

# Gender Representation in Economics Across Topics and Time: Evidence from the NBER Summer Institute \*

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## Abstract

We document the representation of female economists on the conference programs at the NBER Summer Institute from 2001-2018. Over the period from 2016-2018, women made up slightly over 21 percent of all authors on scheduled papers. However, there was large dispersion in the female author share across programs. While the average share of women has slightly risen from 18 percent since 2001-2003, a persistent gap between finance, macroeconomics and microeconomics subfields remains. We examine several channels potentially affecting female representation including gender differences in acceptance and submissions rates, institutional rank, NBER affiliation, faculty seniority and the role of organizers.

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# 1 Introduction

A persistent and stable gender gap exists between graduating economics Ph.D.s and assistant professors since the early 2000s. The gap compounds the cascading decline in the numbers of women graduating as economics majors to those entering economics Ph.D. programs-labeled as “the leaky pipeline” (CSWEP, 2016). Labor demand and supply factors may drive the observed leakage. However, institutional characteristics and implicit biases may also play a role (Wu, 2017; Hengel, 2017; Sarsons, 2017; Bayer and Rouse, 2016).

Substantial recent evidence suggests that women face systematic barriers in the economics profession.<sup>1</sup> Collectively, these papers find that female economists face significant disadvantages to advancing in the profession (Wu, 2017; Hengel, 2017; Sarsons, 2017; Antecol, Bedard and Stearns, 2018; Ceci et al., 2014; Thomas Cunningham and Zavodny, 2008). For example, Ceci et al. (2014) suggest that there exists “a persistent sex gap in promotion that cannot readily be explained by productivity differences.” Many factors reinforce this gap, but a pervasive feature of academic life that may contribute is conferences. While an important source of networking and feedback, conferences will have disparate benefits if there are differences in participation by gender. This gap could be affected by either differences in acceptance or submission rates, which could both be influenced by (predominantly male) conference organizers.

This paper examines the conference representation of female economists using a new panel dataset measuring the share of female authors on the program at the National Bureau of Economic Research (NBER) Summer Institute conference between 2001 and 2018. We use these data to measure female representation across both time and subfields. We then decompose the rate of female economists onto the program into the rate of acceptance, conditional on submission, and the rate of submission. We find no differences in acceptance rates across genders, but find evidence that the probability of submission is likely influenced by institutional factors related to the NBER, including NBER membership and then the gender of the program organizer.

We focus on conference representation for two reasons. First, opportunities to present at major conferences are valuable in academia; they increase the visibility of new work, provide an efficient means to receive feedback from audiences of peers and facilitate collaborative networking (Kalejta and Palmenberg, 2017; Casadevall and Handelsman, 2014; Casadevall, 2015). For younger scholars,

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<sup>1</sup>See Justin Wolfers in the New York Times, <https://www.nytimes.com/2018/02/02/business/why-womens-voices-are-scarce-in-economics.html>

presentations at conferences constitute prestige and enhanced visibility and may be critical to professional advancement. Promotion and tenure committees often use conference presentations as metrics of external recognition. Measuring the prominence of women at conferences can, therefore, provide insight into the representation of female economists in this vital component of the academic process. Second, data from a large conference like the NBER Summer Institute also provide a novel look at gender balances across subfields of economics.

The Summer Institute is an annual three-week conference hosted by the NBER. The conference is a highly visible forum that showcases the latest research advances across many sub-disciplines in economics. According to data from the NBER, the most recent meetings attracted 2,763 registered participants from 440 academic and policy institutions around the world. The conference hosts many different programs under the broad themes of finance, macroeconomics, and microeconomics. Each program is organized by a set of NBER-affiliated economists who select papers that appear on the agenda.<sup>2</sup>

We construct a rich panel dataset of these conference programs from 2001 to 2018 that contains information on the selected papers, their authors, and the organizers of the program. In addition, for sessions with discussants, the data include discussant names. We then identify the gender of the authors, discussants and the organizers.<sup>3</sup> With these data, we first present basic summary statistics about the share of female authors in the time series and across fields. An important caveat to our work is we are not able to identify which of the authors presented, nor who necessarily attended the conference. Our measures will reflect the share of women as authors on papers.<sup>4</sup> We find that the share of female authors ticks upwards slightly over the full sample period, from roughly 18 percent in 2001-2003 to slightly over 21 percent in 2016-2018. The Committee on the Status of Women in the Economics Profession (CSWEP) has done similar work to survey the overall representation of women in economics departments, and we can compare our numbers to CSWEP's annual reports to compare the NBER to the overall economics profession. On average, the share of female authors at the Summer Institute falls below the share of female assistant professors relative to all assistant professors but is generally above the overall share of women in all tenure-track positions.

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<sup>2</sup>While broad, the NBER Summer Institute does not represent all subfields of economics or the distribution of economists across subfields equally.

<sup>3</sup>We assign gender as either male or female either statistically based on first name or perceived preferred gender. Our measure will mismeasure and fail to capture any non-binary gender economists.

<sup>4</sup>This is an important limitation since female coauthors could be rising over time, but not female participation as presenters at the NBER. Also, differences in female authorship across subfields may not entirely translate to presenting at the NBER. With better data, understanding these dynamics may highlight how gender differences regarding the visibility of female economists manifest themselves and where the potential issues lie.

In contrast to CSWEP statistics, our data allow us to move beyond the time series and examine the representation of women across subfields of economics. While there may be anecdotal observations about the share of female representation across subfields, our paper is the first to our knowledge that systemically documents the differences in gender across subfields in economics. Indeed, a striking feature of previous work on gender and economics is that it presents economic research as a monolith. Far from being homogenous, we find that in the first week of the Summer Institute in 2016, a week dominated by finance and macroeconomics programs, 17.5 percent of the authors on papers presented were women. In contrast, the third week of papers, a week focused on labor and public economics, had almost twice as many women on the program; 30.5 percent of the authors were women.

We disaggregate the data into three broad categories: applied micro, finance, and macro & international, and find that the representation of women across the subfields varies substantially. In the most recent period, 2016-2018, the share of women was roughly 14.6 percent in finance; in macro & international, it was slightly higher, around 16.1 percent; and in micro, the share was highest, with 26.5 percent female authors. Moreover, we find that the growth rates across these subfields are roughly the same over the sixteen-year period. This suggests that despite overall growth in the share of women in economics, the aggregate statistics mask significant underlying heterogeneity across sub-disciplines over the past sixteen years.

These differences across subfields prompt us to examine three channels that could potentially affect female representation. First, using anonymized data on submissions in 2016 and 2017, we find that the rate of acceptance for women who submit papers to the NBER Summer Institute is statistically indistinguishable from that of men. Across the three subfields of finance, micro, and macro & international, we find that while micro and macro & international have statistically indistinguishable rates between men and women, women in finance have a 2 percentage point lower probability of a paper acceptance when compared to men in finance ( $t\text{-stat} = -1.63$ ). We estimate relative rates of submission by gender using CSWEP data and find that despite no difference in acceptance rates by gender, there are gender differences in submission rates, which drive overall representation. Second, we study the correlation between the gender of the program organizer and the share of women on the program. We find that the share of female economists on a given program is higher when a woman is an organizer. However, we cannot entirely rule out reverse causality, namely that as the share of women increases, more women are organizers and featured on the program.

Lastly, we focus on the program discussants selected directly by the organizers. We find that in

sessions with discussions, the share of female discussants is similar to the share of female authors. Across sub-fields, differences in female representation on the discussant dimension are also similar to cross-sectional differences in patterns of female authors on programs. Organizers have sole discretion to select discussants based on the papers chosen for the program. While the underlying pool of submissions determines the subset of papers selected for the program, discussant selection is not subject to the same constraint. Hence, the selection likely reflects the organizers' information set of appropriate discussants. Here too we find that female organizers are also more likely to select female discussants.

The share of women in the profession and on the program at the Summer Institute could vary for a variety of reasons. For instance, women could submit at different rates to the Summer Institute; or women could submit papers of differential quality, or there could be differences in acceptance rates by gender. While we can only approximate the submission rates of women to the NBER, we do find that conditional on submissions, there are no systematic differences between the acceptance rates across gender (and across subfields).<sup>5</sup> This suggests that women are not systematically submitting lower quality papers, nor are there differences in acceptance rates across subfields.<sup>6,7</sup>

Our results tie into a large literature that studies the representation of women in economics. Much of this work focuses on the representation of women among faculty and the differential rates of tenure across genders ([Ginther and Kahn, 2004](#); [Kahn, 1995](#); [Bayer and Rouse, 2016](#)). [Hamermesh \(2013\)](#) also shows the share of female economists published in top economics journals. Fewer papers study the representation of minorities as a whole: [Bayer and Rouse \(2016\)](#) and [Price \(2009\)](#) are a few exceptions. Focusing on the representation of African-American economists, [Price \(2009\)](#) argues that departments in fact systematically hire fewer new African American Ph.D.s and lack of representation of African Americans amongst faculty is, in fact, a demand, not supply, problem. In 2015, to address the clear differences in gender representation in finance, the American Finance Association (AFA) founded the Academic Female Finance Committee (AFFECT) to study the causes of low female representation in finance, following the lead of CSWEP. Their results suggest that similar to the results found by CSWEP, a "leaky pipeline" occurs in advancing from Ph.D. programs to the highest levels. The report argues

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<sup>5</sup>This finding is consistent with [Donald and Hamermesh \(2006\)](#) who shows that conditional on being on the ballot, women are more likely to win AEA elections. Some may interpret this finding as, once in elite ranks, women do well.

<sup>6</sup>The fact that the acceptance rates across genders are statistically similar could be consistent with two hypotheses of organizers favoring either male or female authors "just enough," regardless of the quality of the submissions. While the data do not allow us to distinguish between these two competing hypotheses, Occam's razor suggests that it is more likely that the quality across gender of submitted papers is similar.

<sup>7</sup>We are extremely grateful to the Jim Poterba and Alex Aminoff for merging gender identifiers to the NBER submissions data and preparing summary tabulations relating to the 2016 and 2017 meetings for us. Data for more years are not available.

that in fact “there are many qualified women who are less recognized for potential high-level roles.”<sup>8</sup>

Our work is new in two ways: first, we focus on a well-known and large conference over a long time series, which provides an alternative perspective on the visibility of women in the profession.<sup>9</sup> Second, using the large scale of the conference, we examine heterogeneity across economic subfields at the Summer Institute. This setting provides a novel quantification of female representation across subfields.

The gender representation differences we document across subfields leads to the larger question of why these differences exist. Economists use a toolset that works across different aspects of the discipline; unlike many of the sciences, economists have the technical skills to work on various economics topics over the course of their careers. Initial conditions in terms of investments in human capital in Ph.D. programs are very similar across economists, suggesting a strong initial desire by female economists choosing to work in applied micro fields over macro and finance.<sup>10</sup> Nevertheless, the balkanization of economics concerning gender is puzzling.<sup>11</sup> Given the equal rates of acceptance across the topics, differences in either submission rates – women submitting fewer papers than men – or overall representation in the field could drive differences in gender representation across fields. It remains an open question what features of applied micro fields make them more attractive to female economists. [Goldin \(2013\)](#) speculates that there may be features of the way that economics is taught that may encourage or discourage women from becoming economics majors – the same may apply to teaching Ph.D. students and influencing their choice of subfields within economics.

