The units of analysis are 24–55-year-old individuals that could be linked to their fathers in the PSID 2013 data files. The sample is restricted to fathers born between 1935 and 1965.

Each column corresponds to a different regression and displays the coefficients and their robust standard errors (White, 1980). The estimates are weighted using inverse probability weights. First stage regression's independent variables that are not reported include father's age and race dummy variables (White and Black). Second stage and reduced form regression's independent variables that are not reported include the following: an indicator for mother's TE attainment, father and mother age and age at their child's birth, race dummies for child and each parent (White and Black), mother's and father's income, female dummy, single marital status, dummy variables indicating no own children, two dummy variables indicating whether they have sisters and/or brothers, children's birth year dummies, and resident region dummies at the time of the survey. ** significant at the 5% level, *** significant at the 1% level.

of TE rather than mere enrolment, this is not the case, certainly not in a qualitative way. The results in Table 2 are broadly similar to those in Table 1. The two estimates of the coefficient α_1, which are higher than those for enrolment in Table 1, are both positive and significantly different from zero at the 1 percent level. They range from 0.084 to 0.100, again implying significantly increased probabilities of father TE attainment if *Father DA* = 1. The fit and overall *p*-value for these PSID equations (1) are satisfactory and similar to those in Table 1. The two estimates of β_1 are positive and statistically significantly different from zero at the 1 percent level. They range from 0.897 to 1.195 for Proxies 2 and 1, respectively, numbers which are substantially higher than those in Table 1. The Hausman (1978) test suggests that, in this case, IV is preferred for both DA Proxies, as the equality of coefficient vectors under OLS and IV is rejected at the 1 percent level.

The validity checks on whether *Father DA* may play a direct role in equation (2) produced *p*-values for the Proxy 1 and Proxy 2 equations equal to 0.197 and 0.426 respectively, thus rejecting an independent role for *Father DA* in equation (2). When the interaction (*Father DA* × *Father TE*) was added to an OLS version of equation (2), some evidence for greater transmissibility from the DAs was obtained. For Proxy 1, the coefficient on *Father TE* was 0.065 (0.03) and on the interaction term (*Father DA* × *Father TE*) it was 0.078 (0.04), both significantly different from zero at the 5 percent level. For Proxy 2, the coefficient on *Father TE* was 0.080 (0.03) and on the interaction term it was 0.059 (0.03), the first significant at the 1 percent and the second at the 10 percent level. However, for PSID, IV would be required in the case of Proxies 1 and 2, and this tentative evidence for a heavier transmission coefficient for the DAs is not considered in the next paragraph. The two reduced form equations in the lower part of Table 2 have positive coefficients ranging from 0.089 to 0.101 for Proxies 2 and 1, respectively; both are statistically significantly different from zero at the 1 percent level. The PSID estimates for completion are substantially higher than those obtained for enrolment in CPS.

Thus, allowing that one aim of this paper stated in the introduction, viz. that consistent estimators for β_1 can be obtained (as in Tables 1 and 2), the reduced form results in these tables suggest that our second aim, viz. the exploration of the extreme versions of nature and nurture in this episode of an intergenerational transmission of education, can be undertaken: We find that during the 10-year period 1944–1953, far from signaling lower enrolments and completions by their offspring, DA fathers are associated with enhanced annual TE involvement which is significant at least at the 5 percent level and generally at the 1 percent level. Thus, both aims of the paper have been addressed.

