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WHAT CAN UWE DO FOR ECONOMICS?

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What Can UWE Do for Economics?  
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**ABSTRACT**

Men outnumber women as undergraduate economics majors by three to one nationwide. Even at the best research universities and liberal arts colleges men outnumber women by two to one or more. The Undergraduate Women in Economics Challenge was begun in 2015 as an RCT with 20 treatment schools and at least 30 control schools to evaluate whether better course information, mentoring, encouragement, career counseling, and more relevant instructional content could move the needle. Although the RCT is still in the field, results from several within treatment-school randomized trials demonstrate that uncomplicated and inexpensive interventions can substantially increase the interest of women to major in economics.

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A randomized controlled trials registry entry is available at  
<https://www.socialscienceregistry.org/trials/686>

Women do not major in economics to the same degree as do men. In fact, the fraction of majors in economics who are female is lower than in chemistry, mathematics and statistics. In fields that are even more male-dominated than economics, such as engineering, the fraction of majors who are female has increased in the past decade. But the fraction in economics has not. It has not budged in the last 30 years. The Undergraduate Women in Economics (UWE) project seeks to uncover why women do not major in economics to the same degree as men and what can be done to change that.

We will first discuss the various facts that sparked our project including national data on economics majors and administrative data from one undergraduate institution. The design of our RCT, created in 2014/15 and sent into the field in 2015/16, will next be discussed. We then consider the various initiatives that our treated group of schools put into effect during their treatment year. Because our project treated a group of freshmen in 2015/16, the results from our study will not be fully known until 2020 when that group is supposed to graduate. We discuss the results from field experiments done by two our treatment institutions that had more immediate results.

We would like all undergraduates to have accurate information regarding the usefulness of a major. Many college seniors, both male and female, realize too late in their studies that statistics, econometrics, and economic modeling are helpful tools. Students often think that economics is only for those who want to work in the financial and corporate sectors and do not realize that economics is also for those with intellectual, policy and career interests in a wide range of fields.

Most know that economics is a lucrative field. Yet both male and female freshmen are insufficiently informed about the content of economics and its usefulness for their future careers. Advice from parents, relatives, and friends often emphasizes the importance of economics to finance and banking careers, and thereby disproportionately encourages males to major in economics.<sup>1</sup> An emphasis on its usefulness to careers in development and health, for example, would do more to attract women as majors relative to men. One of our conclusions is that better information can help all undergraduates realize the importance of economics to their futures and would increase the fraction of women who enter the workforce well-grounded in economics as an empirical and theoretical subject.

Although we do not have the final results from our RCT, we have formed a good sense of the reasons for the differential interest in economics between male and female undergraduates. We also have formulated a set of interventions.

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<sup>1</sup> Zafar (2013), for example, finds that male undergraduates are more interested, than are females, in the pecuniary aspects of the future career their major will enable.

## A. Economics Majors by Gender: 1984 to 2015

There are almost three male majors nationwide for every female economics major today, expressed relative to their numbers as degree recipients (generally BA but also BS). We term that statistic the “conversion rate.” The reason to deflate or scale by the number of degree recipients is that women outnumber men as undergraduates (and have done so ever since around 1980). The conversion rate is nearly 2.5 among the 100 top-ranked universities (public and private non-profit), about 2.6 for the 100 top-ranked liberal arts colleges, and 2.9, the highest, among public universities.<sup>2</sup>

As can be seen in Figure 1, which gives the conversion rate from 1984 to 2015, there were relatively more female economics majors in the late 1980s than today across all types of institutions. But by around 1990 the conversion rate reached levels about equal to what they are today by type of institution, with some ups and downs along the way. That is, there has been virtually no long-run change in the fraction female in economics, measured here by the conversion rate, since around 1990. We should note that economics is a popular major nationwide, although the related major of business is considerably more popular.

## B. Evidence and Lessons from “Adams College”

When we began designing our project, we obtained administrative data from an institution we call “Adams College.” When we obtained the data in 2013, the conversion rate for Adams was 1.8 and the fraction female among economics majors was 0.35, not much different from those at its peer institutions, such as Stanford, Princeton, and Harvard.

At Adams and many of its peer institutions, incoming freshmen are asked what they believe their primary major will be. Twice as many males than females put economics as their more probable primary major at Adams. We have discovered similar results hold for its peer institutions. The die is cast, it would appear, even before students unpack their bags: two males will major in economics for every female. The first lesson from the Adams data is that useful treatments must occur soon after students arrive on campus. But there are other moments in the undergraduate experience when interventions could make a difference.

Adams women divide into three almost equal groups among those who either major in economics or stated they would major in the subject upon their arrival at college: (1) 0.33 stated upon arrival that economics was their primary major and did major in it; (2)

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<sup>2</sup> Data are from the U.S. Department of Education, NCES, IPEDS. Schools are included only if they grant a bachelor’s degree in economics and are coeducational. The top group of 100 is from *US News & World Report* at the time the UWE project was begun.