The paper proceeds as follows. Section 2 describes the NBER Summer Institute dataset in detail along with a description of the names matching algorithm we use to identify gender. Section 3 presents the basic empirical results. We begin by describing the time-series patterns in the data followed by an analysis of the cross-sectional patterns across subfields. We also provide a benchmark for our findings using data from CSWEP. In Section 4, we examine gender differences in acceptance

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<sup>8</sup>A summary of their findings is here: [http://affectfinance.org/wp-content/uploads/2017/03/Summary-of-Data-presentation-at-AFA-reception\\_rev\\_Feb\\_2017.pdf](http://affectfinance.org/wp-content/uploads/2017/03/Summary-of-Data-presentation-at-AFA-reception_rev_Feb_2017.pdf)

<sup>9</sup>[Thomas Cunningham and Zavodny \(2008\)](#) find that women are underrepresented on the AEA program.

<sup>10</sup>These barriers are likely more significant as careers progress, e.g., switching from empirical health to international trade as an associate professor is likely difficult, due to upfront investments in a knowledge of the literature, commonly used theory, and empirical strategies. Also, as [Eccles and Wang \(2016\)](#) suggest for STEM fields, there may be cultural differences across economics subfields that likely play a role in observed gender composition.

<sup>11</sup>[Eccles and Wang \(2016\)](#) suggest gender differences in selecting health, biological, and medical (HBMS) occupations rather than math, physics, engineering, and computer science (MPECS) careers result primarily from gender differences in occupational and lifestyle values. They suggest that women have preferences for work that is people-oriented and perceived to be altruistic relative to men. We can speculate whether fields such as labor, health, development, and children focus more on people whereas macro and finance focus more on markets.

rates and submission rates, and the potential channels affecting submissions. Finally, in Section 5, we discuss alternative potential gender differences. Section 6 concludes with a discussion of steps taken in a number of STEM disciplines to address the issue of gender imbalances on scientific conference programs.

## 2 Background & Data

The NBER Summer Institute is a high-profile annual conference held over the course of three weeks in July, showcasing the latest research advances across many subfields in economics. The conference hosts many different programs publicly available on the NBER website.<sup>12</sup> We construct a panel dataset of these conference programs from 2001 to 2018, containing information on the papers presented, their authors, the discussant of the paper, and the organizers of the program. This dataset construction was done in two phases, with the 2001-2016 dataset first constructed as described below, and then the 2017 and 2018 years added on subsequently.

To collect the data, we used a webscraping program to compile information for each of the sessions. This exercise results in 6,513 papers and 16,858 authors and discussants over the sample period. Due to issues with the formatting of the NBER website, an additional 625 papers were input by hand. After further data cleaning due to a few webscraping issues, 743 papers were dropped.<sup>13</sup> Following the cleaning exercise, we were left with a final total of 6,867 papers and 17,474 authors and discussants across the 16-year period from 2001-2016.<sup>14</sup>

Next, we identify the gender of the authors in two steps. First, we use a database constructed by Tang et al. (2011), who used Facebook to assemble data on first names and self-reported gender.<sup>15</sup> We construct a measure of the probability of male and female names ( $\hat{\Pr}(\text{male}|\text{name})$  and  $\hat{\Pr}(\text{female}|\text{name})$ ). We then merge this database with the list of authors from the NBER. We mark authors with  $\hat{\Pr}(\text{male}|\text{name}) > 0.95$  as male, and authors with  $\hat{\Pr}(\text{female}|\text{name}) > 0.95$  as female. For the remaining names, either because we have lower probability values or because the Facebook database does not include a name, we manually identify the author's gender.<sup>16</sup> Of the 7,215 distinct

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<sup>12</sup>Available here:<http://conference.nber.org/confer/old-conference.html>

<sup>13</sup>First, we drop entries where the webscraper incorrectly identifies the author name (e.g., including the university name as an author name). Additionally, to consistently compare presentations of post-Ph.D. researchers, we drop egg timer sessions and mini poster sessions since these sessions are usually done by current Ph.D. students.

<sup>14</sup>We do our best to clean and regularize the data, but it is possible that errors still exist in the data. Given the large number of observations, and the fact that these errors are unlikely to be correlated with gender, these errors ought not substantially impact our estimates.

<sup>15</sup>Database available here:<https://sites.google.com/site/facebooknamelist/namelist>

<sup>16</sup>Manual identification consists of searching for the author's name and affiliation and using any gendered text to identify the economist (e.g. "She is a leader in the field of..."). Alternatively, we use the economist's photo to identify gender. If

authors in our dataset, 5,604 authors are automatically identified and 1,611 are manually identified.<sup>17</sup>

To assure ourselves of the quality of the gender identification procedure, we also manually identify the gender of all participants in 2016 and verify the accuracy of the gender for names marked with a probability greater than 95 percent. We find that 99.5% of those marked automatically as male by the algorithm are male, and 97.38% of those marked automatically as female by the algorithm are female. In total, the algorithm only mislabels nine names in 2016.

We also use anonymized aggregated data on submissions to the 2016 and 2017 NBER Summer Institute to disentangle the share of accepted papers and the overall proportion of female economists submitting to the Summer Institute. The submissions data provide a metric to compare the acceptance rate of papers authored by gender to the submissions rate. To preserve anonymity, submissions data were reported in an aggregated format to the subfield level (finance, macro & international, and micro) by the NBER to us.<sup>18</sup> To make our results comparable, we use these sub-disciplines in other components of our analysis.

We use four additional datasets to construct a set of comparison benchmarks of female representation in economics. First, we use data from the CSWEP Reports. Since 1993, CSWEP conducts surveys of economics departments to measure gender composition of faculty across ranks (assistant, associate, etc.), as well as across institution type and rank (graduate program vs. not, and Top 10/20 vs. all programs). We compiled the data from these reports to construct the time series on the share of female professors at different levels of seniority for three sets of types of universities: Top 10, Top 20 and “All” economics departments with a graduate program. In the most recent time periods, “All” refers to 126 departments surveyed by CSWEP.<sup>19</sup>

Second, we compile all NBER members since 1978 from the NBER website.<sup>20</sup> We then identify the gender of each member using the method described above. Out of 2,450 members, 2,368 members are automatically identified, and 268 are manually identified. The final NBER membership dataset includes name, appointment date, program, NBER affiliation, and gender. For our analysis, we will focus primarily on the stock of NBER members from 2001-2016. We also disaggregate the authors into

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neither are available, we omit the author. This only occurs in a handful of cases.

<sup>17</sup>Since we assign gender as either male or female, based on first name or perceived preferred gender, our measure will mismeasure and fail to capture any non-binary gender economists.

<sup>18</sup>These categorizations were chosen in consultation with the NBER and reported in Appendix Table 1.

<sup>19</sup>More information is available here, with specifics of the survey methodology: <https://www.aeaweb.org/content/file?id=3643>. For annual data on the Top 10 and Top 20 faculty in years before 2011, we used data from the 2011 and other previous Reports.

<sup>20</sup>Available here: [http://nber.org/programs/program\\_members.html](http://nber.org/programs/program_members.html). These data do not include members who have passed away since 1978 or left the NBER because they moved overseas.



our three major subfields.

Third, we construct an additional NBER panel dataset using the Wayback Machine website to construct a panel of the Faculty Research Fellows (FRF) and Research Associates (RAs) at the NBER. This data is only available on the website from 2008 onwards, and we collect the names and NBER membership of each member from 2008 to 2018. We then harmonize the names and identify the gender of the members. This gives us a panel of member-year observations, where we are able to identify FRF versus RA membership, as well as their program memberships.

Finally, we use a database of papers published in the *American Economic Review*, *Econometrica*, *Journal of Political Economy* and *Quarterly Journal of Economics* from [Hengel \(2017\)](#) from 2001 to 2015. We merge this database based on paper title to our sample of NBER papers and identify the set that publishes in one of the top four journals. We use a fuzzy string matching software to accomplish this, and count matches as those with 99% match rate.

### 3 Empirical Trends and Comparisons

In this section, we first summarize the basic facts about the share of female authors at the NBER Summer Institute over time and across subfields. We then examine potential channels driving differential rates of female authorship on the programs.

#### 3.1 Time Series

Panel A of [Figure 1](#) reports the share of female authors across all papers divided into three-year bins to smooth out year-to-year fluctuations in gender share. For each bar, the whiskers plot the 95 percent confidence intervals for the means. [Table 2](#) reports the corresponding year-by-year summary statistics. There is a small increase in the share of female authors on the program over this period: from roughly 18 percent in 2001-2003 to slightly over 21 percent in 2016-2018.

This small increase in female authors corresponds with a rise of the share of papers with both female and male coauthors, with over 40 percent of all accepted papers include at least one female co-author by 2018, compared to 25 percent in 2001. In contrast, the share of exclusively male-authored papers has declined, and the share of exclusively female-authored papers has remained flat over this period. The number of sole-authored papers declined substantially over the sample period and three- or four-authored papers grow in their stead. However there is no particular gender differences across these papers. Sole-authored papers do not have a larger share of women than four-authored papers. This pattern is consistent with a mechanical effect of more coauthors leading to a larger share of papers

with at least one female author. We report the share of female-authorship across papers by the number of co-authors in Appendix Figure A1.<sup>21</sup>

### 3.2 Time Series by Field

This relatively slow growth of female representation masks substantial heterogeneity across economic subfields. Panel B of Figure 1 decomposes the share of female authors over time into three major subfields – micro, macro/international and finance – with significant cross-sectional variation in gender representation across the fields.<sup>22</sup> Table 2 reports the corresponding year-by-year summary statistics. Again, the whiskers plot the 95% confidence intervals for the sample means. In 2016-2018, finance has the lowest share of women as authors at 14.6%, macro & international is slightly higher, with 16.1% female authors, and micro has a much higher share of women overall at 26.5%. Growth rates over the period are similar across fields, with very modest growth across all three subfields. Finance grew from 11.1% in 2001-2003, macro & international from 13.7% and micro from 23.9%.

This growth was not uniform across time – finance made initial strides in growth from 2001-2003 to 2004-2006, but had very little growth subsequently. Similar initial growth occurred in macro/international until 2007-2009, with the share of female authors falling back and stabilizing for the next eight years. Finally, micro initially experienced a slight decline from the beginning of the sample until 2007-2009, experiencing a jump in 2010 and onwards. As a result, while there was a universal increase in the share of female authors from 2001-2003 to 2016-2018, it was neither large nor smoothly upward.

### 3.3 Across Programs

We further decompose the distribution of female authorship across individual programs. These individual programs reflect a wide range of underlying economic subfields, with substantial overlap across fields. To reduce the noisiness of our estimates, we focus on programs that have existed for at least five years.

We focus on the female author share at the program-year level, and compare across individual programs. Figure 2 presents a box plot sorted by the median share of female authorship for each program across years. Finance, macro & international and micro are each plotted in different colors. For each program, the box reflects the interquartile range across years from the 25th to 75th percentile.

