Can a Summer Make a Difference? The Impact of the American Economic Association Summer Program on Minority Student Outcomes

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Abstract

In the 1970s, the American Economic Association (AEA) was one of several professional associations to launch a summer program with the goal of increasing racial and ethnic diversity in its profession. In this paper we estimate the effectiveness of the AEA's program which, to the best of our knowledge, is the first to rigorously study such a summer program. Using a comparison group consisting of those who applied to, but did not attend, the program and controlling for an array of background characteristics, we find that program participants were over 40 percentage points more likely to apply to and attend a PhD program in economics, 26 percentage points more likely to complete a PhD, and about 15 percentage points more likely to ever work in an economics-related academic job. Using our estimates, we calculate that the program may directly account for 17-21 percent of the PhDs awarded to minorities in economics over the past 20 years.

I. Introduction

Underrepresentation of minorities in higher education has been the focus of sustained attention in the U.S. for decades. Lack of preparation, information, and resources as well as residual discrimination have been identified as potential reasons for this underrepresentation, prompting policymakers and educators to adopt counteracting strategies such as affirmative action in admissions, scholarships, and enrichment programs. Perhaps the most controversial of these programs is affirmative action in admissions. Studies examining the impact of affirmative action bans generally find that these bans decrease the likelihood that minority students apply to and enroll in top-tier institutions (e.g., Long, 2004; Dickson, 2006; Backes, 2012; Hinrichs, 2012). Similarly, interventions in the spirit of affirmative action, such as quotas and preferential treatment in laboratory designs, suggest that this approach is effective at increasing gender and racial diversity (e.g., Balafoutas and Sutter, 2012; Niederle, Segal, and Vesterlund, 2013; Schotter and Weigelt, 1992). [1] However, given political and legal controversies surrounding affirmative action, many have turned to other strategies for increasing the representativeness of minority students in institutions of higher education.

Providing enrichment for students so that they are better prepared for further academic study is a well-established, though little-researched approach, to increasing academic diversity. For example, for the past fifty years the federal government has funded college preparatory programs, such as Upward Bound and Talent Search. While the research base for these programs is relatively thin, the estimated impacts on student educational outcomes (such as college attendance or the type of institution attended) have

[1] In addition, several theoretical studies have examined the implications of affirmative action for college admission, future earnings, and wage inequality (see, e.g., Chan and Eyster, 2003; Moro and Norman, 2003; Arcidiacono, 2005).

been surprisingly mixed (see, e.g., Haskins and Rouse 2013). There is even less evidence on the effectiveness of enrichment programs to prepare students for graduate programs with the aim of addressing underrepresentation in specific professions, although such programs exist in several fields. For example, the American Economic Association (AEA), American Political Science Association (APSA), and the Public Policy and International Affairs Program (PPIA) have sponsored summer enrichment programs for the past 30 or more years.[2,3]

It is straightforward to understand why the AEA elected to focus on increasing diversity in its profession: in the late 1970s only 3 to 5 percent of doctorates in economics received by US citizens and permanent residents were awarded to minorities traditionally underrepresented in the profession (African Americans, Hispanics, and Native Americans), or about 23 new PhDs, each year (Collins 2000). This lack of diversity was worrisome because economic analysis is likely to benefit from differing perspectives and priorities among those in the profession; in addition, a lack of role models in institutions of higher education may have been discouraging younger generations of minority

[2] Other professions offer slightly different kinds of programs with the shared goal of increasing diversity. For instance, the American Sociological Association runs the Minority Fellowship Program that provides mentoring and financial support to minority applicants to graduate programs and current PhD students. As another example, the Minority Legal Education Resources operates the Bar Process Management Program to assist minorities in passing the Illinois Bar Exam and provide them professional advice. Assessments, and especially those that attempt to ascertain causality, are rare. A less formal assessment of a public policy program appears in MacAllum and Gallup-Black (2003). The political science profession's efforts, which include the Ralph Bunche Summer Institute, are loosely but not causally assessed in Monforti and Michelson (2008).

[3] Around the time that efforts were starting to increase racial and ethnic diversity in many professions, there were also efforts to increase representation of women. For example, the American Economic Association started focusing efforts on increasing the proportion of women in economics in the 1970s. Since then, the percentage of women receiving doctorates in economics has increased from 11 percent in 1975 to 35 percent in 2011, a trend that can be attributed to a variety of factors, including programs designed to address the imbalance (American Economic Association, 1976; McElroy, 2013; Kahn, 1995; Ginther and Kahn, 2004; Hale and Regev, 2013). Notably, Blau, et al. (2010) report findings from the first randomized study of the AEA's mentoring program for junior female economists. They find that the mentoring program had a positive effect on a number of professional outcomes, such as the number of top-tier publications, the total number of publications, and the number of successful federal grants earned by individuals randomly assigned a mentor compared to those randomly assigned to the control group.

students from entering the profession (Collins 2000; Chung 2000) and may have adversely affected minority students' performance (Fairlie et al., 2014).

Unfortunately, after some initial improvement, progress has stalled more recently. As shown in Figure 1, the percentage of economics PhDs awarded to minorities has fluctuated around 8 percent since the mid-1990s, which means on average about 30 new PhDs each year.[4] As a sobering contrast, the percentage of minorities receiving doctorates has experienced a steady increase in other social sciences and in the science, technology, engineering, and mathematics (STEM) fields.

Given the lack of significant improvement in the racial and ethnic representativeness of doctorates in economics, a key question is whether the AEA's Summer Program has been effective at improving the diversity of the economics profession. To address this question and evaluate the success of the program, we use data from over one-third of AEASP participants between its inception in 1974 and 2010, and a comparison group of students who applied to the program but did not attend. While not a randomized control group, the comparison group enables us to assess the program's impact on a variety of graduate school and professional outcomes. Although we control for a variety of background characteristics, we note that there may be residual unobserved differences between the AEASP participants and those in the comparison group that bias the estimated impacts. That said, to the best of our knowledge, this is the first evaluation that uses a comparison group and controls for various background characteristics to

[4] Similarly, the percentage of bachelor's degrees in economics awarded to minorities has remained around 10-12 percent since 1995 (Rouse 2013).

assess an (summer) enrichment program that focuses on disadvantaged and minority groups.[5]

Overall, we find that the AEA's Summer Program participants were over 40 percentage points more likely to apply to and attend a PhD program in economics, 26 percentage points more likely to complete a PhD, and about 15 percentage points more likely to ever work in an economics-related academic job. Using these estimates, we calculate that the program may directly account for 17-21 percent of the minority PhDs in economics over the past 20 years. As such, the results from this analysis suggest that relatively intensive, but short, enrichment programs can be an effective tool for improving diversity in at least economics, and likely other professions.

The rest of the paper is organized as follows. In the next section we describe the AEA Summer Program and its student population. In section III we present the data, including our survey and its implementation and the estimation strategy. We present the results in section IV. Section V concludes.

II. Background on the American Economic Association Summer Program

The Program

With the stated objective of increasing the numbers of professional economists from underrepresented minority groups who have been historically disadvantaged in the

[5] In a related paper, Price (2005) examines the research productivity of Black American economists, and alternately using propensity score matching (on observables) and Heckman corrections (to control for unobserved selection), finds that conditional on being an economist, AEASP participants were somewhat more likely to have published in major journals, received support from the National Science Foundation, and to have NBER membership than those who did not attend. MacAllum and Gallup-Black (2003) survey attendees and unsucessful applicants of public policy summer programs sponsored by PPIA and report differences in sample means from raw data covering survey characteristics. The sample size used in final analysis is around 200 and there are no controls for differences in background characteristics or tests of statistical significance.

American context, the AEA started a Summer Program (the AEASP) to be hosted at an institution for a period of years. The AEASP began regular operation at the University of California, Berkeley in 1974 and has been hosted by 10 other institutions since then.[6] Laudably, the program completed its 41st session in 2015.[7] Table 1 shows the universities that have hosted the program since its inception, the years of operation, and the annual average number of participants at each institution.[8] Since the beginning, the AEASP has included just fewer than 1,000 participants, or about 25 per year; hosts have run the program for an average of 3.7 years.

The program itself has varied over time. One reason for the variation is the resources of the host institution and external funding support. As a result, while the typical program has been 7-8 weeks long, it has ranged from as few as 5 weeks at the University of New Mexico (UNM) to 9 weeks at Duke. Further, while on average about 25 students have participated each year (see Table 1), participant numbers have ranged from fewer than 20 at the University of Texas, Austin (Texas) to over 30 at Duke. Another reason for the variation has been the director's interpretation of the objective of the program. Some directors, especially those earlier on, have aimed to increase the likelihood that students already interested in economics and from relatively competitive

[6] Initially, "underrepresented in the American context" largely meant African American and Native American. Since about the mid-1970s this has broadened to include Hispanics, Filipino-Americans, Pacific Islanders, and others. Scholarship support was generally, but not always, restricted to these groups, although a small number of non-minority participants also have received financial aid. There have also been a very small number of foreign, non-permanent resident participants; to our knowledge, these students did not receive scholarship support unless they had refugee status. The presence of non-minority students was driven by legal rulings and university policy, but at no institution were the numbers of non-minority students large.

[7] See Alexis (1975) for a description of the history and first year of the AEASP, and see Collins (2000) for an earlier discussion of the AEA's efforts to increase the representation of minorities in the economics profession.