In a paper that is almost exclusively devoted to establishing the causal effect of having a father eligible for Vietnam duty on the labor market experience of the offspring (e.g., earnings and labor force participation), Goodman and Isen (2020) offer three coefficients (see their Table 6, rows 3–5, p. 200) which measure the impact of paternal draft eligibility on the TE attainment of their offspring (years of TE attendance, and whether any undergraduate, or any graduate TE was taken). All three coefficients are negative, and the last two are statistically significant at the 5 percent level. The finding is, then, that the children of eligible fathers tend on average to have equal (years of education) or less TE (undergraduate or graduate) than those in the control group. These estimates do not clearly address the intergenerational transmission of TE attainment issue discussed in our paper: Goodman and Isen (2020) do not know the paternal level of TE. In addition, they do not know if the lottery-eligible served in Vietnam; that is, we do not know whether they fall in the treated or control group of our study. We have noted (footnote 12) that the intergenerational transmission of TE for the GIs is low. It is possible that the negative coefficients in Goodman and Isen (2020) reflect the behavior of the children of fathers who actually served in Vietnam. If so, their results would be consistent with those reported here.

3.2. *Ancillary Issues*

We have argued, in Section 2.1, that the CPS data are more suitable for the study of enrolment, rather than completion, because household children who leave home as

early as age 22, setting up separate households, cannot be linked to their parents. It is nevertheless interesting to check if, in a remaining smaller and perhaps selected, sample, the results for CPS *completion* by children aged 25–35 are qualitatively very different.To this end, we used Proxy 1 where for enrolment OLS was appropriate (i.e., in equation (2)) *Father TE*, rather than its instrumented version was used), and a sample of 26,841 observations (instead of 68,991 on enrolment as above). The OLS estimate for the inter-generational transmission coefficient β_1 was 0.127 (0.007) and that for λ_1 was 0.027 (0.008) and 0.023 (0.008) for Proxies 1 and 2, respectively. As in PSID, these results are somewhat higher in absolute value than for CPS enrolment, but broadly in line with the earlier ones; this may be because completion requires stronger paternal support and may be further evidence of nurturing. However, an attempt to implement the whole model in the main body of the paper for CPS completion was not satisfactory, suggesting that selection issues could not be adequately dealt with.

In our analysis we are primarily interested in the intergenerational transmission of TE from father to offspring, while controlling for the mother's TE attainment. The decision to control for the mother's education is in line with discussion in Holmlund *et al*. (2011). To avoid omitted variable bias on our coefficient of interest (*Father TE*), we need to control for mother's education, realizing that this introduces a degree of multicollinearity that may inflate the standard errors. We omitted maternal education and, as expected, a heavier weight is attributed to the father's characteristics: The estimated coefficients of interest (β_1 and λ_1) are higher in magnitude with little change in standard errors. Thus, our results in the main body of the paper, if anything, understate the effect of parental nurturing on the TE involvement and attainment by the offspring.

Finally, in the spirit of falsifiability analysis, we test the appropriateness of our instruments if the chain of causality in equation (2) is broken. In that case we find that the instrumented *Father TE* variable cannot be used to explain the artificial environments chosen and only has value within the framework of equations (1) and (2).

The results in this section are not reported to conserve space, but a set of tables are available for anyone concerned in the file Supplementary Material to "Vietnam Era Fathers: The Intergenerational Transmission of Tertiary Education."

4. Conclusion

In this paper, we explore the educational attainment of the children of fathers born between 1944 and 1953. These fathers were at risk of being drafted, at 19 years of age, during the height of the Vietnam War but could avoid this if they enrolled in TE. A well-established literature documents a substantial and statistically significant rise in the TE participation of this cohort of (later) fathers. We confirm in two different data sets that this rise is so striking relative to adjacent-time cohorts that it suggests that many of these individuals were exercising their right to avoid the draft via TE and would not otherwise have gone on to further studies. How did the children of fathers who did not have an inherent interest in TE behave in terms of their own participation in TE some two decades later? How does this participation compare to that of the children of fathers in the control group who did serve in Vietnam and/or were not born between 1944 and 1953?

One main objective of this study was to provide a framework for estimating the intergenerational transmission coefficient consistently using *Father DA* as an instrument for *Father TE*, a variable that may be correlated with the error term in the *Child TE* equation—leading to inconsistent estimators. A second important aim was to consider the implications of the estimated transmission coefficient (in conjunction with the effect of the draft-deferment option on the acquisition of TE by fathers) for the overall, reduced form, effect of *Father DA* on the educational attainment of his children. This effect is estimated relative to that of the control group of fathers who were born outside the Vietnam period.