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<sup>21</sup>The number of co-authors on each paper rises substantially over time, growing from 1.8 in 2001 to more than 2.5 co-authors per paper by the end of the sample (Appendix Figure A2). If we assume a fixed percentage share of female authors and no assortative matching of coauthors based on gender, as the number of coauthors on a paper rises, there is a mechanical effect of increasing the probability of having a paper with at least one woman.

<sup>22</sup>Table 1 shows the categorization of different programs into the three broad fields of finance, macro & international and micro.

The tails of the box represent the furthest value within 1.5 standard deviations (within program) of the interquartile range. The solid black line presents the across-program average female share, weighted by number of papers.

We see substantial variation in female representation both across- and within-programs. In particular, while there are exceptions across sub-fields, programs in finance and macro & international tend to sit below programs in micro. There is substantial variation across the individual programs, with the lowest median share of roughly zero percent (Productivity Growth and the Macro Economy) near the bottom and the highest median share with 37 percent (Children).

### **3.4 Benchmarking the share of female economists**

To draw conclusions about the level of female representation at the Summer Institute, we need a benchmark of overall female representation in economics. This is difficult for two reasons. First, the composition of seniority on the NBER Summer Institute programs and of economists in the profession may not match. While untenured junior economists have stronger incentives to submit papers to conferences, established senior economists may have an easier path to acceptance. Second, it is not clear which economics departments provide the most appropriate benchmark for comparison. Since the Summer Institute is prestigious, the pool of relevant economists may draw from higher-ranked departments.

We tackle these difficulties by examining a range of different potential benchmarks. Figure 3 plots the share of women in tenure-track positions over time, both in aggregate and for junior & senior positions, in economics programs at universities with graduate programs. The data show that the overall share of women in all tenure-track positions grew steadily from 2001, from 12.9 percent to 20.1 percent in 2017. In contrast, the fraction of assistant professors who are women has stayed relatively constant since 2005, and the fraction of female full professors gradually rose post-2008 after being flat from 2001-2008.

When we compare these time-series trends to the share of female authors at the NBER Summer Institute, the share of women in all tenure-track positions is consistently lower, although the gap shrinks over time. In contrast, the share of female authors at the NBER Summer Institute is lower than the share of women amongst junior faculty. However, what is surprising is that in the period of 2003-2010, which saw a much larger share of female junior faculty at the Top 10 and Top 20 departments, there was not a larger uptick of female authors at the NBER. This suggests that the rank of the author's

institution may not be the relevant driver of participation on the program.

Instead, the measure that best matches the share of female NBER authors is the stock of female NBER members.<sup>23</sup> These NBER members include both Research Associates and Faculty Research Fellows at the NBER, and reflect a broader connection to the NBER organization. This finding is in line with the fact that NBER members are likely more aware of the Summer Institute, and thus more likely to submit to the conference.

To more directly examine the composition of faculty at the Summer Institute, we use manually identified data on the authors of accepted papers in 2016 and compare to statistics from the CSWEP reports. We find that the representation of male and female assistant professors at the NBER Summer Institute is much higher than at all 126 departments with doctoral programs, as well as at just Top 20 and Top 10 departments. In contrast, there are far fewer full professors as authors on the NBER Summer Institute programs relative to departments with doctoral programs (Appendix Figure A3).<sup>24</sup>

The data from CSWEP also provides the share of women at all 126 doctoral departments, the Top 20 and Top 10 departments.<sup>25</sup> In Appendix Figure A4, we next compare the female share on the NBER schedule with the share at universities from the CSWEP data, for both Assistant and Full Professors. In both cases, the NBER Summer Institute female author shares roughly reflect the composition of women at Top 20 institutions, are higher than the composition at Top 10 departments, and lower than the figure for all 126 doctoral departments. While the composition of faculty at the NBER is heavily skewed towards junior faculty (as seen in Appendix Figure A3), when compared to the overall academic population, and by rank, the share of women on the NBER program in 2016 is comparable to the Top 20 departments. These results are consistent with the time series evidence above, where the share of female economists on the NBER SI program in 2016 is comparable to the share of female faculty at Top 20 departments in 2016.

These exercises present four facts about the Summer Institute: one, researchers on the program were far more junior than the average population of economists in 2016; two, the share of female economists on the NBER program was roughly comparable to the share of female assistant professors at the top 20 economics departments in 2016; three, this comparability is specious, as the share of

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<sup>23</sup>The square root of the sum of squared deviations is 0.013 between NBER membership and NBER female authorship, 0.025 between the female share of all tenure track professors and NBER female authorship, and 0.047 between NBER female authorship and the Top 10 or Top 20 female share of professors. The rest of the series are all more than double that of the Top 10 and NBER authors.

<sup>24</sup>To make our datasets comparable, we exclude non-university economists and graduate students in the NBER dataset when calculating the shares.

<sup>25</sup>See page 7 of the 2017 CSWEP Annual Report for details.

female assistant professors at top 20 economics departments was substantially higher in the 2000s, with no similar movement in the share of women on the NBER Summer Institute programs; four, the share of women with NBER membership is the measure that best matches the share of female NBER authors over time.

## 4 Acceptances, Submissions and Potential Channels

A key feature of our NBER Summer Institute results is that they focus on the realized outcomes of two processes. First, the decision for an author to submit a paper to the conference (and various sessions). Second, the choice by the organizers to accept the paper onto the program. In the benchmarking exercise, the decision of what group of economists to compare to the NBER Summer Institute in part reflects these concerns.

More formally, we would like to know the following:

$$\Delta = \Pr(\text{Accept} = 1 | \text{Female} = 1) - \Pr(\text{Accept} = 1 | \text{Female} = 0),$$

the unconditional difference in acceptance on the program between male and female economists. However, we only observe an acceptance conditional on a submission:

$$\begin{aligned}\pi &= \Pr(\text{Accept} = 1 | \text{Submit} = 1) \\ \pi^{F=1} &= \Pr(\text{Accept} = 1 | \text{Submit} = 1, \text{Female} = 1) \\ \pi^{F=0} &= \Pr(\text{Accept} = 1 | \text{Submit} = 1, \text{Female} = 0).\end{aligned}$$

By the law of total probability, we can then write, for  $f \in \{0, 1\}$ ,

$$\Pr(\text{Accept} = 1 | \text{Female} = f) = \pi^{F=f} \Pr(\text{Submit} = 1 | \text{Female} = f).$$

since by definition,  $\Pr(\text{Accept} = 1 | \text{Submit} = 0) = 0$ .

Hence, we can decompose the relative share of women and men on the program by understanding two numbers: first, the relative rate of acceptance, conditional on submission, and second, by the rate of submission. In the next subsections, we explore these mechanisms.

## 4.1 Acceptance rates, conditional on submission

A potential explanation for the low share of women at the NBER may be differences in the acceptance rates between male and female-coauthored submissions. Using an anonymized dataset of submissions from the 2016 and 2017 NBER Summer Institute, we identify overall acceptance rates across papers, as well as within each field: finance, macro & international and micro.<sup>26</sup>

Figure 4 shows nearly indistinguishable acceptance rates for women compared to men when the groups are pooled together. For both macro and micro, the differences are statistically indistinguishable from zero. For finance, we see a lower acceptance rate for female authors. The 2 percentage point difference in acceptance rates is statistically significant (p-value = 0.07). Given the lower base acceptance rate in finance, 2 percentage points is a non-trivial difference. Moreover, the difference in acceptance rates in finance appears in both years of the data. The very similar acceptance rates across other programs suggest that the overall proportion of women on programs reflects the submission rates by women.<sup>27</sup>

The key empirical fact from our submissions data is that  $\pi^{F=1} = \pi^{F=0} = \pi$ . Hence, we can simplify our estimand of interest to

$$\Delta = \pi \underbrace{(\Pr(\text{Submit} = 1 | \text{Female} = 1) - \Pr(\text{Submit} = 1 | \text{Female} = 0))}_{\Delta_{\text{submit}}}.$$

As expected, the difference in the rates is driven by submission rates, since average acceptance is the same. Now the key question is how to approximate the difference in gender submission rates,  $\Delta_{\text{submit}}$ .

## 4.2 Estimating submission rates

We next estimate the rate of submission for men and women. We first note that in the 2016 NBER submission data, 1,034 women and 3,680 men submitted papers. This gives us a numerator on the rate of submission. From the CSWEP measures of faculty, there were 3,138 male tenure and tenure-track researchers at doctoral + non-doctoral economics departments, and 2,984 male ABDs at doctoral programs in 2016. Ignoring missing non-academic researchers such as economists at policy institutions, central banks and so on, this would suggest a submission rate of 60% for men. In contrast,

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<sup>26</sup>We are extremely grateful to the Jim Poterba and Alex Aminoff for merging gender identifiers to the NBER submissions data and preparing summary tabulations relating to the 2016 and 2017 meetings for us.

<sup>27</sup>One caveat is that while papers may be submitted to multiple programs and typically get accepted to one, the probability of a “unique” paper acceptance is likely higher. However, unless the number of submissions per paper is correlated with author gender, this ought not affect our overall analysis.

for women, there were 974 female tenure and tenure-track faculty at doctoral plus non-doctoral economics departments, and 1,469 female ABDs at doctoral programs. This would suggest a submission rate of 42.3% for women, and a difference in submission rates of  $\Delta_{\text{submit}} = 17.7\%$ . Combined with an acceptance rate (conditional on submission) of 14%, this implies a  $\Delta$  in submissions rates of  $0.14 \times 0.177 = 0.025$ . This is a large difference when compared to the implied value of  $\Pr(\text{Accept} = 1 | \text{Female} = 0)$ , i.e., the probability of acceptance for male authors which is  $0.14 \times 0.6 = 0.084$ . This implies a difference in submissions rates of almost 30% across genders relative to the base acceptance rate.

These numbers provide an imperfect baseline for identifying the submission rates across gender, as the interpretation depends on the assumed base population. It is quite plausible that we are undercounting the number of total economists who could potentially submit to the NBER. However, these submission rates are only biased if the missing population of economists who could submit is substantially biased towards men. If the relative rates are similar, then this will only scale the  $\Delta$  measure and the overall rate of acceptance for the unconditional population. The estimated 30 percent relative difference in submissions rates for women will still remain. Combined with the fact that acceptance rates, conditional on submissions, are not statistically significantly different for men and women, these facts suggest submissions rates can explain part of the female representation on the Summer Institute program. We next explore the potential channels that may affect submissions rate by gender.

### 4.3 NBER Membership

We next focus more carefully at the fact that female NBER membership appears to track female NBER authorship best in the time series. NBER membership is a salient feature on the NBER program; in Figure 5, we plot the distribution of the share of a program-year's papers with one or more NBER affiliated authors. We see that the majority of programs have over fifty percent of their papers with an NBER-affiliated co-author.