[8] The program has operated nearly continuously since its inception. The only year the program did not operate was in 2011 as it transitioned from the University of California at Santa Barbara to the University of New Mexico.

undergraduate institutions could enroll in and successfully complete a graduate program in an academically rigorous (think "Top 10") department. Others have focused on "high value added" students who were also interested in economics but who may have been from a less competitive undergraduate institution, who may have not thought seriously of pursuing a career in economics that requires training beyond the bachelor's level, or who may have had lower grades. Leeds (1992) articulated this issue slightly differently in noting that students whose parents were professionals earned substantially higher grades in their undergraduate programs. As a result, directors faced a trade-off between those applicants with the greatest need (and who presumably were least likely to progress on their own) and those applicants most likely to do well (and more likely to progress to doctoral programs on their own). Although the outcomes of interest (e.g., success in a doctoral program and a career in an economics-related profession) are similar, the focus would have affected several decisions of the program directors, such as recruitment and curriculum. While potentially important for the evaluation, as with other aspects of the program that varied, because of small sample size we do not attempt to estimate differential treatment effects by specific program characteristics.

In terms of curriculum, at the outset the program offered what amounted to study of advanced intermediate undergraduate material and an introduction to mathematical economics using Alpha Chiang's classic text (Alexis, 1975). Over the years, econometrics and research components were added; since time constraints were binding, something – usually macroeconomics – had to give. In more recent years, advanced coursework at various hosts has included real analysis, probability and mathematical statistics, time series econometrics, and research seminars that focused on micro data

analysis.[9] At some hosts, the content has been delivered in formal course structures that met university requirements and received academic credit; elsewhere, this was not the case. At the University of Colorado, Denver (UC-Denver) and Duke, an average of roughly 6 participants per year returned for a second summer.[10] Elsewhere, students took a single program regardless of background level. Even excluding from consideration those hosts that provided two levels, it is safe to say that the content has varied substantially from one host to another.

In terms of cost, it was recognized from the outset that most students needed to earn money during the summer to cover living and tuition costs in the coming academic year; moreover, given the caliber of the students attracted, many if not the majority had competing paid internship opportunities. Thus, the Summer Program generally has paid student living and travel costs, books and software costs, and also has provided a modest stipend, which in recent years has been in the $2000 to $2500 range.[11]

[9] Grove et al. (2007), Grove and Wu (2007), and Krueger and Wu (2000) find that better math and economics preparation are related to success in graduate programs in economics, suggesting that these elements of the Summer Program should result in improved outcomes for participants.

[10] We treat AEASP recipients as having been exposed to a single treatment regardless of whether they attended for one or two summers. Descriptive statistics also do not count students who return for a second summer. The impact of the second summer may well be important (as detailed in Becker and Price, 2008), but the recency and number of second-year participants make it difficult to assess the impact on PhD completion and career outcomes with any reliability.

[11] The stated intent of the AEASP has been to increase minority representation in the economics profession and to our knowledge, all students prior to 1996 received scholarship support. However, starting with the Texas program, the *Hopwood v. Texas* court ruling that forbade explicit consideration of race in admission or other academic decisions caused the formal distinguishing of admission and financial aid decisions, and also led to the admission of non-minority students. Since Texas offered credit for the summer program courses, resident economics majors also were allowed to register for the courses and to participate in the AEASP. Local students were awarded a tuition scholarship from Department of Economics funds and included both minority and non-minority scholars. While the *Hopwood* ruling was later significantly relaxed, the successor institutions no longer excluded non-minority students. Host institutions UC-Denver and Duke also offered course credit, and allowed regular students to take Summer Program courses. These hosts also gave a small number of non-minority students need-based financial aid. Note that in our analysis non-AEA Summer Program students from the host institution who were enrolled in the courses are not regarded as AEASP students.

In addition to student costs and stipends, the program also recruited faculty and teaching assistants. In most years, the program has had a faculty member who served as the director, along with a staff assistant. Some of the faculty and teaching assistants came from the host institution; those who did not were provided transportation and housing. Most faculty and all teaching assistants, regardless of institution, were paid for their work effort. These costs were covered by support from the AEA, public and private foundation grants, university (generally in-kind) contributions, and sponsor in-kind contributions.[12] Institutional in-kind support included (at some, but not all, hosts) classroom and other space, telephones, computer labs, and dormitories. Some hosts also have opened the courses to other students and transferred tuition revenue to the program. Examples of sponsor in-kind support include Coors Brewing Company's hosting of the 2002 and 2003 graduation ceremonies, or the Federal Reserve Board of Governors' sponsoring of a Fed-based faculty member for the four years that the program was at Duke.

Program costs have varied through the years, in part because input costs changed over time and location, in part because input quantities varied markedly and in part because hosts or supporters provided varying amounts of unrecorded in-kind support. Faculty salaries also varied, both because cost structures differ across institutions, and because some schools treated instruction as regular teaching credit, while others paid summer school rates or hired visitors. Above all, inputs varied. At UC-Denver and Duke, costs were higher because some participants returned for a second summer. Administrative commitments also increased (generally to 0.5 of an academic year full-

[12] The program has received support from the National Science Foundation and private foundations, such as the Ford, Mellon, and MacArthur Foundations.

time equivalent for the director) and at Duke, UC-Santa Barbara, and New Mexico there was extensive use of recent alumni as teaching assistants and mentors. Overall, based on budget reports submitted to the AEA to which we have access, costs ranged from $576,634 ($22,178/participant) in 2003 to $776,676 ($25,889/participant) in 2006. In contrast, the budget for the first AEASP program was well under $300,000 (and under $12,500/participant; Alexis, 1975).[13]

Applicants

We do not have complete records on applicants, but based on what we have, it appears that the size of the applicant pool has varied from about 50-75 at Texas to 150 at the University of Wisconsin, Madison. Applicant pool size has varied with economic climate, host institution effort and prestige, and the program's geographic accessibility.[14] Program directors had little reason to generate a large pool of highly-qualified applicants only to reject most of them. As such, the incentive was to ensure there was a large and diverse pool yielding 50-75 "quality" applicants, and not much of an impetus to go beyond that (and, in any event, recruiting budgets were tight).[15] In short, the program's applicant pool was not large but was highly competitive and in a typical year there would have been at least two or more admissible applicants for each offer made. Further, acceptance rates tended to be high. For example, at Duke and UC-Denver about 90

[13] All costs are converted to 2013 dollars using the CPI-U.

[14] The pool often declined during periods of high employment and economic growth. Evidence of this during the years at Temple University is described in Leeds (1992). Data on applicant pools other than Temple come from personal communication and information provided by program directors at Texas and Wisconsin.

[15] Another potential source of selection is if the host institution used the program as a tune-up for already admitted students. However, it was not common for AEASP participants to enter the PhD program of the host institution after attending the summer program. For example, only 1 of 119 students who first attended the Duke program directly entered its PhD program. More generally, while some students directly entered PhD programs (at any institution) after leaving the Summer Program, it was not common.

percent of those admitted accepted the offer and attended. We have no reason to believe that the percentages elsewhere were different. As a result, few alternates were extended offers. Overall, program size was constrained by funding and host administrative capacity rather than by the size of the applicant pool.

The combination of multiple sources of applicants, varying recruitment strategies by different hosts but generally quite modest effort, and very high yield rates from those who were admitted are key to our identification strategy. Together these characteristics imply that those who did not attend the AEASP and who were surveyed are likely to be quite similar to those who did attend. To get a sense of the difference between those admitted and those denied admission, we explored the initial admissions rankings for 2004, a year for which there are detailed data and for which there were four individuals on the admissions committee, each of whom rated applicants on a common scale. There were about 32 applicants close to the cut-off for admissions. The average correlation coefficient between selection committee member pairs for this set was -0.076 (which suggests that a lively and acrimonious meeting followed). For the entire set of complete applicants, the mean correlation coefficient was 0.336; correlations with the program director rose to 0.466. Nonetheless, it is difficult to conclude from this exercise that the control group is vastly different from the participants along dimensions that were observable to the admissions committee. This should not be surprising: especially at the margin, committees were concerned with admitting a group that was heterogeneous in terms of race, gender, region, type of school attended, and financial circumstances.

Participants

The composition of the minority student body also changed from one program to another.[16] Reflecting the two potential targets of the program discussed earlier, some schools, such as Temple (Leeds, 1992) and UC-Denver, targeted students from less elite schools for practical as well as ideological reasons; Duke and Stanford did so to a lesser extent as a matter of policy.

Consistent gender and race/ethnicity data for all programs do not exist, but the following points can be made from the (unpublished, but available from the authors) data that do exist. In the early years of the AEASP, the student composition was overwhelmingly African-American. In more recent years, the student bodies have been more evenly divided between African-American and Hispanic backgrounds, though there has been substantial oscillation from one year and host to the next. There also have been small contingents of students (just over 15 percent of our alumni survey respondents) who were Native American or from other historically underrepresented Asian-American groups (of Filipino, Pacific Islander, Hmong, or Vietnamese origin). Some students also have self-identified as multiple racial/ethnic backgrounds. Finally, throughout the program's history, women have comprised slightly less than half of the AEASP student body, though in some years women were the majority. There is no apparent time trend in the share of students who are women.

III. The Survey and Empirical Strategy

[16] A natural question is whether an inordinate share of participants might come from host institutions, thereby creating substantial unobserved heterogeneity. Insofar as there is a bias, it appears to have been modest. Of the 76 students who attended the UC-Denver programs, only one was an undergraduate there at that time. One more attended when the program moved on to Duke (but with the same director, so that links remained). Of the 119 new students at Duke, four were Duke undergraduates, and one was an incoming Duke PhD student. However, this pattern is not greatly different from the preceding period: two Duke undergraduates attended the program when it was at UC-Denver, as did one student who was entering Duke's PhD program.