In the context of a two structural equation system, estimated with *Father DA* as an instrument for *Father TE*, where the first equation describes the TE attainment of the father and the second the TE involvement of the child, we find that the additional education obtained by the father has a positive, sizeable, and statistically significant impact on the TE participation of the child. The inter-generational transmission coefficient is estimated consistently through IV in three of the four possible cases: The *Father DA* instrument is "relevant," and the Hausman (1978) test of orthogonality between the *Father DA* and the error term in the *Child TE* equation suggests that the IV vector of coefficients is significantly different from the LPM (OLS) one. In the one case where the Hausman (1978) test cannot reject the equality of the LPM and IV coefficient estimates, the LPM estimates are available, they are consistent, and efficient.

In the reduced form equation for *Child TE*, *Father DA* has a positive and statistically significant coefficient, at least at the 5 percent level and generally at the 1 percent level, in all four cases studied. This suggests that the group of DAs, which includes a large number of individuals who would not have attained TE were it not for the draft, are more likely to pass on to their children the wish to pursue TE (a desire that they themselves did not inherently have) than fathers in the control group. In this particular context, the transmission mechanism is likely to be influenced by nurture, broadly defined.

The results of this paper point to an important relationship when considering education policy in regard to social mobility. Consider the perspective of an adherent to an extreme nature position. Such a person would believe that fathers who undertook TE for opportunistic reasons, such as to avoid being drafted, would not possess heritable traits favorable for enrolling and achieving TE: They would not be able to pass on, or develop, traits in their children that would ensure their academic success. However, if nurture is the key factor in the intergenerational transmission of TE, then the additional education of DA fathers and all that entails (e.g., higher parental aspirations and a different role model for the children, better parental professional placement, higher income, better home location and schooling, and keener peers at school) would be expected to have a strong impact on the propensity for TE by the offspring. This study of inter-cohort effects of DA fathers through broadly defined nurture provides an opportunity to weigh its importance, relative to pure heritability, using a natural experiment. This is achieved because of the instrument provided by the extraordinary TE attainment of the fathers.

Not only do we find no reduction in the transmission effect for cohorts that include such opportunistic individuals, but we find that there is a positive effect on the intergenerational transmission of TE. As noted by Haveman and Smeeding

(2006, p. 128), "children of less well-educated and less well-to-do parents begin the 'college education game' later, with fewer choices and fewer resources."[16] Our results suggest that fathers who would otherwise not attend TE, except for non-standard reasons, will absorb nurturing characteristics that will provide just as much of an encouragement for their children to attend TE as for those fathers who would attend TE under normal circumstances. Therefore, providing a pathway that increases one generation's attendance to TE may very well persist and affect subsequent generations into the future. If so, policies that encourage participation in TE at a point in time may offer benefits beyond those experienced by their initial targets in a way that breaks the tight relationship of social mobility between generations based on parental higher education.

Although a finding that causality (nurture) plays an important role in explaining the positive correlation between parents' and their offsprings educational attainment, this does not mean that different education reforms that lead to equivalent increases in TE attainment will have the same spillover effects for their children. Each education policy, including the educational deferment policy during the Vietnam war period, will lead to a different group of individuals from the set that would not normally have chosen to attend university to do so. That is, there will be a selection effect from within the group that would, absent the reform, not have attended, and this effect is likely to be specific to the particular education reform in question. It is important to investigate a variety of education reforms that lead to an increase in TE attainment to understand more fully the extent to which such spillover effects may be policy dependent.

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[16]As do others, Christofides *et al.* (2009, p. 18) find "that the role of parental education (is) substantially more important (than family income) in explaining the long term trend in university attendance rates." Words in parentheses added.

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