This prompts the question of whether accepted male and female authors on the program are differentially likely to be NBER members. Table 4 examines the rates of NBER membership across accepted authors. We first consider the following specification:

$$\text{NBER Member}_{it} = \beta \text{Female} + \gamma \text{Rank} + \tau X_{it} + \epsilon_{it} \quad (1)$$

The outcome variable in the regressions is an indicator for whether the accepted author is NBER mem-

ber. We include a dummy for whether the author is male or female, and also control for the rank of the authors' institutions according to RePec.<sup>28</sup>  $X_{it}$  includes various forms of fixed effects, and a dummy for if the institution rank is missing.<sup>29</sup> Column 1 of Table 4, Panel A shows that conditional on rank, female accepted authors are on average less likely to be NBER members than men. Second, authors from higher ranked institutions are more likely to be NBER members, but the effect is more muted for women. Figure 6, Panel A, presents a non-parametric representation the Column 1 specification. Holding rank fixed, the probability of male NBER member-authors is consistently higher than female NBER member-authors. As we scan the figure from left to right, the pattern holds across institutional rank. Panel B shows that the persistent gender-gap between NBER member-authors holds controlling for program-year fixed effects. The plots in both panels also visually make obvious that the relationship between rank and NBER membership is non-linear, as the relationship between institutional rank and the probability of NBER membership for accepted authors is very steep initially and then flattens out.

To account for these non-linearities in institutional rank, the remaining columns of Table 4 include a quadratic rank term as well. Column 2 also includes year and program fixed effects. The coefficient on the squared term is positive and statistically significant, suggesting that the effect of rank on an accepted author being an NBER member is non-linear. Column 3 includes program-by-year fixed effects and the patterns regarding gender and rank continue to hold; it is less likely that an accepted author is a NBER member if they are a women, or a member from a lower ranked institution. Collectively, the results in Columns 1-3 suggest that although a vast majority of papers on the Summer Institute program have an NBER-affiliated author, an accepted female author is roughly 8 percentage points less likely to be an NBER member, holding fixed institution rank and program-year.

We next examine how the gender gap in NBER membership changes over time. In Columns 5 and 6 we split the sample into a pre- and post-2010 period. The negative but smaller coefficient on the female term in Column 6 suggest that the gender gap between NBER members narrows in the post-2010 period. We repeat the same exercise as column 4 and 5, but for each major subfield, in Panel B. In both Micro and Macro/International, there is a shrinking gender gap, with Micro moving from an almost 10 percentage point gap to almost zero and Macro/International dropping by almost two-thirds from 18.8 to 6.22. In contrast, Finance's gap actually grew over this period, with female authors

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<sup>28</sup>Note that RePEc rank sorting is ordinal so that higher-ranked institutions have a lower rank, eg., Harvard University has a ranking of #1.

<sup>29</sup>We set institution rank to zero in cases where the rank is missing. This dummy absorbs the effect of missing rank.



on the Finance program going from 13 percentage points less likely to be members to 15 percentage points.

What drives this shrinking NBER gender gap (but differential across fields)? We use another dataset to provide a partial explanation. We use an annual dataset of the NBER membership from 2008 to 2018, with identifiers of both the major programs that the members are a part of as well the members' rank. This rank can be either Faculty Research Fellow (FRF), which is a typically pre-tenure junior position, or Research Associate (RA), which is a more senior post-tenure position. In Panel A of Figure 7, we report the share of all NBER members who are women over this time period, and also report the share of women for FRF and RAs. As noted above, the female share of NBER members has roughly crossed 20 percent at the end of this period. However, the female share of FRFs is much higher, at nearly 30 percent, while the female share of RAs is around 18 percent. This implies that the flow of young NBER members (FRFs) is much more oriented towards women than the more senior stock of NBER members (RAs). We see a similar (but higher) pattern in Panel B, with members who are affiliated with Micro programs.<sup>30</sup> In Panel C, the same higher share of female FRFs in Macro and International implies that there is a larger flow of young female NBER members in the pool. For both Micro and Macro/International, the share of female NBER members is consistent with the share of authors on the NBER programs in those fields. However, in Panel D, the NBER members for Finance display very little difference between the FRFs, RAs and the overall NBER membership, suggesting that the flow of young NBER members who are women and do finance is not higher than the current stock. In more recent years, particularly in 2018, the share of female FRFs appears to have grown slightly.

The gender gap across fields and on the program could be indicative of evidence that the probability of submission is affected by NBER membership, both across time and fields. This could be either through institutional constraints or knowledge of the submission process. It's worth noting that the shares do not change very much over time, even within FRF and RA, consistent with a relatively unchanging share of female authors. Moreover, the female share of NBER members in each field is comparable to the share of female authors on the program in each field, with the exception being Finance, where female authors on the Summer Institute program are slightly higher than female NBER members on the program. This points to the possibility that despite equality conditional on acceptance, differences in knowledge or access might drive some of the differences in submission

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<sup>30</sup>Some individuals are members of several programs; for the purposes of these figures, each individual is only counted once in a given panel, but may be counted twice across Panel B, C and D.

across gender.

#### 4.4 Organizers

Given the potential differences in submission rates, we can examine the role of organizers in gender composition on different programs. Organizers have the ability to both accept submitted papers (where they exhibit no average bias in favor of a gender) as well as solicit submissions (where submissions may come slightly more from men). If informal solicitations or formal calls for papers are correlated with an organizer’s ingroup, then we may see differences in female author share for male and female organizers.

In Table 5, we report the impact of having a female organizer on the share of female authors. This table presents regression results from alternative versions of the following benchmark specification:

$$\text{Female Share}_{it} = \alpha_i + \alpha_t + \text{Female Organizer}_{it} + \epsilon_{it}, \quad (2)$$

where the share of women on a program is the dependent variable, the main explanatory variable is “Female Organizer Share” is a continuous measure of the fraction of women organizers. In all specifications, we weight programs by the number of papers. Standard errors are clustered at the program level.

In our first specification, we examine the full pooled effect, with only year fixed effects in the regression, and report the results in Column 1. We find an insignificant positive effect of having a female organizer on the share of female authors. In Column 2, we also include program fixed effects along with the year fixed effects. The estimates suggest a positive and significant effect of about 3.5 percentage points of a female organizer on the share of women featured on a program. Since this regression exploits within-program variation in organizer gender, it highlights the fact that similar topics with female organizers appear to have a higher representation of women.

A caveat to bear in mind is that the observed patterns may be capturing differential trends across programs if the growth in female organizers coincides with a growth in the share of women. In other words, there may be a growing representation of women in a field that drives the increase in both female organizers and female authorship. Indeed, the share of programs with at least one female organizer has grown over time, with a particularly pronounced growth in micro and macro & international. We attempt to address this concern by controlling for subfield-by-year fixed effects (Finance, Micro and Macro/International by year). The inclusion of field-year fixed effects reduces

the coefficient estimates, but they remain significant and positive.

In Columns 4-6, we mimic the regressions from Column 1-3, but differentiate the coefficients by field. We see the positive effect of female organizers concentrated in macro & international, and surprisingly a negative effect in finance. These results persist with subfield-by-year fixed effects in Column 6.

In Table 6, we repeat the same regressions as Table 5, but examine the share of women among discussants as an outcome. Not all programs at the Summer Institute have discussants – amongst the 48 distinct programs we measure in 2016, for papers that we consider, only 29 of the programs have discussants. The gender representation of discussants is particularly noteworthy because organizers select discussants independent of submission. As a result, this can be a useful tool for studying female representation at a conference, independent of submission rates.

We see that in Columns 1-3, there is a positive effect of having a female organizer on the female share of discussants. However, these results are only significant in Column 1, and insignificant in Columns 2 and 3. When we focus by fields, we see that the positive effect of female organizers exists for all fields, but is only statistically significant with code and year fixed effects (in Column 5 and 6) for Finance.

Lastly, in unreported results, we compare the share of authors and discussants that are female over time.<sup>31</sup> We find that in aggregate and across all fields, the share of women as discussants is lower than that of authors, but this difference is only statistically significant for micro fields.

This evidence can be interpreted both positively and negatively. On the plus side, a body of evidence suggests that women bear a larger brunt of the “service” tasks in academia (e.g. [Misra et al. \(2011\)](#)), and it suggests that this is not the case at the NBER. On the other hand, being a discussant (particularly at a high-prestige venue such as the NBER summer institute), can be considered an important way to create visibility for young academics, and one in which organizers have substantial discretion. Being a discussant is both a burden and a benefit – empirically it is unclear whether either dominates.

## 5 Alternative Channels

We finally consider two alternative aspects of NBER authors that may differ by gender: paper quality measured by publication outcome and the institutional rank of authors. These two approaches

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<sup>31</sup>To make a fair comparison, we examine the subset of programs that have at least one discussant in a given year (54% of all program-years)

attempt to proxy for the quality of the papers or the authors. Both measures are relatively crude, but find little evidence of substantial research quality differences across men and women on the NBER Summer Institute programs.

## 5.1 Publications

Conditional on NBER acceptance, how do papers publish? For a subset of years (2001-2011), we identify the share of NBER papers on programs subsequently published in either the Journal of Political Economy (JPE), the Quarterly Journal of Economics (QJE), Econometrica and the American Economic Review (AER), using data from [Hengel \(2017\)](#). We estimate the following equation:

$$Y_{it} = \beta \text{Female Co-Author}_{it} + \tau X_{it} + \epsilon_{it}, \quad (3)$$

where  $Y_{it}$  denotes a variety of outcomes, including an indicator for whether the paper was published in one of the Top 4 journals listed above, or an indicator for each of the individual journals (QJE, ECMA, AER, JPE). Female Co-Author denotes whether a paper had a female co-author on the paper.  $X_{it}$  denotes program-by-year fixed effects. These results are almost identical if we include additional controls for the institution rank of the authors, or allow for less exhaustive fixed effects. We cluster standard errors at the program level.

In [Table 3](#), we report the results from estimating [Equation 3](#). On average, a paper on the NBER program during this period had a roughly ten percent chance of being published in one of the Top 4 in our dataset. Moreover, we find that the probability of publishing in one of the Top 4 journals is 1.1 percentage points lower for female co-authored papers, but statistically insignificant, with large standard errors of around 1.1 percentage points. We also examine across journals and find that for all journals but the JPE, this difference is insignificant. However, for the JPE, the effect is negative and significant, with female coauthored papers having a 1.4 percentage point lower chance of publication. This is almost entirely the size of the overall average outcome of 1.7 percentage points for the JPE. This lack of difference by gender is consistent with the assumption that papers with female co-authors tend to be of similar quality at the high end and hence have a similar rate of publication.

## 5.2 University Rank

An alternative proxy for research quality is the rank of the institution with which an author is affiliated. [Figure 8](#) plots the cumulative share of authors accepted onto the NBER programs across RePEc

rankings. For all accepted authors, we calculate the cumulative share as the share of authors for each institutional rank, divided by the total number of authors identified by rank, and cumulated across ranks. For each gender, we calculate the share within gender. A steeper curve implies a larger share of higher-ranked institutions.<sup>32</sup> The area under the curve in the plot from Figure 8 shows that roughly 50% of the authors come from the top 30 institutions in RePec rankings, consistent with the prior that a prestigious conference like the NBER summer draws authors from the top-ranked institutions.

Conditional on institutional rank, however, there do not appear to be significant differences across gender. The distribution of female authors appears to be slightly lower across ranks, but the difference is small. Given the steepness of the cumulative plots and the closeness of the series by gender, the data suggest that both men and women from top institutions are highly represented on the Summer Institute program. Table 7 highlights the top ten schools represented on the program and shows that 34% of papers come from top ten schools. Both panels of the table corroborate the prestigious nature of the conference.