The Survey

We started by putting together a sample frame of AEASP participants. We did so with a list of participants from 1974-2007 that we believe to be complete. These data included addresses and, for more recent years, virtually complete e-mail addresses. While e-mail and physical addresses change, informal and some formal (e.g., Facebook pages) contacts remain strong, and ultimately it was possible to contact a very large majority of participants.

Fortunately, we also had relatively complete records on all applicants from Stanford, UC-Denver, and Duke with which to construct a comparison group. The advantage of this comparison group is that it represents a group of students who were motivated to apply for the AEA Summer Program and therefore are likely relatively comparable to the participants. At the same time, most of them were not accepted to the program and we only have such data from a limited number of program years.[17]

We conducted a web-based survey from October 2010 to March 2011 to 1,464 individuals. We offered $25 as an incentive for participation. In total, 473 individuals responded (for a response rate of 32 percent): 329 applied to and attended the program, and 144 applied to but did not attend.[18] Of all applicants, 19 percent reported that they were not admitted and 6 percent reported having declined the offer or not attended for reasons such as poor health. Figure 2 shows the number of respondents by treatment and

[17] In an attempt to broaden the comparison group, we also asked survey participants to nominate someone with whom the individual went to college but did not apply to the AEA Summer Program, a form of "snowball sampling" (Goodman, 1961). While broadening the sample, this group of students is likely more dissimilar to the participants (on both observable and unobservable characteristics) than those from the unsuccessful applicant comparison group and, importantly, only increased the overall sample by 3 observations. As a result, we focus the analysis on only the applicant comparison group although results are similar when we use all available data and are available on request. Unless otherwise mentioned, statistics in this paper do not involve the snowball sample.

[18] There were 8 respondents who did not respond to any outcome-related variables; 5 were AEASP alums and 3 had not attended. We treat them as survey non-respondents.

comparison status by the year in which they applied to the program. We had the highest number of responses from the summer sessions of 1989-96 and 2000-07 though there were a remarkable 14 respondents from the 1981 class.

The survey asked for background information, such as parental educational attainment, and about college experiences, any post-graduate studies, and labor market experiences. Specifically, we asked about six educational outcomes including: whether the respondent had graduated with an economics major, applied to an economics graduate program, applied to an economics doctoral program, attended an economics graduate program, attended an economics doctoral program, and completed a doctoral degree in economics. We also asked about seven employment-related outcomes: whether the respondent currently has an economics-related job, has an economics-related job at an educational or research institution, has an economics-related job in academia, ever has had an economics-related job, ever has had an economics-related job at an educational or research institution, ever has had an economics-related job in academia, and current gross annual salary.

Empirical Strategy

We think of a potential AEA Summer Program participant as choosing future outcomes as an optimization strategy, subject to constraints on time, financial resources, ability, alternative options, and behavioral parameters, such as his or her discount rate. Empirically, we model the impact of participating in the AEA Summer Program on a variety of "economics-related" outcomes, *Y*, for individual *i* as follows:

$$Y_i = \alpha + \beta AEASP_i + \boldsymbol{X_i}\Theta + v_i \,, \qquad (1)$$

where $AEASP_i$ is a treatment status indicator for individual i having participated in the AEA Summer Program, $\boldsymbol{X}_i$ is a vector of baseline characteristics, v_i is the error term, and α, β, and Θ are parameters to be estimated; β represents the average effect on outcome Y of having participated in the Summer Program. In the tables that follow, we estimate equation (1) using a linear probability model for ease of interpretation; however, we have also implemented probit models which yield similar results (see Appendix Table 1).

We focus our analysis on three subsamples of our dataset. First, we use the full sample, which consists of every individual who applied to the AEASP and all of the available comparison group observations (which we highlight are only from Stanford, UC-Denver, and Duke University). The second "balanced" sample only consists of data from the years the program was at Stanford, UC-Denver, and Duke University; thus, the treatment group also only consists of applicants to those programs. The final sample further limits this "balanced" sample to individuals who applied to those programs through 2002 ("pre-2003") to allow for sufficient time to observe some of the longer-run outcomes.

The key challenge in this analysis is addressing potential unobserved heterogeneity between AEASP participants and non-participants. Table 2 compares background characteristics between participants and non-participants in different subsamples. Columns (1) and (2) present the mean of characteristics of the two available comparison groups: those who applied in all available years to a program at Stanford, UC-Denver, or Duke in column (1) and those who applied to one of these programs before 2003 in column (2). Columns (3), (5), and (7) present the mean characteristics of

the treatment groups from our three samples, and columns (4), (6), and (8) show the p-value of the t-test of the difference in means between treatment and comparison groups.

In each subsample, treatment and comparison groups are fairly similar, although there are some differences. That said, we highlight that nearly all differences are statistically indistinguishable across all of the available observable characteristics using the balanced and pre-2003 balanced samples. Specifically, the AEA Summer Program participants were less likely to have graduated from a Historically Black College and University (HBCU) in the full sample and the balanced sample. In addition, non-participants are about 5 years younger than participants in the full sample, due to the inclusion of older alumni in the treatment group. They are also 1.5 years older than participants in the pre-2003 balanced sample. Despite these individual differences, an omnibus F-test only suggests that overall the treatment and comparison groups are different when using the full sample where the p-value was 0. The p-value on the omnibus F-test was 0.57 for the balanced sample and 0.42 for the pre-2003 balanced sample, suggesting that the treatment and comparison groups are statistically similar in these two samples. Nevertheless, we control for observable characteristics in the subsequent analyses.

Due to a low survey response rate (32 percent), we also attempt to explore whether survey respondents were different from non-respondents. Ideally, we would have liked to have regressed a survey response dummy on a series of baseline characteristics, such as those reported in Table 2 using the survey sample. Unfortunately, the only characteristic that we observe for the entire survey sample is whether the individual was female. Across all three subsamples, the coefficient on female is nearly

zero and statistically insignificant, which suggests that it is not systematically associated with the survey response decision.[19] Even more importantly, the impact of whether the individual was female on the decision to respond is not statistically different between the treatment and comparison groups. Appendix Table 2 reports the regression results in detail.[20] While admittedly a very limited exercise based on a demographic variable, the estimates at least do not obviously indicate that our estimates of the impact of the AEASP on subsequent outcomes were affected by differential survey response bias.

The combination of a small sample size and a very small proportion of AEASP applicants who were accepted but declined admissions offers make it impractical to explore increasingly tight control groups. From Becker and Price (2008), we know that those participants who returned for a second year were qualitatively different from others because of both selection and screening (not all applicants for a second year were accepted). However, there are very few two-year treatment respondents in the survey, making further analysis impractical.

IV. Results

Table 3 presents the main results of the impact of the AEASP on "economics-related" outcomes. In columns (1)-(3) we present results using the full sample, columns (4)-(6) show results using the "balanced" sample using data from Stanford, the UC-Denver, and Duke, and columns (7)-(9) show results using the subset of data from the

[19] As mentioned in footnote 16, we treat the 8 respondents who did not respond to any outcome variables as survey non-respondents. Treating them as respondents does not change any of the results in this exercise.

[20] We also obtained AEA membership status as of June 2014 for the entire survey sample and regressed a survey response dummy on AEA membership. Different from gender, current AEA membership status is not a baseline characteristic. Again, we found no statistically significant difference in the coefficent between treatment and comparison groups. Because AEA membership changes over time and thus may be correlated with other time-varying characteristics such as age, we do not report the results here although they are available upon request.

balanced sample through 2002 ("pre-2003"). Further, we show estimates of the "raw" impact of the AEA Summer Program on these outcomes as well as estimates conditional on a variety of background characteristics. Specifically, we control for a quadratic in the individual's age, sex, race, ethnicity, number of undergraduate institutions attended, whether she or he received a bachelor's degree from an HBCU, whether she or he received a bachelor's degree from an "elite" institution, and whether at least one parent has a graduate degree.[21] Estimated coefficients from the full set of covariates are presented in Appendix Table 3.[22]

Impacts on Education Outcomes

The first panel of Table 3 presents the impact of the AEA Summer Program on education outcomes such as the likelihood that an individual majors in economics (defined as economics, agricultural economics, and business/applied economics) or applies to, enrolls in, or completes a graduate program. Starting with the impact on interest in economics at the undergraduate level, we find across the samples that AEASP participants were about 10 percentage points more likely to graduate with a major in economics (broadly defined) although this impact is not statistically significant in the pre-2003 balanced sample.

Further, we observe that AEA Summer Program participants were significantly more likely to apply to and attend graduate programs in economics. Specifically, AEA

[21] We control for the age of the respondent as a quadratic in the results shown here. In unreported regressions we have included up to a quartic in age and also limited the sample to those born after 1965. Both strategies generated results similar to those presented here and are available from the authors on request.

[22] We impute missing data via mean substitution. That said, there are very few missing data (see Appendix Table 4): only about 4.1% observations in covariates are missing in the full sample, 3.2% for the balanced sample, and 1.3% for the pre-2003 balanced sample, making the point virtually moot. While not presented, results that exclude imputation are not substantively different (and hence are not included in the text).