0.31 stated economics was their primary major but did not major in it; and (3) 0.36 majored in economics but did not state it was their primary major upon arrival.

Principles of Economics is a very popular course at Adams, particularly among those who had an initial interest in the field. Almost 80 percent of those who gave economics as their probable future major take the course and another part of that group places out of Principles through a five on the AP exam.

The women who take Principles but do not eventually major in the subject are disproportionately among those who obtained a grade below an A- in the course. The relationship holds even among those who gave economics as their intended major. Women who take Principles have a much higher probability of majoring in the subject if they obtain a high grade. That is not true for males, who major in economics almost independent of their grade in Principles.

Males get higher grades in the Principles course than do females, as can be seen in Figure 2.A. But conditional on the grade received, females have a far steeper gradient regarding their likelihood of majoring in the subject, as can be seen in Figure 2.B. A female who obtains a B+ in Principles has a 27 percent chance of majoring in economics but a male who receives a B+ has a 41 percent chance. A female who gets an A in principles has a 42 percent likelihood of majoring in the subject and that is about the same as that for a male (41 percent). Note that there is no difference in the probability males major in economics if he gets a B+ or an A, but the fraction is reduced for females by almost 20 percentage points. The line indicating the likelihood of a male majoring in economics is almost flat with respect to their principles grade whereas it is steeply sloped for women.<sup>3</sup>

What accounts for these differences? It is possible that female students work hard in subjects at which they excel (or told they excel), whereas male students take subjects they know will eventually benefit them. Female students may seek more “comfort” in their selection of a major, whereas males stick with their goal. It is also possible that this behavior is the result of “stereotype” threat. Once women do poorly in a subject at which they are often told they will perform poorly at, they shy away from it. One way to test this is to see if the same behavior occurs in courses in which women are thought to do well in,

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<sup>3</sup> Note that the difference in the gradient regarding the grade in Principles for males versus females exists within groups. For example, it exists for certain groups like Asian-Americans and international students who have relatively high rates of majoring in economics and it also exists for those who intended to major in economics and for those who did not intend to do so. See Rask and Tiefenthaler (2008) for almost identical results from another institution.

such as literature. Various pieces of evidence suggest that women gravitate to fields in which they do well, independent of the notion of stereotype threat.<sup>4</sup>

The important point here is that interventions that praise students who get a B+ or a B in Principles should have a greater impact on female than male students. The second lesson from the Adams data is that helping female students not get discouraged in the gateway course in economics could encourage them to major in the field.

As in most other institutions, the courses that follow Principles for the major at Adams are the intermediate theory courses and econometrics. There is no differential fall off by sex after students take these courses. The prime moments where female students relative to male students decide to major in economics are at the very start of their undergraduate life and just after taking Principles.

The majors that attract the students who leave the Economics major at Adams are a mixed bag of government, psychology, and general social sciences.

Another interesting determinant of whether women major in economics is a feature that cannot be altered: ethnicity and birthplace. At Adams and its peer institutions, international students, defined as those whose home country is outside the US, disproportionately major in economics and within the group females have a greater share than they do in the total. The same is true for Asian Americans. These are interesting facts that explain some portion of why certain institutions (e.g., Berkeley, UCLA) have a higher fraction female than do comparable institutions with fewer Asian students. But there are apparently no implications for increasing the share of women among undergraduate economics majors.

What about math-ability? The raw difference between males and females in declaring economics as one of the three top choices upon acceptance at Adams is 0.187. Including the pre-admission scores on the SAT math and the Adams math placement test reduces the difference by just 1 percentage point to 0.177. Math-ability does not have much to do with the initial decision to major in economics and with the choice of an eventual major.

What about taking economics prior to admission? Males disproportionately take AP economics, but that does not explain the large differences in major choice. Among male

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<sup>4</sup> For example, Butcher, McEwan, and Weerapana (2016) analyze an anti-grade inflation policy at Wellesley. They find that the policy led to a relative increase in economics majors because economics was among the subjects that graded the harshest. The anti-grade inflation policy led other subjects, that had previously been “comfort” or easy graders, to grade more harshly.

undergraduates, 15.8 percent got a five on the macro AP and 11.4 percent of females did; 12 percent of males but 9.2 percent of females got a five on the micro AP. Differences regarding the major are much larger. Including whether a student got a five on the economics AP decreases the difference between males and females in the declaration of economics as the intended major by less than 1 percentage point. Similar results hold for the eventual major.

### C. Origins of UWE

The observations from the IPEDS data sparked Goldin, when she was president of the AEA, to think about how to get more women to major in economics.<sup>5</sup> Economics as a field had become complacent. The major was popular among male students and males had once greatly outnumbered females as undergraduates. But that was no longer the case and economics was losing out. The discipline had become concerned that there were too few female economics students at the graduate level and finally realized that only by increasing the undergraduate pipeline could those numbers increase.