## 6 Conclusion

We find that over the period from 2016-2018, women made up 21 percent of all authors on scheduled papers, but there was large dispersion across different sub-disciplines. While the average share of women on programs has risen slightly over the past 18 years from 18 percent in 2001-2003, the gap of women between finance, macroeconomics and microeconomics subfields has remained constant.

Using two years of anonymized submission data, we find statistically indistinguishable acceptance rates across men and women. Hence, the gender representation at the NBER Summer Institute likely reflects the gender composition of the submissions pool. However, it is not possible to measure with precision the pool of academics who submit to the NBER summer institute, we venture to approximate an estimate of the submissions rates by gender. From our analysis, the only comparable benchmark of female economists that matches both the level and time series of female representation at the NBER is the share of women who are NBER affiliates. While the NBER Summer Institute makes a substantial effort to email and contact all departments with doctoral programs to solicit submissions, our results suggest that either information or some other barriers may influence the probability of submission. For programs interested in increasing female representation, encouraging a larger share of female submissions may be effective.

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<sup>32</sup>RePec rankings are from <https://ideas.repec.org/top/top.inst.allbest10detail.html>

We are also left with the puzzling question of why there are such stark differences across fields in female representation. Indeed, far from being homogeneous, we find that for an economist attending the first week of the Summer Institute in 2016 (dominated by finance and macroeconomics sessions), 17.5 percent of the authors on papers presented were women. In contrast, the third week of papers (a week focused on labor and public economics) had almost twice as many women on the program; 30.5 percent of the authors were women. While finance acceptance rates appear to have a small tilt in favor of men, this is not the case for macro & international, which also have much lower representation of women. A potential explanation is that women have a preference for topics in certain subfields of economics and actively choose to enter these fields. Given evidence on the role of mentoring (e.g. [Neumark and Gardecki \(1998\)](#), [Carrell, Page and West \(2010\)](#), [Bettinger and Long \(2005\)](#)), future research could consider the impact of mentors on encouraging more women to enter particular subfields of economics. Alternatively, there may be unexplored barriers to entry in sub-fields in finance. These barriers appear puzzling and worth exploring in future research.

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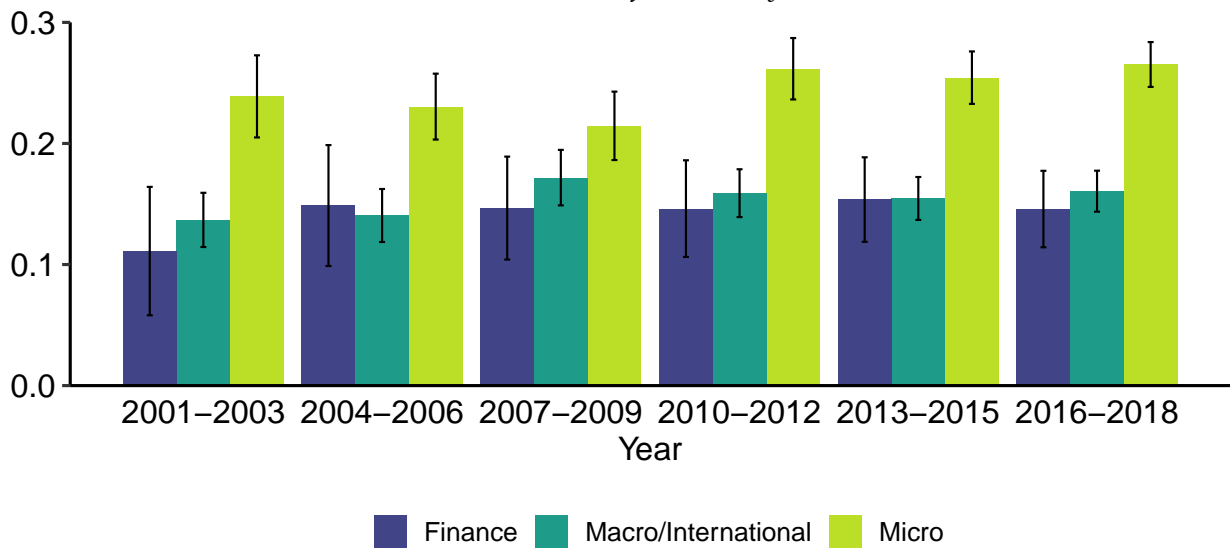


**Figure 1: Gender Composition over Time**

*Panel A: Female Share of Authors by Author Composition*

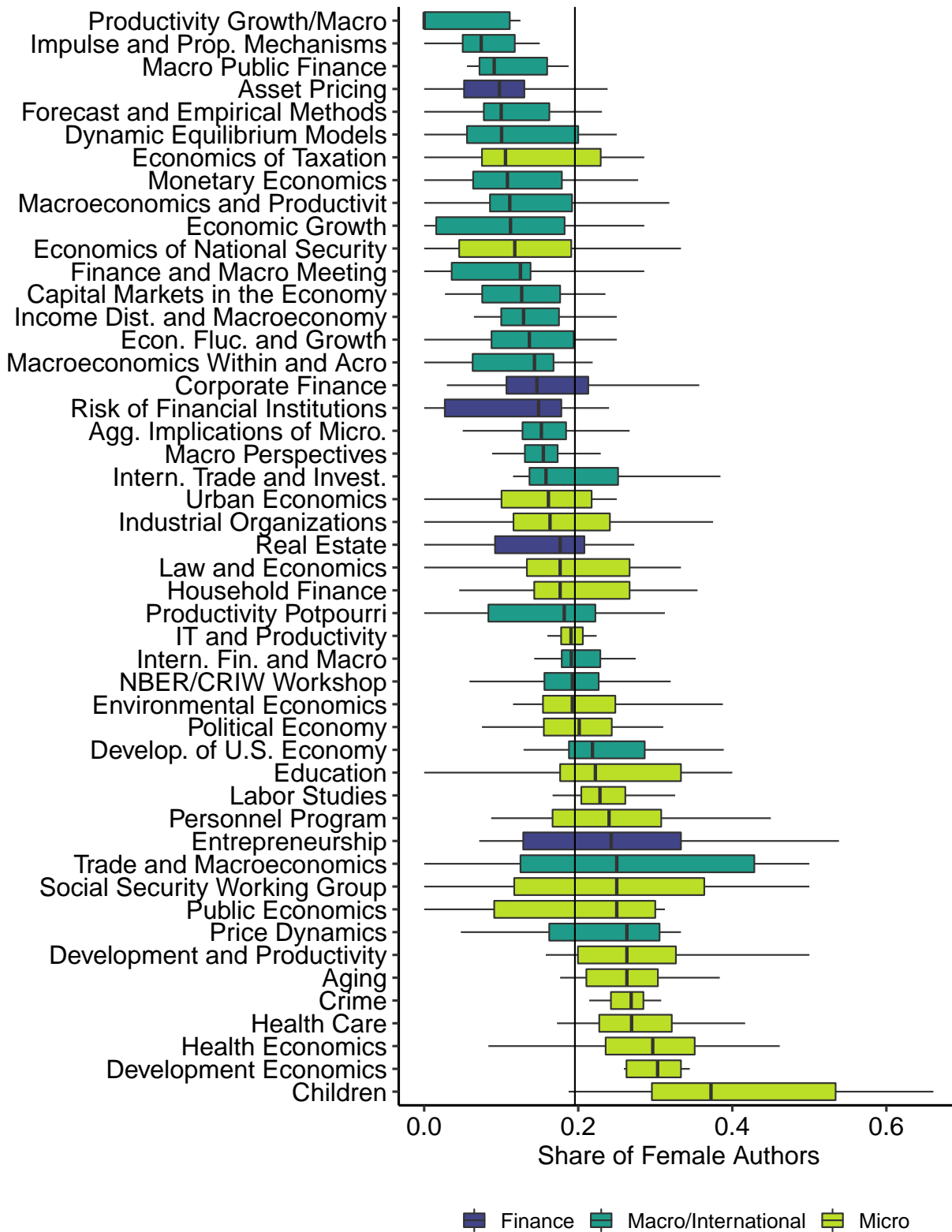


*Panel B: Female Share of Authors by Field*



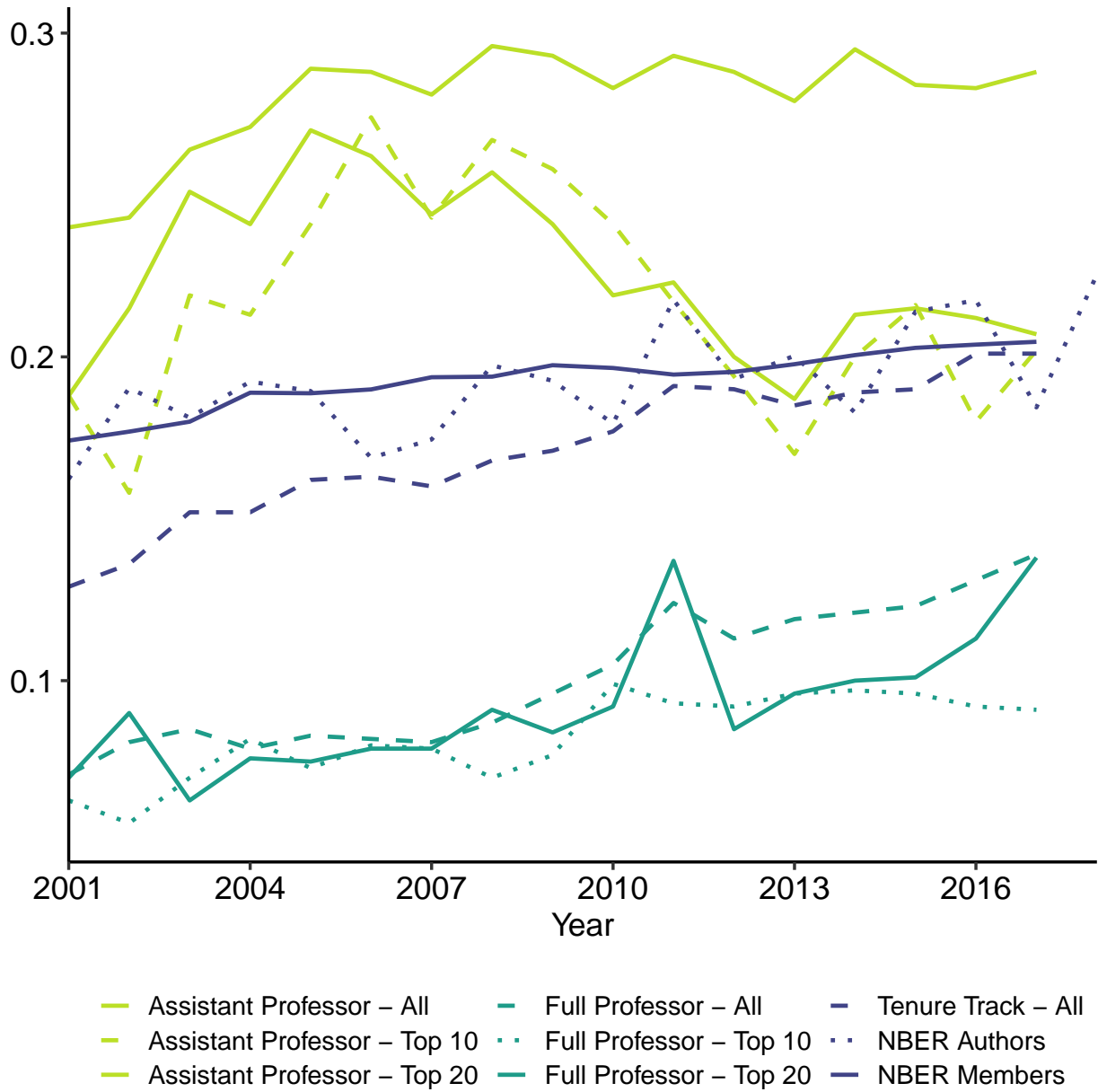
**Note:** This figure plots the overall representation of female economists divided into four year buckets. Panel A reports the share of female authors across all papers. Panel B shows the composition of authors across accepted papers broken down into categories based on author composition. The error bars represent +/- 1.96 times the standard error of the mean.