Summer Program participants were nearly 30 percentage points more likely to have applied to and attended a graduate program in economics and over 40 percentage points more likely to have applied to and attended a doctoral program in economics relative to the comparison group. Further, program participants appear to have been about 26 percentage points more likely to complete a PhD in economics relative to the comparison group in the most restrictive sample – those who applied before 2002 and who have had the greatest amount of time to complete one (see column (9)). Note that while the point estimates vary, the estimated impact of an over 200 percent increase in the likelihood of completing a doctorate in economics (relative to the comparison group mean) holds across the samples, and with and without available covariates.[23]

Impacts on Labor Market Outcomes

The bottom panel of Table 3 presents estimates of the AEA Summer Program on longer-run "economics-related" career outcomes, such as currently having an economics-related job or an economics-related academic job, or ever having held a job related to economics. In general, 45 percent of those who applied to the AEA Summer Program were holding an economics-related job at the time of the survey and nearly 60 percent had ever held such a job. These percentages are quite high and reflect the fact that those who applied to the program already had some interest in economics. We focus our discussion on results from the pre-2003 balanced sample below.

[23] We have estimated the models using only the pre-2001 balanced sample to provide a longer time for alumni of the summer program to have completed a doctoral program. While most of the results are similar, the number of observations drops dramatically (between 62 and 113 depending on the outcome) thereby increases the standard errors. These results are available from the authors on request.

We estimate that the AEA Summer Program increased the likelihood that participants were holding, or ever held, a job in an economics-related occupation at the time of the survey by about 11 percentage points, although the estimates are not statistically significant at conventional levels. In contrast, we find that the program significantly improved diversity in the profession as reflected in other measures. For example, we estimate that participants were over 15 percentage points more likely to currently have, or ever had, an academic job related to economics; participants were 30 percentage points more likely ever to have held an economics-related job in an educational or research institution. Given that only about 5 percent of the comparison group had an academic job related to economics at the time of the survey, only 9 percent had ever had such a job, and around one-fifth had ever held a job in an educational or research institution, these impacts are economically quite large.[24]

While impressive, we caution that these estimates must likely be interpreted as upper-bounds of the impact of the program as we do not have a randomly-assigned control group. However, it is notable that the estimates are fairly stable across the three

[24] While not central to the analysis, a few striking findings are worth mentioning. First, having a BA from an elite institution reduces the likelihood of applying and strongly reduces the likelihood of attending an Economics PhD program. However, it generally does not reduce the likelihood of actually earning a PhD, working as an economist, or entering academe. We anticipate that the discouraged application effect reflects higher opportunity costs to students from elite institutions, while superior education and socialization improves outcomes for those who do go on to PhD programs. The very large income effect (Appendix Table 3M) is consistent with this view.

Second, having attended a HBCU has no impact in balanced samples on any outcomes. Third, choosing one's parents wisely is an important life strategy. Having a parent with a graduate degree substantially increases the likelihood of applying for a PhD program (after all, if one's parents can earn a graduate degree, it cannot be that difficult), attending a PhD program, having an economics-related job, and having one at an academic institution – and there is also a very large income effect.

Finally, while the AEASP has large graduate and professional job effects, it does not appear to have long run income effects. Put differently, returns to the AEASP are either external or are nonpecuniary to the individual.

samples and with and without controlling for available background characteristics. Further, as shown in Appendix Table 1, they are also robust to using a non-linear probit and to employing propensity score matching. We also note that given the program appears to have encouraged more students to apply to graduate programs, the marginal students may have been weaker which would bias against finding positive impacts on PhD completion and later outcomes.[25]

The AEASP's Cumulative Impact on the Number of Economics Doctorates

Taking the estimates at face value, we ask what impact the AEASP has likely had on increasing diversity in the economics profession. We limit this thought exercise to the impact on the number of doctorates awarded to minority students as we have outside estimates of the total number of such doctorates from which to form a "universe." Based on the estimates in Table 3, AEASP alumni were 26 percentage points more likely to complete a doctorate in economics than were unsuccessful applicants. To estimate the cumulative impact of the AEASP on the number of doctorates awarded in economics, we use the following simplified calculation. Let P be the number of minority undergraduates who were potential applicants for economics PhD programs in a typical year, r the likelihood that these students would have eventually completed an economics PhD without the AEASP intervention, k the AEASP program effect, A the number of students who attended the AEASP in a particular year, and G the total number of minority students from that year who eventually completed an economics PhD. We then have,

[25] As evidence of the program encouraging more marginal students to apply, the coefficient estimate on AEASP participation in a linear probability model predicting PhD completion, is negative (although statistically insignificant) conditional on having enrolled in a PhD program in the pre-2003 balanced sample. These results are available on request.

$$(P - A)r + A(r + k) = G.$$

This simplifies to

$$Pr + Ak = G.$$

In any one year the contribution of the AEASP to the proportion of doctorates awarded to minorities is $(A \times k)/G$. The aggregate contribution is therefore the sum of $A \times k$ divided by the sum of G over T years:

$$\frac{\sum_t^T A_t \text{ x } k_t}{\sum_t^T G_t}.$$

Assuming the effect of the program on completing an economics PhD estimated in the pre-2003 balanced sample is similar in other years, we use $k_t = 0.26$ for all t.[26] Between 1993 and 2012, a total of 628 or 777 economics doctorates were conferred to minorities, depending on the data source.[27] On average 25 students attended AEASP annually (i.e., 500 students total in 20 years). Therefore, between 1993 and 2012, between 17 and 21 percent ($500/628 \times 0.26$ and $500/777 \times 0.26$) of the doctorates in economics conferred to minorities can be directly attributed to the AEASP.[28] These estimates imply that the program was responsible for an additional 130 PhDs earned in economics and related fields by American minorities over the 20-year period. Given that AEASP operation costs during this period were roughly $12 million ($600,000×20, in 2013 dollars), and

[26] We assume that the applicants to the AEASP were potential applicants for economics PhD programs in the year following their college graduation and that the treatment effect of the program applies to all minority students who might have applied to a doctoral program in economics.

[27] We obtain the number of degrees conferred to minorities from two sources, both through NSF's WebCASPAR database. 777 is from the NSF Survey of Earned Doctorates/Doctorate Records File and 628 is from the Integrated Postsecondary Education Data System Completions Survey (IPEDS CS). Note that IPEDS CS data are only available since 1995. We impute 1993 and 1994 values using the average of 1995-1999 data. Both numbers include U.S. citizen and permanent residents only. Minority is defined as Native American, Black and Hispanic, the same way as defined in Figure 1.

[28] In this simple calculation, we assume that minority students awarded an economics PhD between 1993 and 2012 are equal in numbers to future PhDs generated by potential PhD applicants during this same 20-year period.

ignoring individuals' opportunity costs, the implied financial cost of "producing" a new minority PhD is about $92,500.

To get a sense of the magnitude of this figure, consider the cost of alternative strategies to increase racial and ethnic diversity. One strategy might be to identify talented students at institutions that rarely send students directly to doctoral programs (call them "solid-but-non-elite") and pay the cost differential to send them to institutions that do send students directly to doctoral programs (call them "elite"), and, further, set up the students to succeed. A back-of-the-envelope calculation suggests that this strategy, ignoring administrative and advising costs, would require at least $500,000 per PhD produced – roughly five times that of the AEASP.[29] Alternatively, one might support a program to help minority students to get a master's degree in preparation for doctoral programs. There are an increasing number of these types of programs, and they vary in cost and duration. To our knowledge, of those with a doctoral placement focus, only Duke and Howard have large minority student populations in their economics graduate programs. A back-of-the-envelope calculation, ignoring administrative costs, suggests that this strategy would cost about $300,000 per PhD produced – that is, three times that of the AEASP.[30]

[29] In this thought experiment, we assume that the selected participants would need to complete four years of undergraduate study at the elite institution, since most students entering these institutions, and especially those going on to doctoral programs, typically start with calculus and other AP credits. Based on tuition and costs for the 2013-2014 academic year at Duke and North Carolina A&T State University, we assume that the cost differential between "elite" and "solid-but-non-elite" institutions is roughly $17,500/semester, or $140,000 for a four year course of study (Duke, 2014; NC A&T, 2014). Living cost differentials add roughly another $16,000. The likelihood of a selected student entering a doctoral degree program in economics is surely no more than 0.5, while the likelihood of completion conditional upon entering a doctoral program is about 0.6 (Stock et al., 2006; Stock and Siegfried, 2013). The cost of producing a PhD this way is at least $520,000 = $156,000/(0.5*0.6).

[30] The cost of completing a master's degree at Howard is approximately $94,000 ($25,000 tuition/year + $22,000 expenses/year). The cost at Duke is approximately $128,000 ($44,000 tuition/year + $20,000 expenses/year). The unweighted average is $111,000; if we generously assume that half of those selected

We are confident there are other, potentially lower cost, ways to increase the number of minority PhDs and our estimates should not be interpreted as dispositive. However, these simple thought experiments imply that the AEASP is inexpensive relative to obvious alternatives.

V. Conclusion

In this paper we estimate a sizeable impact of the AEA summer program (AEASP) on racial and ethnic diversity in the economics profession. Specifically, we find that the program may have increased the likelihood that students pursued graduate work in economics, were more likely to complete a doctorate and were more likely to pursue careers related to economics. These estimates also do not, however, take into consideration the impact of the Summer Program on the caliber of the PhD programs attended by participants nor any indirect impacts generated by having more role models and peers in the profession.

Obviously these estimates did not derive from a controlled experiment. They are, however, fairly robust across a variety of specifications and with the inclusion of covariates. While it is conceivable that residual unobserved differences between the AEASP participants and the comparison group are biasing the estimated impacts, we are encouraged that the coefficient estimates are relatively insensitive to the inclusion of additional covariates.[31] Furthermore, while ultimately we suspect that any selection bias

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will enter doctoral programs and three fourth will complete the PhD conditional upon entering a doctoral program, the cost of producing a PhD via a master's degree program is nearly $300,000 per PhD.