In addition to wanting more majors to increase graduate enrollment, some economists also realized that female undergraduates, as students and as members of society, were losing out by overlooking economics. The oversight, moreover, was often for the wrong reasons.

Goldin submitted a proposal to the Alfred P. Sloan Foundation to support an RCT (randomized controlled trial) now called *Undergraduate Women in Economics* (UWE), or *The Challenge*. The project was funded by Sloan in Summer 2014 and Tatyana Avilova was hired as the project manager. An advisory group (now called the Board of Experts) met in November 2014 to discuss strategy.<sup>6</sup>

In January 2015 e-mails were sent to all departmental chairs and/or undergraduate heads of colleges and universities (separate campuses) that granted an economics BA to at least 15 graduates per year, as given in the IPEDS data. There were only 344 of these institutions in the US. Each e-mail recipient was asked whether the person agreed, in principle, to implement a set of treatments or interventions to increase the number of female majors. They were told that their institution would receive \$12,500 (in increments after meeting stated goals) for their efforts and that the funds could be used in any way that would further the stated objective.

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<sup>5</sup> See Bayer and Rouse (2016) on the beneficial impact of greater diversity on the field of economics.

<sup>6</sup> Information on the Board of Experts is at: <http://scholar.harvard.edu/goldin/board-experts>

We received enthusiastic replies from 167 schools, almost half of the 344 institutions we initially contacted, demonstrating a strong latent demand for action.<sup>7</sup> Due to the large number of positive responses, we increased the cutoff number of BAs in economics from 15 to 30 per year. We wanted to ensure that the economics program at each institution was large enough to pick up changes in majors induced by the interventions rather than from fluctuations due to small cohort size. We also imposed other requirements to increase the power of the experiment.<sup>8</sup>

We narrowed the group to 88 schools, which we have termed the “treatable” sample. We then stratified the 88 treatable schools into four selectivity groups and randomly picked five schools from each group of 22.<sup>9</sup> All 20 randomly picked “treatment” schools agreed to take part in the trial; 36 of the non-treatment schools agreed to be “controls.”<sup>10</sup> Both treatments and controls agreed to submit data through our on-line tool.

#### D. Treatment and Control Institutions

The idea behind the RCT is that the UWE program would incentive schools to initiate treatments that would disproportionately increase the number of female majors, possibly without decreasing the number of male economics majors. The idea was to treat the group of incoming freshmen who would likely graduate four years later. But some

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<sup>7</sup> We later determined that some interested faculty never received the e-mail since it was sent to the person we believed was the chair of the department or of the undergraduate program.

<sup>8</sup> The cutoff of 30 majors, left 118 schools in sample. Next, we eliminated all schools that were not in the “top 100 universities” or the “top 100 colleges” category according to *US News & World Report (USN&WR)*. We also eliminated some PhD granting institutions that produced fewer than three PhDs in the 2008-2012 period. This left us with a “treatable” sample of 88 schools.

<sup>9</sup> We combined the *USN&WR* rankings for top universities and top colleges, and ranked all 88 institutions from highest to lowest. Schools with the same ranking (e.g., #1 university and #1 college) were ordered based on the average SAT score. The ranked list was then divided into four groups of 22, with a number 1 through 22 based on their relative *USN&WR* rank. Ten (10) random numbers were drawn from one to twenty-two using an online random number generator. Schools with the first five numbers were assigned to the treatment group and schools with the second five numbers were assigned to a waitlist. The rest of the schools were automatically assigned to the control group. We did not need to contact any schools on the wait list.

<sup>10</sup> The control group can consist of the 68 schools from the treatable sample that were not randomly selected into the treatment group. Because all these schools were originally invited to participate in the *UWE Challenge*, they are aware of the initiative. They cannot be prevented from implementing interventions of their own design, but they were not provided with the same guidance and resources as were the treatment institutions. For all institutions in the control and treatment groups, the numbers of male and female economics majors will be available through the IPEDS database.

students do not graduate in four years and some sophomores might be treated along with the freshmen.

The treatment institutions are encouraged, although not obligated, to continue the interventions going forward, but funding is officially provided in the designated treatment year only. In addition to proposing and implementing interventions to target undergraduate students, treatment schools are instructed to report data, beyond what can be obtained through the IPEDS database. The additional data include contemporaneous enrollments by sex in the economics principles and intermediate courses, the number of transfer students in the courses, and the numbers of double majors. We also asked for the number of graduates who majored in economics, which is available through the IPEDS.<sup>11</sup>

We have, in addition, asked schools to report outcomes based on the treatment group since some sophomores and upperclassmen might have been treated along with the freshmen. We understand that this may not be possible in all cases. We will, as well, follow cohorts as they go through the program to see if relative enrollments of males and females in the higher-level classes change.