**Figure 2: Gender Composition Across Programs**



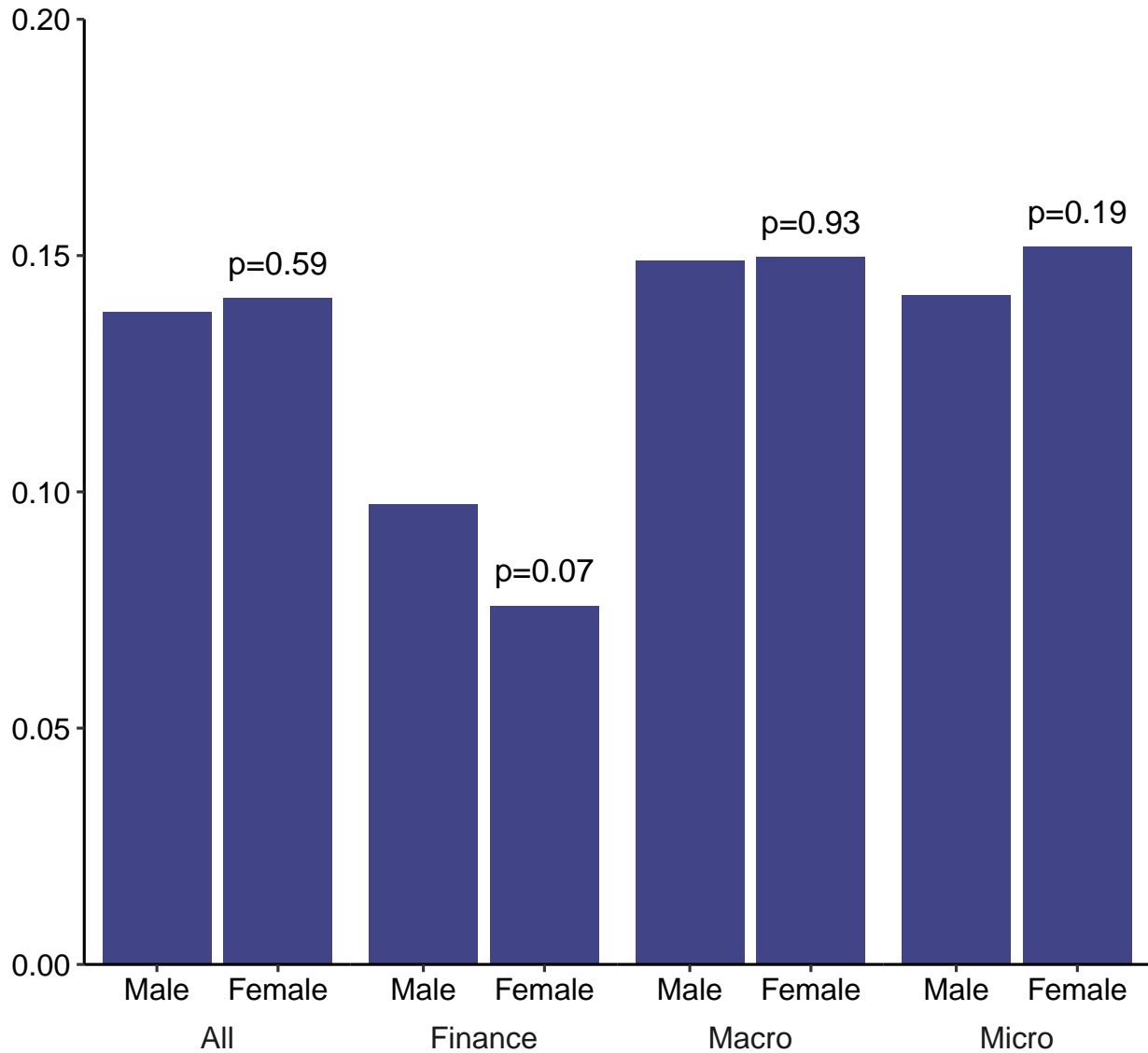
**Note:** This figure plots a box plot of the gender composition across programs using all data from 2001 to 2018. For each program, the box reflects the interquartile range, with the middle line reflecting the median. The lines reflect the furthest value that is within 1.5 standard deviations of the interquartile range, where the standard deviations are measured within program. The overall black line reflects the overall average share of female authors. We only report programs that have a minimum of 5 years of data. Programs are coded into fields using the categorization in Table 1.

**Figure 3: Benchmarking the share of female economists over time**



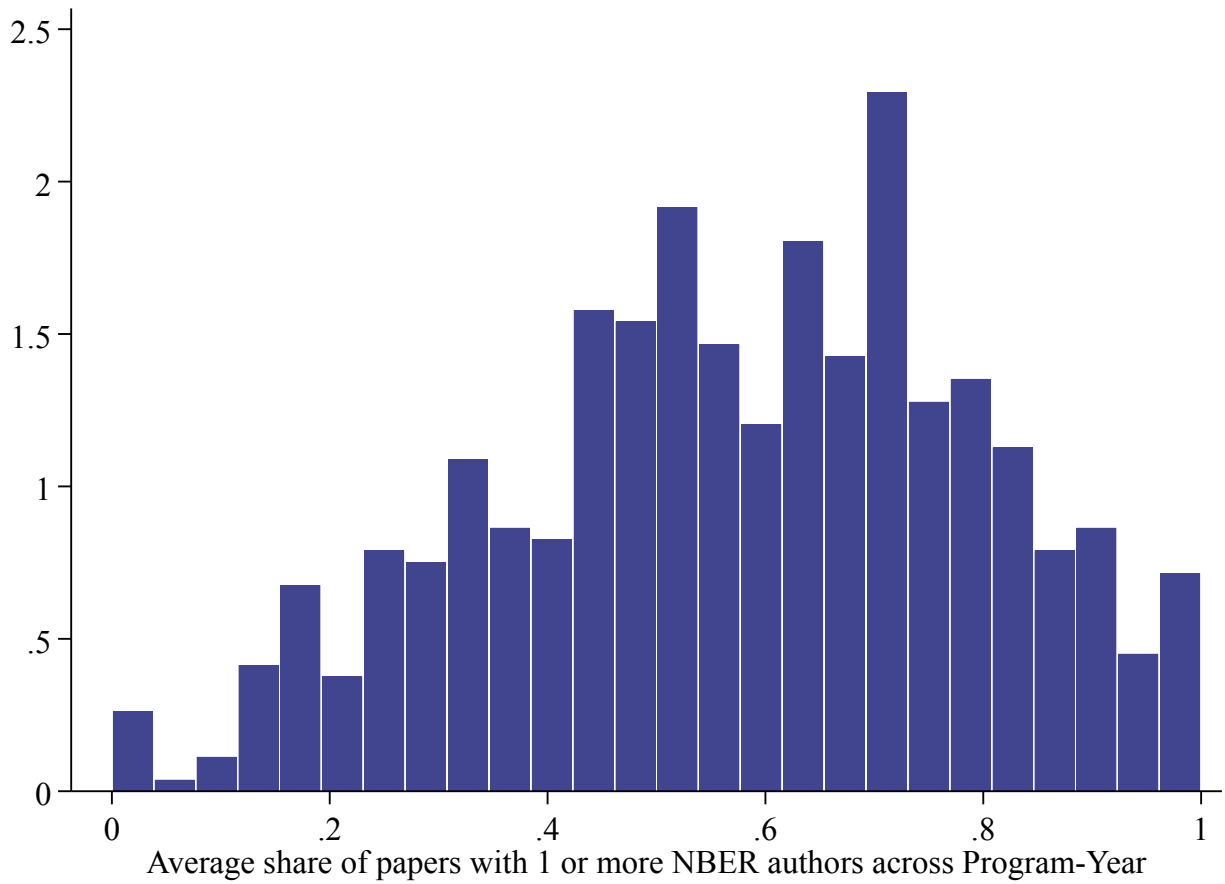
**Note:** This figure plots the share of female economist in different categories over time. The bottom set of lines report the share of women who are Full professors at all institutions with graduate programs, or at the Top 10 and Top 20 institutions. The top lines report the share of assistant professors that are women across the three sets of universities. All of these statistics come from the CSWEP report on representation of women in economics. The solid middle line reports the share of NBER members (research associates and faculty research fellows) that are women. This comes from the NBER website on NBER members. The dotted middle line reports the share of authors that are female on the NBER programs, and the dashed middle line reports the share of all tenure track professors from CSWEP at all institutions with graduate programs.