[31] Further, even if the comparison group was *ex-ante* the same as the treatment group in terms of relevant characteristics, the rejected applicants may have treated the rejection as a signal about their abilities. Therefore, the program may have had a negative effect on the comparison group's outcomes such that our estimates serve as an upper bound of the program effect.

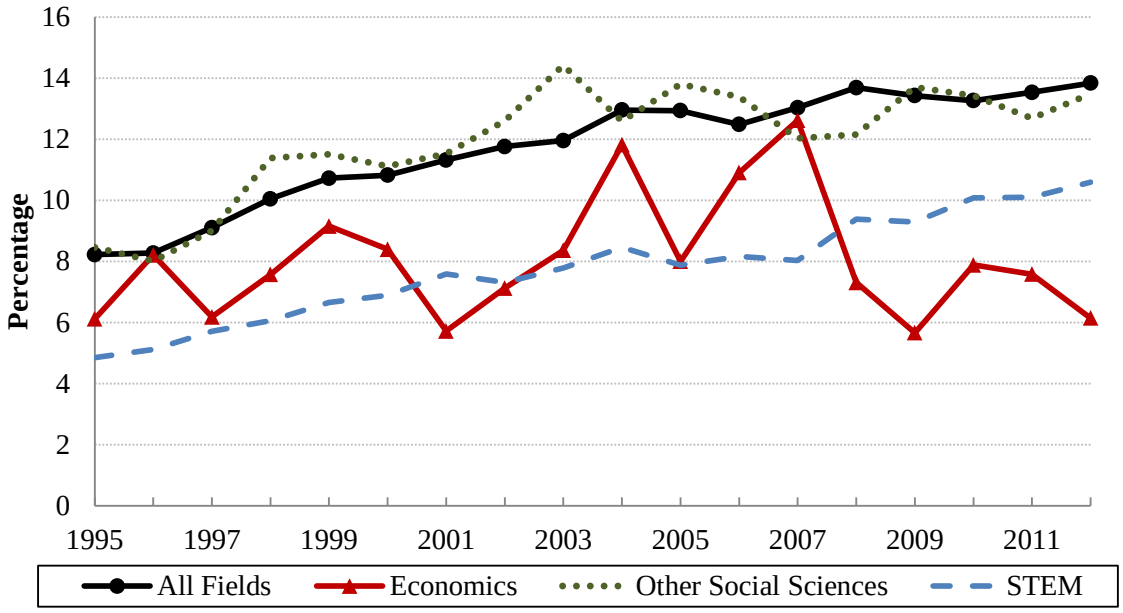
is likely positive, it is also worth noting that the program does not appear to have changed the likelihood that applicants attended graduate school in general, but rather changed the field of study to economics.[32] The program also appears to have encouraged more marginal students to apply to graduate school, which would work against finding a positive impact on post-doctoral outcomes. Finally, selectivity is unlikely to be time invariant, but rather would likely reflect opportunity costs (and the selection goals of the different hosts). We also note that the sample size of the data limits our ability to analyze potential heterogeneous effects of the program, such as class size, school reputation, and participation of a second year. Clearly a more rigorous evaluation could (and should) be contemplated to generate more reliable and nuanced estimates of the program. This will presumably involve both randomized controls and treatments, and more rigorously defined treatments.

These final caveats in mind, it is useful to consider why the program has likely been so successful. Most obviously, it has provided mathematics, statistics, writing, presentation, and economic modelling skills of direct use to graduate study. In addition, the shock of being confronted with an overwhelming work load and learning how to deal with it, and more generally improve time management skills, may also have helped to better prepare the students for graduate work. Students have also received advising on how to prepare for graduate study, on the institutions at which they might thrive, on which courses to take in the upcoming academic year prior to applying, and on-going mentoring from AEASP faculty and administrators while in graduate school and links to subsequent support systems. In addition, the program may have had psychological

[32] By regressing ever attended an advanced degree program on AEASP attendance and our controls, we find the AEASP attendance effect to be statistically insignificant.

effects, by boosting confidence, providing a peer support group and introductions to wider networks, and exposure to role models. Finally, it is reasonable to believe that the program has some signalling value in the process of graduate school application, either to the admission committees or to the candidates themselves. Thus, the program could help the students both by increasing human capital and by signalling their abilities. Better understanding of the mechanisms by which the program may be improving student interest and success in economics would be useful to designing and improving the program in the future.

Figure 1: Percentage of PhDs Conferred to Minorities, 1995-2012



Note: Estimates are computed using data obtained from the Integrated Postsecondary Education Data System Completions Survey through NSF's WebCASPAR database. Degree counts include U.S. citizen and permanent residents only. Minorities include American Indian, Alaska Native, Black, and Hispanic.

Figure 2: Distribution of Survey Respondents in the Application Sample of AEASP Data

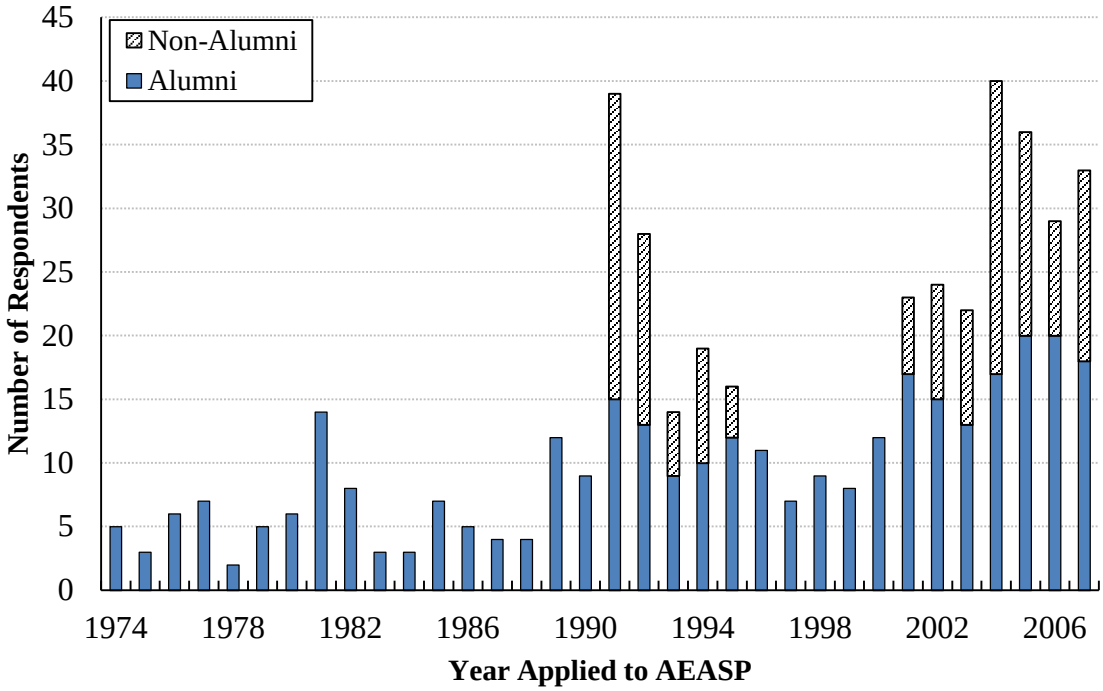


Table 1: AEA Summer Program Enrollment, 1974 - 2012

AEASP Hosts	Years	Total Number of Students	Average Number of New Students/Year
University of California, Berkeley	1974	22	22
Northwestern University	1975-1979	117	23
Yale University	1980-1982	88	29
University of Wisconsin, Madison	1983-1985	87	29
Temple University	1986-1990	137	27
Stanford University	1991-1995	123	25
University of Texas, Austin	1996-2000	96	19
University of Colorado, Denver	2001-2003	79	26
Duke University	2004-2007	120	30
University of California, Santa Barbara	2008-2010	71	24
University of New Mexico	2012	20	20
Total		960	25

Note: Student enrollment data refer only to new students and not returning students for Advanced level programs at UC-Denver and Duke. Total students are approximated numbers reported by each program director. AEASP did not operate in 2011.

Table 2: Survey Respondent Characteristics

	Comparison Group		Treatment Group					
	Balanced	Pre-2003 Balanced	All Alumni		Balanced Alumni		Pre-2003 Balanced Alumni	
	Mean (1)	Mean (2)	Mean (3)	Difference with (1) (p-value) (4)	Mean (5)	Difference with (1) (p-value) (6)	Mean (7)	Difference with (2) (p-value) (8)
Personal Chacteristics								
Age	35.88	40.31	40.45	0.00	35.01	0.25	38.94	0.09
$Age^2(\div 100)$	13.34	16.47	17.22	0.00	12.61	0.20	15.43	0.11
Female	0.44	0.46	0.44	0.98	0.44	0.95	0.44	0.84
Hispanic	0.27	0.31	0.38	0.03	0.35	0.13	0.30	0.82
Race								
African American	0.69	0.68	0.67	0.61	0.69	0.94	0.75	0.33
Other races	0.15	0.14	0.16	0.94	0.16	0.91	0.14	0.97
White	0.15	0.18	0.17	0.56	0.15	0.98	0.11	0.23
Education								
Number of undergrad institutions attended	1.48	1.41	1.43	0.57	1.39	0.29	1.37	0.76
Undergraduate degree institution type								
HBCU	0.24	0.25	0.16	0.05	0.16	0.05	0.15	0.12
Elite research university	0.27	0.30	0.32	0.26	0.30	0.48	0.31	0.87
Parental Education								
At least one parent has graduate degree	0.40	0.38	0.43	0.64	0.44	0.51	0.46	0.29
Both parents below graduate degree	0.60	0.63	0.58	0.63	0.56	0.54	0.55	0.33
Omnibus F-test (p-value)			0.00		0.57		0.42	
Number of observations (range)	130-143	64-71	306-329		163-179		85-91	

Note: The full sample consists of the all alumni treatment group and comparison group from years of Stanford, UC-Denver, and Duke (S-U-D). The balanced sample consists of the S-U-D treatment and comparison groups. The pre-2003 balanced sample consists of the pre-2003 S-U-D treatment and comparison groups, which is a subset of the balanced sample. Elite research university is defined as a very competitive and very high research activity institution according to the 2010 Carnegie Classification. The p-value of F-statistic is obtained from the regression of the treatment on the listed covariates.