Our 20 treatment schools are a highly-varied group. Some are large state universities, a few are flagship institutions; some are small liberal arts colleges and several are Ivy League institutions. Some have business schools with undergraduate majors (business programs appear to syphon off females from economics more than they do males). Several allow double or even triple majors. In terms of the variables of interest, they range widely in terms of the fraction female among their recent group of BA economics majors and in terms of the fraction of their undergraduates who major in economics. Figure 3 gives a map showing the geographic range of the 20 schools.

We provide the fraction female among economics majors in Figure 4 (adjusted for the numbers of male and female graduates) for all 88 “treatable” schools and for the 20 randomly selected treatment schools.<sup>12</sup> Not surprisingly the group of 20 nests inside the larger group of 88 from which they were randomly drawn (from four selectivity segments). The range for our treatment sample is considerable. At the high end are Berkeley (0.39) and Brown (0.38). At the lower end are Illinois State (0.14) and the University of Connecticut (0.16).<sup>13</sup>

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<sup>11</sup> The IPEDS also asks race and ethnicity of majors.

<sup>12</sup> We graph this version of our “conversion” rate because it has less extreme values.

<sup>13</sup> The one school in the group of 88 that is at parity is MIT, in large part because economics is even less technical than many of the other popular majors there. Other engineering schools (not in the group of 88) have similarly high values for the fraction female.

## E. Range of Treatments

In May 2015, we met in Cambridge, MA with the treatment schools in two groups of ten to discuss the issues faced by each and the treatments and interventions each thought would be useful to employ. We had acknowledged early on that each potential treatment would not fit all schools and that a limited set of treatments would not adequately address the problem. Instead, we assembled a list of potential treatments in three (somewhat overlapping) areas and required our treatment schools to use several of them:

1. *Better Information*: These interventions are to provide more accurate information about the application of economics and career paths open to economics majors. Interventions include informational sessions at the start of the academic year, having diverse speakers at events, and ensuring the presence of at least one female adviser.
2. *Mentoring and Role Models*: The intent is to create networks among students and to show support for their decision to major in the field. Potential interventions include mentoring freshmen and sophomores by upper-class students, providing more guidance to students in finding summer jobs and RA-ships in economics, organizing faculty-student lunches, and producing videos about the department and its students. If possible, the use of female upper-class students and faculty members was encouraged but since they could not be increased, the added burdens on existing female instructional staff could be counterproductive.<sup>14</sup>
3. *Instructional Content and Presentation Style*: This category is meant to improve beginning economics courses and make them more relevant to a wider range of students. Examples include using more evidence-based material in gateway courses, and incorporating projects, such as those in the local community, into beginning and upper-level courses to allow students to apply their knowledge to current issues.

Treatment schools submitted plans of action by the start of the Fall 2015 semester and provided progress reports in January 2016. All but one school began their treatment year in AY 2015/16.<sup>15</sup> Their proposals and progress reports discuss a wide range of implemented interventions, which we have listed in Table 1. The UWE program sponsored several conferences that brought together students and faculty from many of the treatment schools. The first was held at the University of Virginia in April 2016 and the second was

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<sup>14</sup> See Carrell, Page, and West (2010) for convincing evidence that female instructors in STEM fields increase grades of females and their likelihood of majoring in STEM more than male instructors do.

<sup>15</sup> Because of staffing problems, University of Central Florida began their treatment year in 2016/17.

held a year later at Colorado State University in April 2017. A northeast undergraduate conference was held at Williams College, also in April 2017.

We required that treatment and control schools submit data on various measures of enrollment and graduation going back several years. The enrollment data requested includes: the number of students enrolled in the Principles sequence, and the number of students enrolled in the Intermediate Theory sequence, all by course and gender. The graduation data includes: the number of students by gender graduating with a major in Economics (or a double major in Economics); the number of students graduating with a minor or secondary in Economics; the number of students graduating with a major in Economics who are transfer students to the institutions after their sophomore year.

Several participants, such as the University of California schools, have many transfer students who enter after completing two years of community college. Most of the prerequisite coursework for the major, for these students, is completed prior to their transfer. By the time that they enroll in one of our schools, they would already be on track to a specific major and would not be affected by interventions aimed at students in the initial gateway stage of the major. Seeing what portion of total majors are accounted for by these transfer students may reveal the effect of interventions.

#### F. Preliminary Results

We will not be able fully to evaluate the UWE *Challenge* interventions for several years. In some institutions, students do not declare a major until they are ready to graduate and for all institutions, students can change majors along the way. Therefore, we must wait until the first treatment year graduates to assess if more women majored in economics in the treatment schools than in the controls or than before the treatment.