**Figure 4: NBER Acceptance Across Fields and Gender**



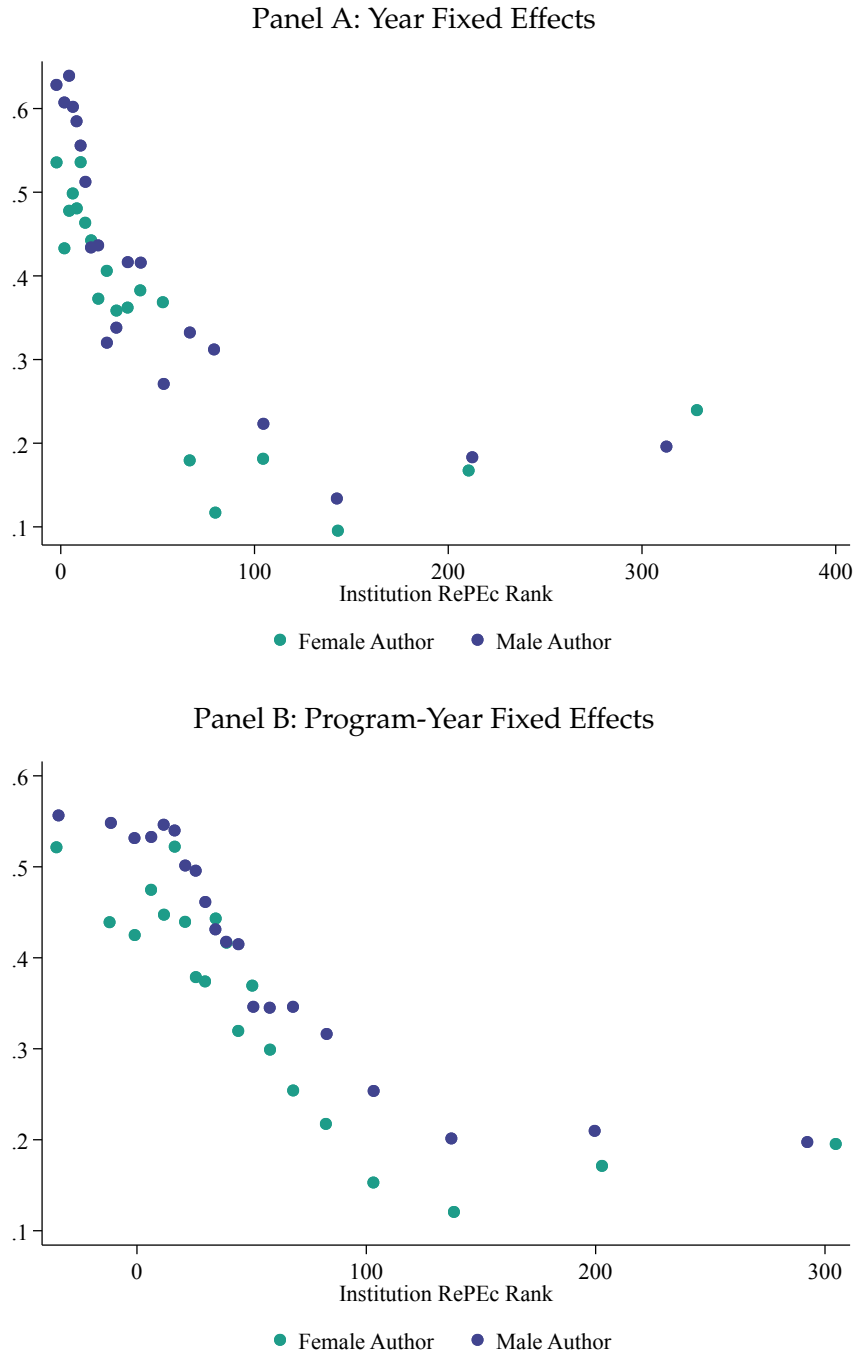
**Note:** This figure plots the acceptance rate into the NBER, conditional on submission, of authors for the 2016 and 2017 NBER Summer Institute. The first set of bars plot the acceptance rate for male and female authors for all fields pooled. The next three sets split out acceptance rates by field. None of the differences is significant, except for finance, with a p-value of 0.07. Reported p-values are from a t-test of difference in means between male and female acceptance rates.

**Figure 5:** Share across programs of papers with one or more NBER Author



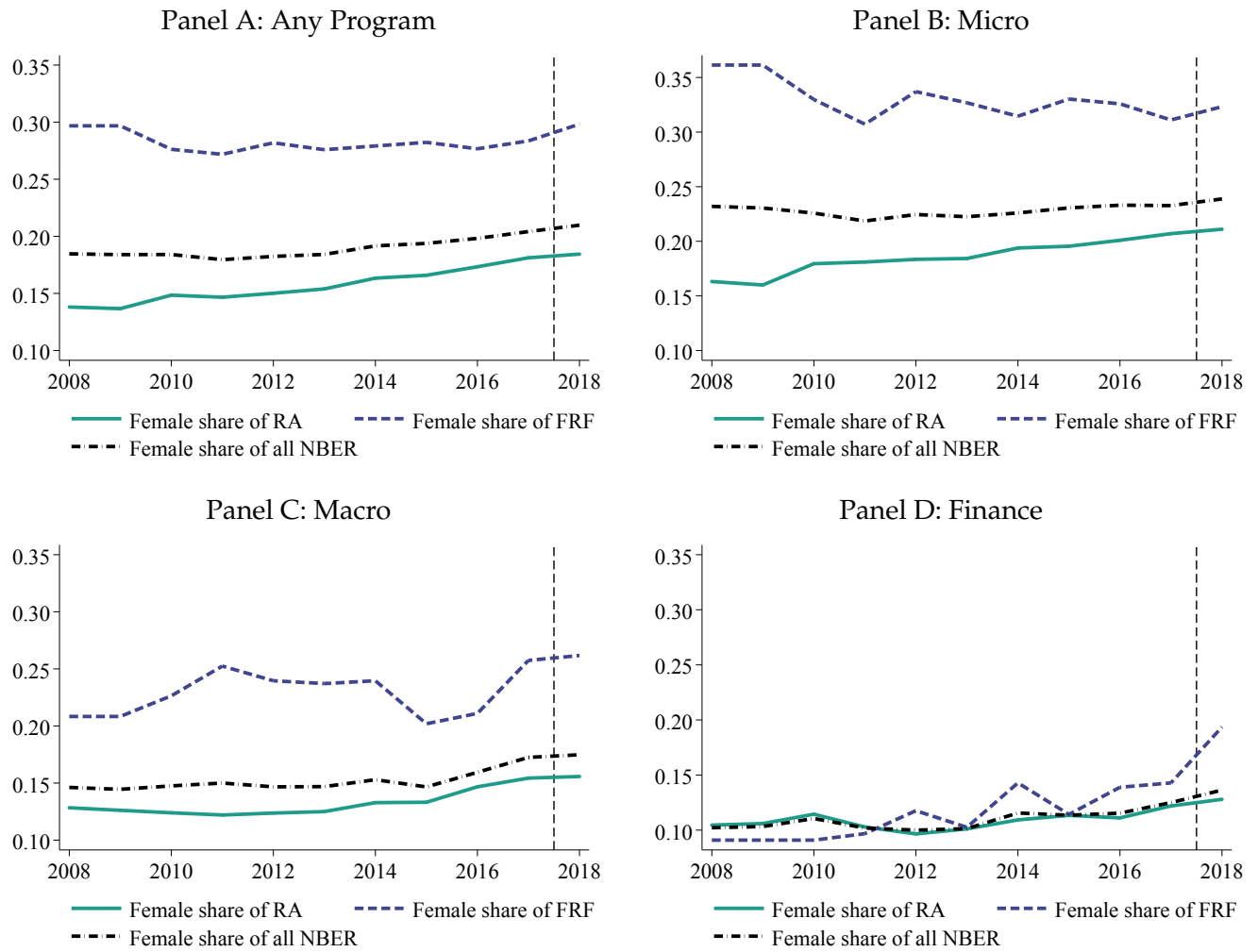
**Note:** This figure plots the distribution of the share of papers in a given program-year at the NBER Summer Institute that have at least one NBER member as an author.

**Figure 6:** Probability an Author is an NBER Member by Institution Rank



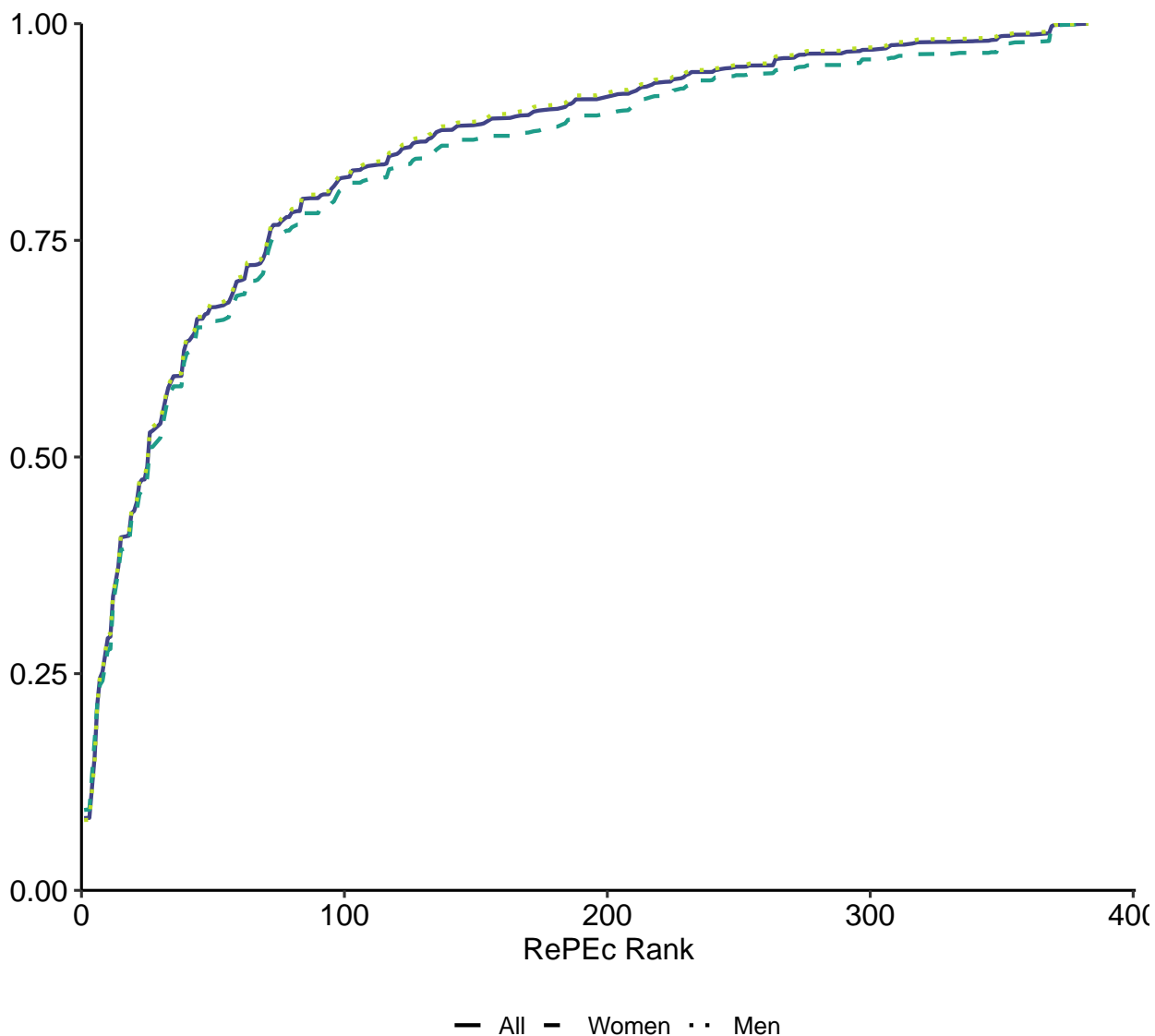
**Note:** These figures plot the probability that an NBER summer institute author is an NBER member. For Panel A, we use year fixed effects as controls. In Panel B, we use program-by-year fixed effects. To construct each binned scatter plot, we first regress both the y- and x-axis variable on the control variables and calculate residuals. We then group the observations into twenty equal-sized (five percentile-point) bins based on the x-axis residual and scatter the means of the y- and x-axis residuals within each bin.