Table 3: AEA Summer Program Treatment Effect by Outcomes

Outcomes	Full Sample			Balanced Sample			Pre-2003 Balanced Sample		
	Mean for Comparison (1)	Treatment Effect (2)	Treatment Effect with covariates (3)	Mean for Comparison (4)	Treatment Effect (5)	Treatment Effect with covariates (6)	Mean for Comparison (7)	Treatment Effect (8)	Treatment Effect with covariates (9)
Education Outcomes									
Graduated with an econ major	0.62	0.12**	0.12**	0.62	0.11**	0.11*	0.68	0.10	0.10
		(0.05)	(0.05)		(0.05)	(0.06)		(0.07)	(0.08)
Applied to an econ grad program	0.43	0.27***	0.30***	0.43	0.34***	0.33***	0.44	0.35***	0.31**
		(0.07)	(0.07)		(0.07)	(0.08)		(0.10)	(0.12)
Applied to an econ PhD program	0.23	0.37***	0.43***	0.23	0.45***	0.46***	0.16	0.49***	0.46***
		(0.06)	(0.07)		(0.07)	(0.07)		(0.09)	(0.11)
Attended an econ grad program	0.32	0.33***	0.35***	0.32	0.39***	0.38***	0.34	0.41***	0.35***
		(0.06)	(0.07)		(0.07)	(0.07)		(0.10)	(0.11)
Attended an econ PhD program	0.14	0.37***	0.40***	0.14	0.43***	0.43***	0.11	0.50***	0.45***
		(0.05)	(0.06)		(0.06)	(0.06)		(0.08)	(0.10)
Completed a PhD degree in econ	0.05	0.18***	0.17***	0.05	0.14***	0.16***	0.09	0.26***	0.26**
		(0.04)	(0.04)		(0.05)	(0.05)		(0.08)	(0.10)
Labor Market Outcomes									
Have an econ-related job	0.44	0.10**	0.08	0.44	0.06	0.07	0.45	0.16*	0.11
		(0.05)	(0.05)		(0.06)	(0.06)		(0.08)	(0.08)
Have an econ-related job at an educational or research institution	0.08	0.15***	0.14***	0.08	0.16***	0.14***	0.05	0.25***	0.21***
		(0.03)	(0.04)		(0.04)	(0.04)		(0.06)	(0.06)
Have an econ-related academic job	0.05	0.12***	0.10***	0.05	0.08**	0.08**	0.05	0.18***	0.16***
		(0.03)	(0.03)		(0.03)	(0.03)		(0.05)	(0.06)
Ever had an econ-related job	0.57	0.16***	0.12**	0.57	0.15***	0.13**	0.59	0.15**	0.11
		(0.05)	(0.05)		(0.06)	(0.06)		(0.08)	(0.08)
Ever had an econ-related job at an educational or research institution	0.21	0.24***	0.22***	0.21	0.28***	0.23***	0.18	0.30***	0.30***
		(0.05)	(0.05)		(0.05)	(0.05)		(0.07)	(0.07)
Ever had an econ-related academic job	0.07	0.15***	0.10***	0.07	0.12***	0.10**	0.09	0.18***	0.15**
		(0.03)	(0.03)		(0.04)	(0.04)		(0.06)	(0.07)
Current gross annual salary (Ln)	10.93	0.41***	0.19*	10.93	0.18	0.11	11.25	0.13	0.11
		(0.11)	(0.11)		(0.13)	(0.12)		(0.12)	(0.11)
Number of observations (range)		254-468			170-318			88-160	

Note: “An academic job” is defined as a job at an educational institution with one of the following faculty ranks: professor, associate/assistant professor, lecturer, and instructor (TA and RA are excluded). Robust standard errors are in parenthesis. Treatment effects with covariates impute missing values in covariates. See Appendix Table 3 for the full specification of covariates and details of the imputation. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

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Appendix Table 1: Treatment Effects from Probit Estimation and Propensity Score Matching (PSM)

Outcomes	Full Sample			Balanced Sample			Pre-2003 Balanced Sample		
	OLS (1)	Probit (2)	PSM (3)	OLS (4)	Probit (5)	PSM (6)	OLS (7)	Probit (8)	PSM (9)
Education Outcomes									
Graduated with an econ major	0.12**	0.12**	0.13**	0.11*	0.11*	0.12**	0.10	0.08	0.10
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.08)	(0.07)	(0.08)
Applied to an econ grad program	0.30***	0.32***	0.32***	0.33***	0.33***	0.35***	0.31**	0.32***	0.36***
	(0.07)	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.12)	(0.11)	(0.13)
Applied to an econ PhD program	0.43***	0.50***	0.45***	0.46***	0.53***	0.48***	0.46***	0.58***	0.51***
	(0.07)	(0.09)	(0.07)	(0.07)	(0.09)	(0.08)	(0.11)	(0.14)	(0.11)
Attended an econ grad program	0.35***	0.38***	0.35***	0.38***	0.41***	0.40***	0.35***	0.38***	0.40***
	(0.07)	(0.08)	(0.07)	(0.07)	(0.08)	(0.07)	(0.11)	(0.12)	(0.13)
Attended an econ PhD program	0.40***	0.49***	0.40***	0.43***	0.52***	0.45***	0.45***	0.58***	0.50***
	(0.06)	(0.08)	(0.06)	(0.06)	(0.08)	(0.06)	(0.10)	(0.14)	(0.10)
Completed a PhD degree in econ	0.17***	0.21***	0.19***	0.16***	0.15***	0.15***	0.26**	0.31***	0.25**
	(0.04)	(0.06)	(0.04)	(0.05)	(0.04)	(0.05)	(0.10)	(0.11)	(0.10)
Labor Market Outcomes									
Have an econ-related job	0.08	0.09	0.12*	0.07	0.08	0.08	0.11	0.12	0.17*
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.08)	(0.09)	(0.09)
Have an econ-related job at an educational or research institution	0.14***	0.16***	0.14***	0.14***	0.14***	0.14***	0.21***	0.24***	0.26***
	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)	(0.06)	(0.06)	(0.06)
Have an econ-related academic job	0.10***	0.11***	0.11***	0.08**	0.07***	0.07**	0.16***	0.18***	0.18***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)	(0.06)	(0.06)	(0.06)
Ever had an econ-related job	0.12**	0.12**	0.14**	0.13**	0.14**	0.14**	0.11	0.11	0.15*
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.08)	(0.08)	(0.09)
Ever had an econ-related job at an educational or research institution	0.22***	0.25***	0.23***	0.23***	0.25***	0.25***	0.30***	0.34***	0.36***
	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.07)	(0.09)	(0.08)
Ever had an econ-related academic job	0.10***	0.12***	0.13***	0.10**	0.09**	0.11***	0.15**	0.16**	0.18***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.07)	(0.07)	(0.06)
Current gross annual salary (Ln)	0.19*		0.15	0.11		0.14	0.11		0.10
	(0.11)		(0.16)	(0.12)		(0.13)	(0.11)		(0.13)

Note: Treatment effects of propensity score matching are estimated using the kernel matching method. The propensity score satisfies the balancing property in all samples. Marginal effects at means are reported for the probit estimation. All treatment effects are estimated using the same specification as in Appendix Table 3A-3M. Robust standard errors are in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 2: Survey Response Difference by Gender

	Full Sample (1)	Balanced Sample (2)	Pre-2003 Balanced Sample (3)
Panel A			
Female	0.00	0.01	0.03
	(0.02)	(0.03)	(0.04)
Observations	1464	922	549
Panel B			
Female	0.02	0.02	0.03
	(0.04)	(0.04)	(0.04)
Female*AEASP	-0.04	-0.05	-0.05
	(0.05)	(0.07)	(0.09)
Observations	1464	922	549

Note: Panel A reports OLS regression results of survey response dummy on female. Panel B adds AEASP and female*AEASP as covariates to the same regression. Coefficients on AEASP are omitted from Panel B. Robust standard errors are in parenthesis. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3A: Impact of AEA Summer Program on Graduating with an Economics Major