There are a few reasons why the UWE intervention might have had an impact even if we cannot measure it. There is considerable variation in majors from year to year. Our power calculation indicates that we should be able to detect a change in the fraction of female BAs who are economics majors of 0.0072 between our control and treatment groups. But because the mean (unweighted by treatment school) is about 0.04, that is a fairly large change.

There is also leakage in various ways. Some the “treated” students were sophomores and upperclassmen at the time of treatment and will graduate before the treatment class does. In addition, we might not be able to account for some of the transfer students, none of whom would have been treated. Finally, some of the control schools after

learning about the UWE *Challenge* instituted interventions of their own to increase the number of female majors.

We are fortunate that several of our treatment schools executed their own RCTs for which they obtained IRB approval at their institution. These provide results in advance of our own and are cleaner due to an absence of the complications mentioned. The two schools for which we have results—Colorado State University and SMU—were among those with the lowest fraction female majoring in economics among recent graduating classes.<sup>16</sup>

Colorado State University, under the direction of Prof. Hsueh-Hsiang (Cher) Li, ran an RCT in Spring 2016. Three treatments were included in the principles course that mirrored those UWE suggested more generally: (1) Students in the treatment arm were shown a video during section about careers in economics and given information on the earnings of economists; (2) Female students in the treatment arm received information on the grade distribution at mid-term and those at and above the median were sent letters praising their work and encouraging them to major in the field; and (3) Female students in the treatment arm, regardless of their grades, were encouraged to partake in peer mentoring activities.

Students were asked at the start and end of the semester whether they planned to major in economics. The aggregate impact of all three treatments was substantial (increasing majors by more than 50 percent from baseline levels of 0.13, conditional on taking the Principles course), particularly given the small cost. Although each intervention had some impact, treatment (2), which encouraged female students to major in the field who had a grade above the median, had by far the greatest effect.

At Southern Methodist University, Catherine Porter and Danila Serra (2017) ran a field experiment in which they randomized which Principles sections would engage in a role model intervention. At the end of the semester the course is routinely surveyed about probable major. Administrative data provides information on whether students later registered for the intermediate course. The same course, with the same instructors, was offered the year preceding the experiment, giving the authors the ability to do an instructor fixed-effects model as well.

The intervention was a 15-minute statement by one of two female graduates of SMU economics on the importance of economics to their careers. The interventions increased

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<sup>16</sup> UC Santa Barbara also did an RCT, but their results will not be available for another half year. Their field experiment was to send congratulatory and encouraging messages to students in the Principles course (Ec1) who did reasonably well.

the fraction of women taking the intermediate course within a year by 8 percentage points on a base of about 13 percent (using the raw data) and increased the fraction giving economics as a probable major by about the same. These are extremely large effects. There was no impact on the males in the class. As in other studies (e.g., Carrell, Page and West, 2010), much of the effect came from female students with high GPAs. Furthermore, the women who shifted fields disproportionately came from the humanities and languages rather than from other STEM fields. The authors find, consistent with the results from Adams College, that grades in the Principles course have no influence on the decision to continue with the subject for males but are strongly related to continuation for females.

#### G. What UWE Has Done for Economics

We do not yet know whether the interventions adopted by the UWE treatment schools will have an impact on the number of female undergraduates who major in economics. The within-school RCTs did have effects and these effects were very large. In one case the outcome was whether the students said they would major in economics, not whether they did. But in the other it was whether the students enrolled in the intermediate course and that generally indicates that the student will major in economics. It appears that small interventions could have large effects.

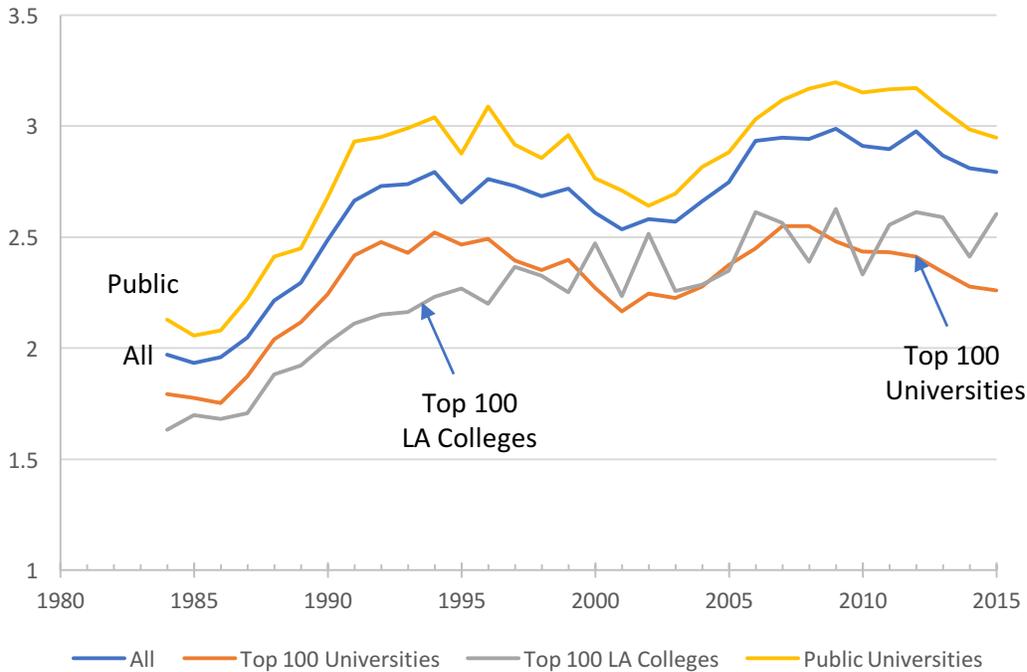
The interventions that most of our treatment schools have used were relatively inexpensive. But they required the time and initiative of hard-working undergraduate instructional staff and faculty. Unless the chair of the department or, better yet, the dean of the school or the provost at the university provides incentives, there is little motivation to add to the duties of teaching personnel. The Undergraduate Women in Economics program, together with the Alfred P. Sloan Foundation, provided incentives by giving recognition to the initiatives and collective support and encouragement. In some instances, the initiatives were recognized by the “higher ups” in the university.