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.125**	0.119**	0.112**	0.107*	0.105	0.101
	(0.049)	(0.052)	(0.055)	(0.057)	(0.072)	(0.077)
Age		0.009		-0.012		0.067
		(0.022)		(0.041)		(0.086)
Age^2(÷100)		-0.008		0.023		-0.091
		(0.026)		(0.056)		(0.111)
Female		0.045		0.094*		0.010
		(0.045)		(0.056)		(0.074)
Hispanic		0.017		-0.015		-0.008
		(0.075)		(0.092)		(0.156)
Black		0.063		-0.000		0.126
		(0.090)		(0.112)		(0.186)
Other		0.054		0.003		0.034
		(0.086)		(0.114)		(0.168)
# of undergraduate		-0.058**		-0.083**		-0.062
institutions attended		(0.029)		(0.038)		(0.055)
BA from an HBCU		-0.035		-0.081		0.037
		(0.062)		(0.078)		(0.092)
BA from an elite institution		-0.046		-0.049		-0.046
		(0.052)		(0.066)		(0.094)
At least one parent has		-0.064		-0.058		-0.075
graduate degree		(0.048)		(0.060)		(0.079)
Number of Observations	439	439	298	298	153	153
R-squared	0.016	0.050	0.014	0.064	0.014	0.115

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3B: Impact of AEA Summer Program on Applying for an Economics Graduate Program

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.273***	0.301***	0.341***	0.327***	0.348***	0.305**
	(0.071)	(0.073)	(0.074)	(0.078)	(0.105)	(0.116)
Age		0.034		0.034		0.077
		(0.034)		(0.051)		(0.071)
Age^2(÷100)		-0.048		-0.036		-0.079
		(0.042)		(0.068)		(0.083)
Female		-0.039		0.004		0.024
		(0.061)		(0.073)		(0.104)
Hispanic		-0.044		-0.020		-0.226
		(0.098)		(0.113)		(0.270)
Black		0.009		0.064		-0.163
		(0.113)		(0.136)		(0.298)
Other		0.028		0.141		0.080
		(0.119)		(0.153)		(0.243)
# of undergraduate		0.030		-0.009		-0.032
institutions attended		(0.036)		(0.044)		(0.072)
BA from an HBCU		-0.142*		-0.116		-0.040
		(0.084)		(0.097)		(0.146)
BA from an elite institution		-0.130*		-0.138		-0.234*
		(0.070)		(0.087)		(0.121)
At least one parent has		0.093		0.067		0.053
graduate degree		(0.062)		(0.076)		(0.111)
Number of Observations	261	261	176	176	88	88
R-squared	0.059	0.142	0.117	0.181	0.125	0.256

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3C: Impact of AEA Summer Program on Applying for an Economics Ph.D. Program

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.373***	0.430***	0.450***	0.458***	0.487***	0.462***
	(0.064)	(0.065)	(0.070)	(0.072)	(0.092)	(0.108)
Age		0.016		0.038		-0.053
		(0.035)		(0.056)		(0.082)
Age^2(÷100)		-0.030		-0.053		0.063
		(0.042)		(0.074)		(0.096)
Female		-0.030		-0.038		0.010
		(0.061)		(0.072)		(0.102)
Hispanic		-0.087		-0.106		-0.328
		(0.092)		(0.102)		(0.282)
Black		-0.077		-0.062		-0.407
		(0.107)		(0.120)		(0.305)
Other		-0.021		0.070		-0.126
		(0.116)		(0.138)		(0.204)
# of undergraduate		0.061*		0.039		0.016
institutions attended		(0.037)		(0.043)		(0.086)
BA from an HBCU		-0.106		-0.061		-0.062
		(0.091)		(0.113)		(0.178)
BA from an elite institution		-0.125*		-0.123		-0.217**
		(0.068)		(0.079)		(0.109)
At least one parent has		0.152**		0.197**		0.193*
graduate degree		(0.063)		(0.077)		(0.114)
Number of Observations	254	254	170	170	88	88
R-squared	0.103	0.192	0.188	0.261	0.220	0.344

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3D: Impact of AEA Summer Program on Attending an Economics Graduate Program

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.329***	0.351***	0.387***	0.381***	0.412***	0.347***
	(0.064)	(0.066)	(0.069)	(0.071)	(0.100)	(0.113)
Age		0.056*		0.046		0.091
		(0.031)		(0.045)		(0.072)
Age^2(÷100)		-0.072*		-0.049		-0.090
		(0.038)		(0.059)		(0.084)
Female		-0.063		-0.039		-0.052
		(0.059)		(0.070)		(0.104)
Hispanic		-0.017		0.009		-0.033
		(0.093)		(0.105)		(0.239)
Black		0.060		0.071		-0.035
		(0.108)		(0.130)		(0.277)
Other		0.079		0.129		-0.037
		(0.115)		(0.144)		(0.217)
# of undergraduate		0.031		0.001		-0.035
institutions attended		(0.035)		(0.043)		(0.073)
BA from an HBCU		-0.164**		-0.135		-0.043
		(0.079)		(0.092)		(0.153)
BA from an elite institution		-0.131*		-0.099		-0.158
		(0.069)		(0.085)		(0.121)
At least one parent has		0.104*		0.086		0.150
graduate degree		(0.062)		(0.075)		(0.116)
Number of Observations	281	281	194	194	92	92
R-squared	0.085	0.170	0.143	0.208	0.166	0.281

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3E: Impact of AEA Summer Program on Attending an Economics Ph.D. Program

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.368***	0.403***	0.433***	0.433***	0.500***	0.454***
	(0.053)	(0.056)	(0.061)	(0.063)	(0.085)	(0.104)
Age		0.044		0.045		-0.037
		(0.028)		(0.042)		(0.080)
Age^2(÷100)		-0.060*		-0.054		0.050
		(0.034)		(0.055)		(0.093)
Female		-0.027		-0.043		-0.029
		(0.058)		(0.067)		(0.099)
Hispanic		-0.083		-0.060		-0.147
		(0.088)		(0.097)		(0.228)
Black		-0.033		-0.046		-0.253
		(0.102)		(0.115)		(0.265)
Other		0.018		0.021		-0.181
		(0.106)		(0.126)		(0.180)
# of undergraduate		0.050		0.019		0.021
institutions attended		(0.036)		(0.043)		(0.083)
BA from an HBCU		-0.145*		-0.097		-0.089
		(0.080)		(0.097)		(0.171)
BA from an elite institution		-0.146**		-0.134*		-0.182*
		(0.064)		(0.075)		(0.106)
At least one parent has		0.136**		0.157**		0.260**
graduate degree		(0.060)		(0.072)		(0.112)
Number of Observations	281	281	194	194	92	92
R-squared	0.108	0.186	0.183	0.239	0.241	0.355

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3F: Impact of AEA Summer Program on Completing an Economics Ph.D. Program

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.179***	0.170***	0.140***	0.156***	0.260***	0.255**
	(0.040)	(0.041)	(0.045)	(0.046)	(0.081)	(0.096)
Age		0.065***		0.043		0.031
		(0.021)		(0.032)		(0.109)
Age^2(÷100)		-0.070***		-0.038		-0.029
		(0.026)		(0.044)		(0.141)
Female		-0.070		-0.026		-0.043
		(0.046)		(0.051)		(0.097)
Hispanic		-0.064		-0.062		-0.182
		(0.064)		(0.071)		(0.168)
Black		-0.095		-0.071		-0.245
		(0.083)		(0.089)		(0.219)
Other		-0.006		0.006		-0.089
		(0.093)		(0.089)		(0.158)
# of undergraduate		-0.019		-0.074**		-0.064
institutions attended		(0.033)		(0.031)		(0.087)
BA from an HBCU		-0.070		-0.045		-0.043
		(0.057)		(0.065)		(0.138)
BA from an elite institution		0.005		0.010		-0.014
		(0.054)		(0.062)		(0.106)
At least one parent has		0.154***		0.172***		0.300***
graduate degree		(0.050)		(0.057)		(0.109)
Number of Observations	278	278	191	191	90	90
R-squared	0.041	0.145	0.038	0.182	0.087	0.243

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3G: Impact of AEA Summer Program on Having an Economics-Related Job

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.101**	0.084	0.064	0.075	0.155*	0.105
	(0.050)	(0.053)	(0.056)	(0.058)	(0.079)	(0.082)
Age		0.025		0.024		-0.196**
		(0.024)		(0.041)		(0.079)
Age^2(÷100)		-0.024		-0.025		0.236**
		(0.029)		(0.054)		(0.098)
Female		-0.105**		-0.072		-0.077
		(0.048)		(0.058)		(0.085)
Hispanic		0.067		0.150*		0.166
		(0.072)		(0.084)		(0.130)
Black		-0.084		0.010		0.105
		(0.088)		(0.108)		(0.172)
Other		-0.023		0.029		0.177
		(0.086)		(0.113)		(0.169)
# of undergraduate		0.005		0.025		0.039
institutions attended		(0.030)		(0.037)		(0.051)
BA from an HBCU		0.008		-0.040		-0.054
		(0.066)		(0.079)		(0.108)
BA from an elite institution		-0.011		0.041		0.140
		(0.055)		(0.068)		(0.095)
At least one parent has		0.067		0.063		0.096
graduate degree		(0.050)		(0.061)		(0.088)
Number of Observations	468	468	318	318	160	160
R-squared	0.009	0.059	0.004	0.071	0.024	0.168

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3H: Impact of AEA Summer Program on Having an Economics-Related Job at an Educational/Research Institution

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.152***	0.141***	0.156***	0.135***	0.253***	0.214***
	(0.034)	(0.037)	(0.040)	(0.042)	(0.056)	(0.059)
Age		-0.006		0.028		-0.048
		(0.018)		(0.025)		(0.057)
Age^2(÷100)		0.009		-0.037		0.049
		(0.023)		(0.033)		(0.069)
Female		-0.063*		-0.041		-0.039
		(0.037)		(0.043)		(0.073)
Hispanic		0.031		0.080		0.067
		(0.062)		(0.074)		(0.146)
Black		-0.016		0.060		0.066
		(0.074)		(0.087)		(0.166)
Other		-0.015		0.051		0.046
		(0.069)		(0.087)		(0.140)
# of undergraduate		0.008		-0.011		-0.031
institutions attended		(0.025)		(0.029)		(0.041)
BA from an HBCU		-0.008		-0.034		-0.068
		(0.051)		(0.057)		(0.086)
BA from an elite institution		-0.090**		-0.077		-0.024
		(0.042)		(0.052)		(0.080)
At least one parent has		0.132***		0.158***		0.155**
graduate degree		(0.041)		(0.049)		(0.071)
Number of Observations	447	447	308	308	153	153
R-squared	0.032	0.073	0.042	0.093	0.103	0.160

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3I: Impact of AEA Summer Program on Having an Econ-Related Academic Job

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.121***	0.095***	0.081**	0.082**	0.183***	0.160***
	(0.029)	(0.030)	(0.032)	(0.034)	(0.054)	(0.060)
Age		0.013		0.034*		-0.008
		(0.016)		(0.019)		(0.051)
Age^2(÷100)		-0.006		-0.036		0.012
		(0.020)		(0.026)		(0.063)
Female		-0.032		-0.007		-0.038
		(0.032)		(0.034)		(0.071)
Hispanic		-0.060		-0.058		-0.006
		(0.051)		(0.059)		(0.155)
Black		-0.085		-0.026		0.066
		(0.065)		(0.073)		(0.167)
Other		-0.017		0.023		0.125
		(0.067)		(0.072)		(0.142)
# of undergraduate		0.005		-0.025		-0.028
institutions attended		(0.023)		(0.021)		(0.040)
BA from an HBCU		-0.023		-0.044		-0.074
		(0.044)		(0.042)		(0.075)
BA from an elite institution		-0.043		-0.018		0.010
		(0.037)		(0.041)		(0.074)
At least one parent has		0.079**		0.082**		0.099
graduate degree		(0.037)		(0.038)		(0.068)
Number of Observations	421	421	294	294	144	144
R-squared	0.028	0.095	0.019	0.093	0.064	0.124

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3J: Impact of AEA Summer Program on Ever Had an Economics-Related Job

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.156***	0.125**	0.152***	0.131**	0.150**	0.108
	(0.050)	(0.052)	(0.056)	(0.057)	(0.075)	(0.076)
Age		0.014		0.037		-0.193***
		(0.023)		(0.040)		(0.059)
$Age^2(\div 100)$		-0.013		-0.043		0.237***
		(0.028)		(0.053)		(0.070)
Female		-0.072		-0.018		-0.028
		(0.046)		(0.058)		(0.081)
Hispanic		0.166**		0.249***		0.195*
		(0.065)		(0.075)		(0.108)
Black		0.022		0.031		-0.003
		(0.077)		(0.093)		(0.136)
Other		-0.011		-0.008		-0.005
		(0.078)		(0.104)		(0.145)
# of undergraduate		-0.009		0.000		-0.004
institutions attended		(0.028)		(0.033)		(0.048)
BA from an HBCU		-0.055		-0.071		0.013
		(0.067)		(0.083)		(0.105)
BA from an elite institution		-0.026		-0.002		0.098
		(0.051)		(0.064)		(0.087)
At least one parent has		0.108**		0.099*		0.077
graduate degree		(0.046)		(0.058)		(0.083)
Number of Observations	443	443	295	295	159	159
R-squared	0.024	0.079	0.025	0.108	0.025	0.166

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3K: Impact of AEA Summer Program on Ever Had an Economics-Related Job at an Educational/Research Institution

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.244***	0.217***	0.277***	0.228***	0.301***	0.300***
	(0.045)	(0.049)	(0.053)	(0.055)	(0.071)	(0.074)
Age		-0.009		0.059*		0.072
		(0.022)		(0.031)		(0.068)
$Age^2(\div 100)$		0.012		-0.077*		-0.082
		(0.027)		(0.041)		(0.084)
Female		-0.059		0.002		0.022
		(0.047)		(0.055)		(0.083)
Hispanic		0.136*		0.209**		-0.033
		(0.071)		(0.081)		(0.159)
Black		-0.007		0.101		-0.152
		(0.086)		(0.101)		(0.193)
Other		0.014		0.083		-0.114
		(0.088)		(0.114)		(0.169)
# of undergraduate		-0.008		-0.051		-0.122***
institutions attended		(0.030)		(0.035)		(0.047)
BA from an HBCU		0.041		0.007		0.089
		(0.064)		(0.074)		(0.108)
BA from an elite institution		-0.035		-0.036		0.006
		(0.053)		(0.064)		(0.086)
At least one parent has		0.216***		0.233***		0.170**
graduate degree		(0.049)		(0.058)		(0.083)
Number of Observations	436	436	292	292	158	158
R-squared	0.054	0.121	0.083	0.178	0.098	0.189

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3L: Impact of AEA Summer Program on Ever Had an Econ-Related Academic Job

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.146***	0.102***	0.117***	0.101**	0.180***	0.147**
	(0.033)	(0.035)	(0.038)	(0.039)	(0.058)	(0.065)
Age		0.022		0.053**		0.036
		(0.017)		(0.022)		(0.055)
$Age^2(\div 100)$		-0.016		-0.057*		-0.037
		(0.021)		(0.029)		(0.068)
Female		-0.065*		-0.028		-0.101
		(0.036)		(0.041)		(0.075)
Hispanic		-0.051		-0.015		-0.070
		(0.060)		(0.070)		(0.142)
Black		-0.067		0.004		-0.038
		(0.069)		(0.081)		(0.164)
Other		0.048		0.063		-0.012
		(0.070)		(0.081)		(0.137)
# of undergraduate		-0.011		-0.054**		-0.054
institutions attended		(0.023)		(0.022)		(0.041)
BA from an HBCU		-0.035		-0.063		-0.122
		(0.049)		(0.053)		(0.082)
BA from an elite institution		-0.085**		-0.067		-0.093
		(0.040)		(0.046)		(0.077)
At least one parent has		0.100**		0.099**		0.079
graduate degree		(0.040)		(0.044)		(0.071)
Number of Observations	443	443	295	295	159	159
R-squared	0.032	0.101	0.029	0.117	0.052	0.125

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 3M: Impact of AEA Summer Program on Current Gross Annual Income

	Full Sample		Balanced Sample		Pre-2003 Balanced	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
AEA Summer Program	0.409***	0.191*	0.179	0.109	0.130	0.110
	(0.111)	(0.111)	(0.126)	(0.121)	(0.125)	(0.115)
Age		0.121***		0.006		0.006
		(0.042)		(0.082)		(0.090)
Age^2(÷100)		-0.103**		0.055		0.041
		(0.048)		(0.105)		(0.106)
Female		-0.073		-0.117		-0.283**
		(0.080)		(0.111)		(0.131)
Hispanic		-0.069		-0.085		-0.142
		(0.129)		(0.160)		(0.247)
Black		-0.137		-0.191		-0.196
		(0.131)		(0.178)		(0.257)
Other		-0.163		-0.210		-0.394*
		(0.127)		(0.183)		(0.219)
# of undergraduate		-0.145**		-0.207*		-0.126
institutions attended		(0.067)		(0.106)		(0.090)
BA from an HBCU		0.088		0.075		-0.142
		(0.113)		(0.158)		(0.187)
BA from an elite institution		0.392***		0.398***		0.468***
		(0.087)		(0.118)		(0.122)
At least one parent has		0.190**		0.217*		0.213*
graduate degree		(0.079)		(0.110)		(0.123)
Number of Observations	332	332	220	220	131	131
R-squared	0.049	0.282	0.009	0.249	0.008	0.372

Note: Regressions with covariates impute missing values in covariates. For continuous covariates, we impute the missing values by the treatment/comparison group mean and include imputation dummies in regressions. For dummies, we impute the missing values by 0 and include imputation dummies in regressions. The list of covariates listed in this table, plus imputation dummies and a constant term, constitute the full specification for column (2), (4), and (6). It is also the specification used for treatment effect with covariates in Table 3 and Appendix Table 1."Elite" institutions are those identified as those that are "very competitive and very high research activity" by the 2010 Carnegie Classification. Robust standard are errors in parentheses. *, **, *** represent $p<0.01$, $p<0.05$, $p<0.1$, respectively.

Appendix Table 4: Number of Observations

	Full Sample			Balanced Sample			Pre-2003 Balanced Sample		
	Observed	Missing	Imputed	Observed	Missing	Imputed	Observed	Missing	Imputed
Personal Chacteristics									
Age	443	29	6.1%	304	18	3.8%	150	12	2.5%
Female	463	9	1.9%	316	6	1.3%	159	3	0.6%
Hispanic	460	12	2.5%	313	9	1.9%	158	4	0.8%
Race									
African American	440	32	6.8%	296	26	5.5%	153	9	1.9%
Other races	440	32	6.8%	296	26	5.5%	153	9	1.9%
White	440	32	6.8%	296	26	5.5%	153	9	1.9%
Education									
Number of undergrad institutions attended	472	0	0.0%	322	0	0.0%	162	0	0.0%
Undergraduate degree institution type									
HBCU	472	0	0.0%	322	0	0.0%	162	0	0.0%
Elite research university	472	0	0.0%	322	0	0.0%	162	0	0.0%
Parental Education									
At least one parent has graduate degree	439	33	7.0%	296	26	5.5%	152	10	2.1%
Both parents below graduate degree	436	36	7.6%	293	29	6.1%	152	10	2.1%
Average	452	20	4.1%	307	15	3.2%	156	6	1.3%