Some of our control schools, we have been told, were motivated by the UWE *Challenge* to try their own interventions to increase the number of female majors. If enough of the schools did that, we could see a trend break in the IPEDS data. We will know more in the next few years about the impact of the UWE *Challenge* and the project more generally.

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Figure 1: Economics Conversion Rate for US Public and Private Non-Profit Institutions of Higher Education, 1984 to 2015

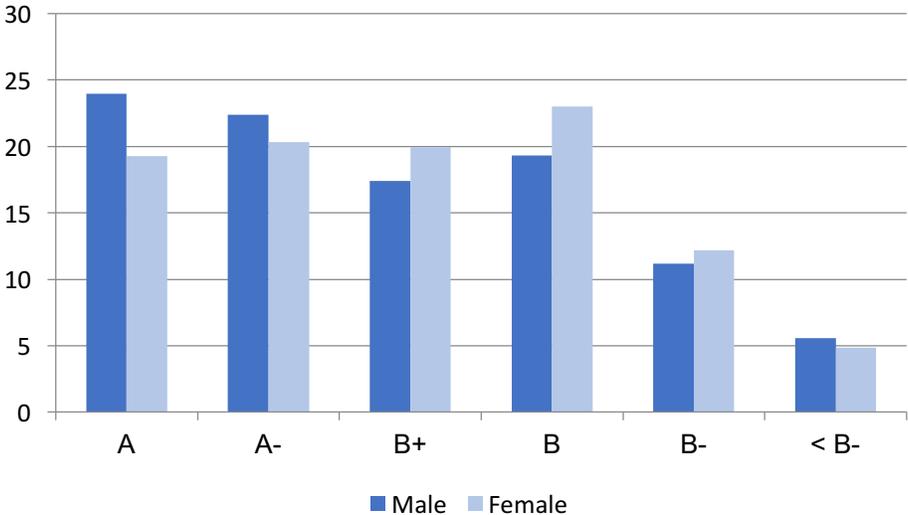


Source: U.S. Department of Education, NCES, IPEDS

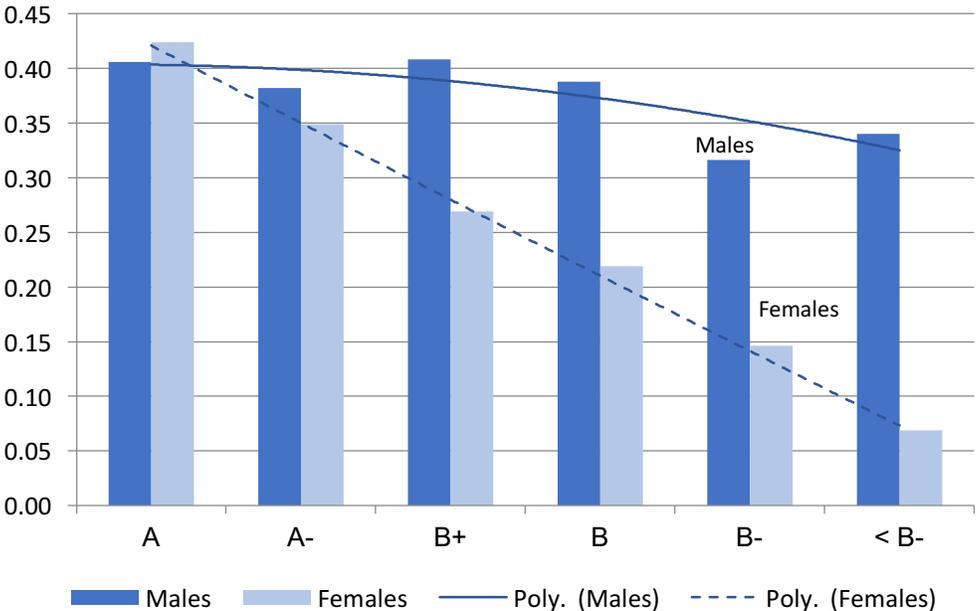
Notes: Schools are included only if they granted an undergraduate degree in economics. The economics “conversion rate” =  $[(\text{Male Economics BAs}/\text{All Male BAs})/(\text{Female Economics BAs}/\text{All Female BAs})]$ , where BA is meant to include all undergraduate bachelor’s degrees.

Figure 2: Grade Distribution by Sex in Principles and the Fraction Majoring in Economics by Grade for 2005 to 2013 Graduating Classes at “Adams” College

A. Distribution of Grades in Principles-Spring (or Fall if placed out)



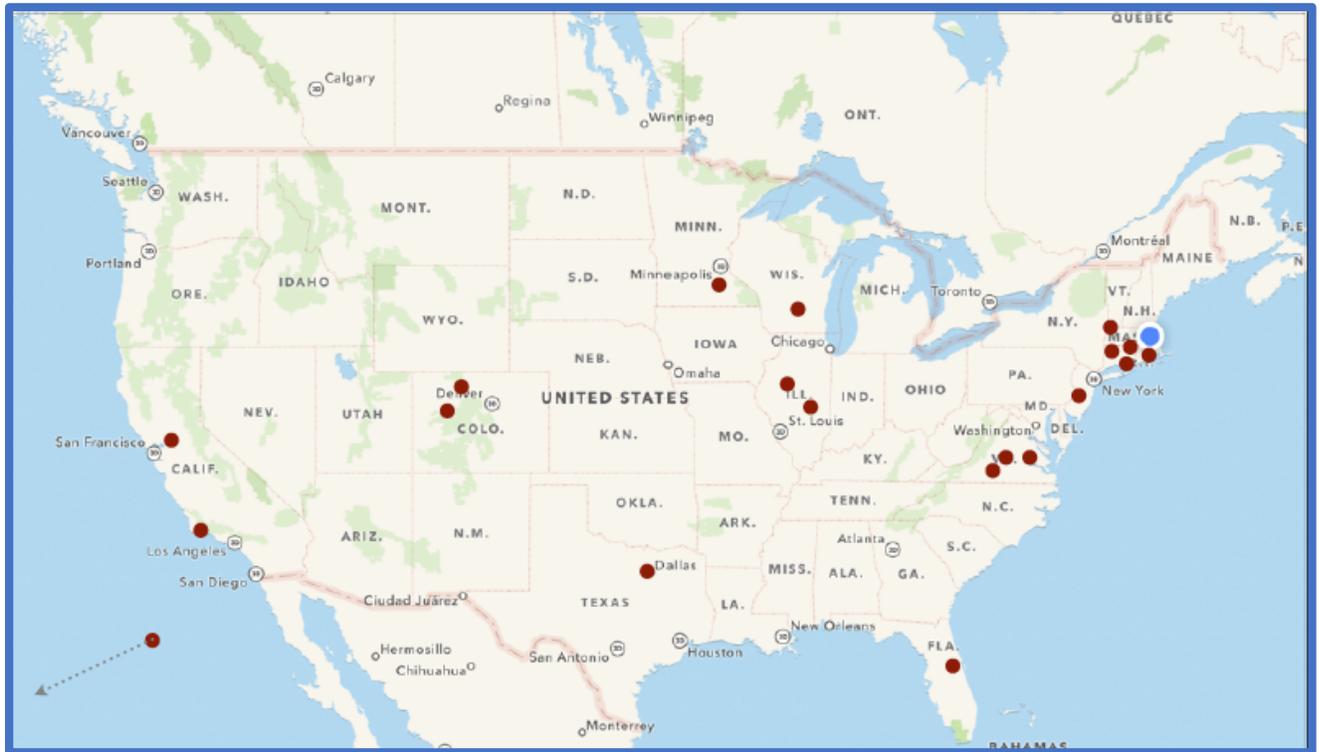
B. Fraction Majoring in Economics by Grade in Principles-Spring (or Fall if placed out)



Source: Adams College administrative data.

Notes: Grade is for Principles-Spring or -Fall if student placed out of Principles-Spring. Results do not change if Principles-Fall is used. Trend-lines are second degree polynomials.

Figure 3: The Twenty UWE Treatment Schools

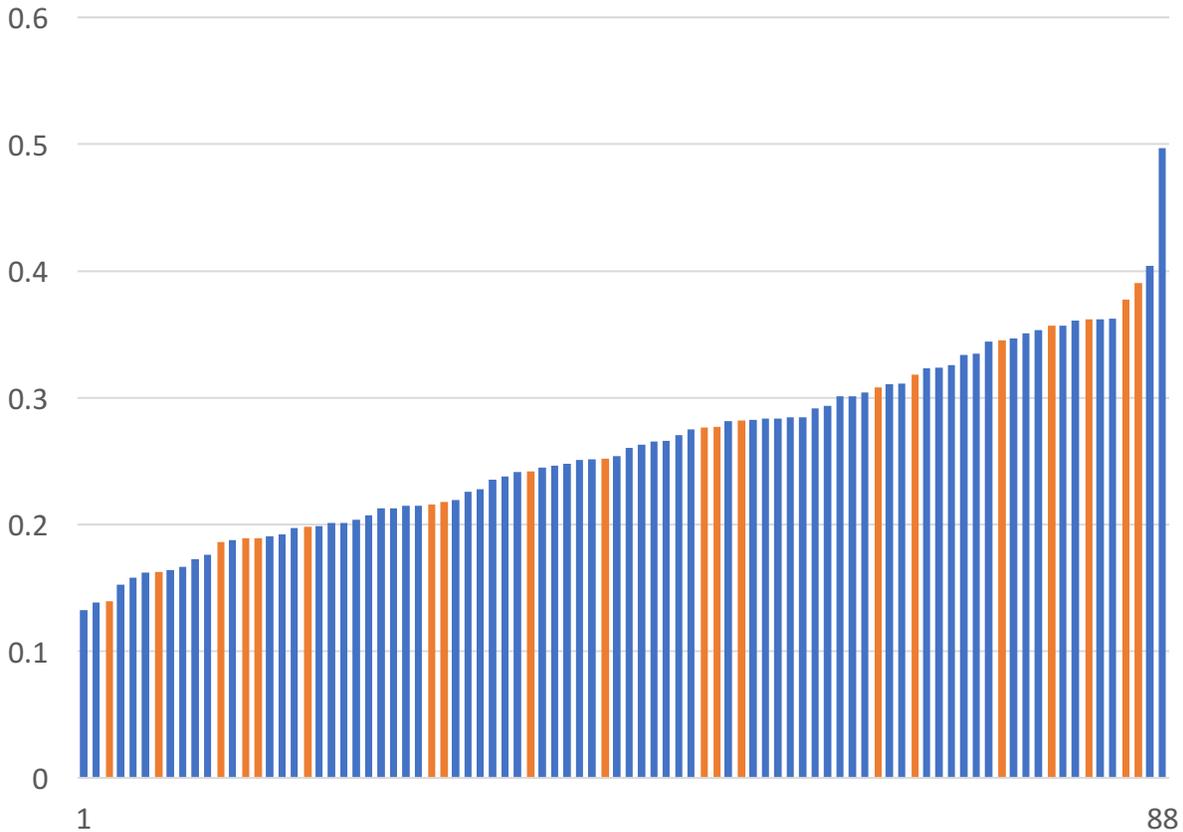


Treatment schools (in alphabetical order):

Brown University; Colorado State University, Fort Collins; Connecticut College; Illinois State University; Princeton University; Southern Methodist University; St. Olaf College; UC Santa Barbara; UC Berkeley; University of Central Florida; UC Boulder; University of Connecticut; University of Hawaii, Manoa; University of Illinois, Urbana-Champaign; University of Richmond; University of Virginia; University of Wisconsin, Madison; Washington and Lee University; Williams College; Yale University.

Figure 4: Fraction Female (Adjusted) among the 88 “Treatable” and the 20 Treatment (Orange) Institutions (2011-2013)

Fraction Female among Economics Majors (adjusted by number of graduates)



Source: IPEDS. Data averaged across 2011 to 2013 are given. The UWE RCT was set up using these data.

Notes: Fraction female (adjusted) =  $\frac{[(\text{Female Ec Majors}/\text{Female BAs})/(\text{Female Ec Majors}/\text{Female BAs}) + (\text{Male Ec Majors}/\text{Male BAs})]}$

Table 1: Major Interventions Implemented by Treatment Institutions

<b>Intervention Description</b>	<b>Number of Institutions</b>
Providing more complete information about upper-level courses	12
Sending letters of encouragement to students in Principles	11
Use of the AEA video and/or producing own video about economics	10
Panels with faculty, alumni, and others about economics careers	7
Informational fliers about economics for freshman at start of year	7
Focus groups with students to learn what could be improved	7
UWE (Undergraduate Women in Economics) student clubs	6
Use of upper-class majors and graduate students as mentors	6
Faculty workshops with undergraduates	6
Informal lunches for faculty and students	6

Other: Social media outreach (4); extra sections in Principles (3); changes to Principles content (2); changing major requirements (2); better matched advising with incoming freshmen (2); more RA opportunities (2).