**Figure 7: Female share in the NBER Membership by type of affiliation**



**Note:** This figure plots the share of female NBER members over time from 2008 to 2018. On each panel, the female share is plotted for three groups: all NBER members, Faculty Research Fellow (FRF) members and Research Associates (RA) members. In Panel B, Micro is defined as membership in Aging, Children, Development of the American Economy, Development, Education, Environment and Energy Economics, Health Care, Health Economics, Industrial Organization, Law and Economics, Labor Studies, and Public Economics. Macro is defined as membership in Economic Fluctuations and Growth, International Finance and Macroeconomics, International Trade and Investment, Monetary Economics, Political Economy or Productivity Innovation and Entrepreneurship. Finance is defined as membership in Corporate Finance or Asset Pricing.

**Figure 8:** Cumulative Author Distribution by Rank and Gender



**Note:** This figure plots the cumulative share of authors accepted onto the NBER programs across RePEc rankings. For all authors, it calculates the cumulative share as the share of authors for each rank, divided by the total number of authors (for those with identified ranks), and cumulated across ranks. For each gender, it calculates the share within gender. A steeper curve implies a larger share in higher ranked institutions. RePEc rankings are pulled from here: [https://ideas.repec.org/top/top\\_inst.allbest10detail.html](https://ideas.repec.org/top/top_inst.allbest10detail.html)



**Table 1:** Field Categorization of NBER Programs

Finance	Macro/International	Micro
Asset Pricing	Aggregate Implications of Microeconomic Consumption Behavior	Aging
Corporate Finance	Capital Markets in the Economy	Children
Entrepreneurship	Development of the American Economy	Crime
Real Estate	Dynamic Equilibrium Models	Development Economics
Risk of Financial Institutions	Econ Fluct and Growth	Development and Productivity
	Economic Fluctuations - Behavioral/Macro	Economics of National Security
	Economic Growth	Education
	Finance and Macro Meeting	Environmental Economics
	Forecast and Empirical Methods	Health Care
	Impulse and Propagation Mechanisms	Health Economics
	Income Distribution and Macroeconomics	Household Finance
	International Finance and Macroeconomics	IT and Productivity
	International Trade and Investment	Industrial Organizations
	Macro Perspectives	Innovation
	Macro Public Finance	Labor Studies
	Macroeconomics Within and Across Borders	Law and Economics
	Macroeconomics and Productivity	Personnel Program
	Monetary Economics	Political Economy
	NBER/CRIW Workshop	Public Econ: Taxation and Social Insurance
	Price Dynamics	Social Security
	Trade and Macroeconomics	Urban Economics

**Note:** This table gives the categorization of programs used for the figures and tables throughout the paper. We combine programs together in cases where names changed slightly.

**Table 2: Summary Stats by Year**

Year	Number of Papers (1)	Female Share of Papers (2)	Paper Breakdown		
			All Male (3)	Male + Female (4)	All Female (5)
<i>All Fields</i>					
2001	332	0.16	0.74	0.17	0.08
2002	370	0.19	0.69	0.18	0.13
2003	320	0.18	0.70	0.21	0.09
2004	381	0.19	0.69	0.22	0.09
2005	361	0.19	0.68	0.25	0.07
2006	377	0.17	0.71	0.20	0.08
2007	371	0.17	0.69	0.23	0.08
2008	368	0.20	0.67	0.20	0.13
2009	416	0.19	0.67	0.23	0.10
2010	437	0.18	0.67	0.27	0.06
2011	469	0.22	0.64	0.28	0.08
2012	435	0.20	0.65	0.28	0.07
2013	487	0.20	0.62	0.30	0.08
2014	508	0.18	0.67	0.26	0.07
2015	499	0.22	0.56	0.37	0.06
2016	586	0.22	0.60	0.30	0.10
2017	577	0.19	0.67	0.24	0.10
2018	597	0.23	0.57	0.33	0.10

**Note:** this table reports the year-by-year summary statistics from the sample of NBER authors. Column 1 reports the total number of papers on the program each year in our sample. Column 2 reports the average share of authors on the programs that were women. Columns 3-5 report the shares of papers in each year that had all male authors, male and female authors, and all female authors, respectively.

**Table 2: Summary Stats, Continued; by Year + Field**

Year	Number of Papers	Female Share of Papers	Paper Breakdown		
			All Male	Male + Female	All Female
	(1)	(2)	(3)	(4)	(5)
<i>Micro</i>					
2001	99	0.22	0.69	0.18	0.13
2002	128	0.28	0.59	0.23	0.17
2003	99	0.22	0.64	0.27	0.09
2004	156	0.22	0.63	0.28	0.09
2005	139	0.24	0.58	0.35	0.06
2006	143	0.23	0.64	0.29	0.08
2007	131	0.18	0.66	0.28	0.06
2008	140	0.23	0.64	0.21	0.15
2009	142	0.24	0.61	0.27	0.11
2010	151	0.23	0.58	0.34	0.08
2011	188	0.30	0.48	0.39	0.12
2012	164	0.24	0.59	0.35	0.07
2013	199	0.27	0.52	0.36	0.13
2014	211	0.25	0.55	0.35	0.09
2015	209	0.26	0.48	0.44	0.09
2016	271	0.27	0.52	0.32	0.16
2017	249	0.25	0.57	0.29	0.14
2018	323	0.28	0.49	0.36	0.15
<i>Macro/International</i>					
2001	168	0.12	0.79	0.17	0.04
2002	169	0.14	0.76	0.14	0.10
2003	158	0.15	0.77	0.14	0.09
2004	165	0.16	0.76	0.16	0.08
2005	153	0.15	0.76	0.18	0.06
2006	177	0.12	0.79	0.12	0.09
2007	185	0.17	0.72	0.19	0.09
2008	170	0.19	0.71	0.17	0.12
2009	198	0.16	0.72	0.19	0.09
2010	201	0.17	0.70	0.25	0.05
2011	213	0.15	0.74	0.21	0.05
2012	207	0.16	0.71	0.23	0.06
2013	216	0.15	0.71	0.24	0.05
2014	224	0.13	0.78	0.16	0.07
2015	229	0.18	0.62	0.32	0.05
2016	257	0.19	0.64	0.30	0.06
2017	260	0.14	0.74	0.20	0.06
2018	212	0.16	0.68	0.28	0.04
<i>Finance</i>					
2001	21	0.13	0.86	0.10	0.05
2002	22	0.06	0.86	0.09	0.05
2003	24	0.15	0.71	0.25	0.04
2004	29	0.18	0.66	0.28	0.07
2005	32	0.13	0.72	0.22	0.06
2006	32	0.14	0.72	0.22	0.06
2007	31	0.12	0.74	0.19	0.06
2008	30	0.16	0.67	0.30	0.03
2009	41	0.15	0.71	0.24	0.05
2010	46	0.11	0.78	0.17	0.04
2011	44	0.12	0.77	0.20	0.02
2012	40	0.20	0.65	0.28	0.08
2013	47	0.17	0.62	0.36	0.02
2014	53	0.13	0.72	0.25	0.04
2015	54	0.17	0.63	0.37	0.00
2016	58	0.12	0.76	0.21	0.03
2017	61	0.13	0.72	0.23	0.05
2018	54	0.19	0.57	0.39	0.04

**Table 3: Publication Outcomes in Top Journals by Gender**

	Accepted in Journal				
	Top 4	QJE	ECMA	AER	JPE
Female Co-Author	-0.011 (0.011)	-0.004 (0.006)	-0.001 (0.003)	0.008 (0.008)	-0.014*** (0.004)
Number of Papers	4208	4208	4208	4208	4208
Avg. Acceptance Rate	0.099	0.031	0.009	0.043	0.017
Code $\times$ Year F.E.	Yes	Yes	Yes	Yes	Yes

**Note:** this table presents the results from the following estimating equation:

$$Y_{it} = \beta \text{Female Co-Author}_{it} + \tau X_{it} + \epsilon_{it}, \quad (4)$$

where  $Y_{it}$  denotes a variety of outcomes, including an indicator for whether the paper was published in one of the Top 4 journals listed above, or an indicator for each of the individual journals (QJE, ECMA, AER, JPE). Female Co-Author denotes whether a paper had a female co-author on the paper.  $X_{it}$  denotes program-by-year fixed effects. In each column, we report the results for each potential outcome. We cluster standard errors at the program level.

**Table 4: Rates of NBER Membership across accepted authors**

Panel A: All Programs					
Probability an accepted author is NBER member					
	Full Sample			Year ≤ 2010	Year > 2010
	(1)	(2)	(3)	(4)	(5)
Female	-7.688*** (1.945)	-7.447*** (2.088)	-8.500*** (1.945)	-13.663*** (3.523)	-5.807*** (1.860)
RePEc Rank	-0.151*** (0.018)	-0.455*** (0.030)	-0.430*** (0.027)	-0.384*** (0.037)	-0.453*** (0.035)
RePEc Rank <sup>2</sup>		0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Female × RePEc Rank	0.046*** (0.017)	0.050 (0.032)	0.044 (0.032)	0.117* (0.064)	0.010 (0.041)
Female × RePEc Rank <sup>2</sup>		-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Observations	17594	17594	17594	6486	11108
Year F.E.	Yes	Yes	Yes	Yes	Yes
Program FE	No	Yes	Yes	Yes	Yes
Program-Year FE	No	No	Yes	Yes	Yes

Panel B: By Field

Probability an accepted author is NBER member						
	Micro		Macro/International		Finance	
	Year ≤ 2010	Year > 2010	Year ≤ 2010	Year > 2010	Year ≤ 2010	Year > 2010
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-9.443** (4.094)	-1.581 (2.578)	-18.806*** (4.823)	-6.223* (3.238)	-13.081* (7.257)	-15.021** (5.642)
RePEc Rank	-0.336*** (0.058)	-0.347*** (0.034)	-0.384*** (0.043)	-0.520*** (0.035)	-0.453*** (0.127)	-0.621*** (0.054)
RePEc Rank <sup>2</sup>	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001** (0.000)	0.001*** (0.000)
Female × RePEc Rank	0.164 (0.103)	-0.085 (0.052)	0.078 (0.098)	0.010 (0.071)	0.079 (0.163)	0.168 (0.114)
Female × RePEc Rank <sup>2</sup>	-0.001** (0.000)	0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.001)	-0.000 (0.000)
Observations	2332	4839	2908	4678	596	1184
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Program FE	Yes	Yes	Yes	Yes	Yes	Yes
Program-Year FE	Yes	Yes	Yes	Yes	Yes	Yes

**Note:** this table reports the results from the following specification:

$$\text{NBER Member}_{it} = \beta \text{Female} + \gamma \text{Rank} + \tau X_{it} + \epsilon_{it} \quad (5)$$

The outcome variable in the regressions is an indicator for whether the accepted author is NBER member. We include a dummy for whether the author is male or female, and also control for the rank of the authors' institutions according to RePec. Note that RePec rank sorting is ordinal so that higher-ranked institutions have a lower rank, eg., Harvard University has a ranking of #1.  $X_{it}$  includes various forms of fixed effects, and a dummy for if the institution rank is missing. Standard errors are clustered at the program level. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

**Table 5: Organizer Effects on Female Author Share**

	Share Female Author					
	(1)	(2)	(3)	(4)	(5)	(6)
Share Female Organizers	0.072 (0.052)	0.069** (0.029)	0.060** (0.030)			
× Finance				-0.112 (0.070)	-0.077*** (0.013)	-0.067*** (0.024)
× Micro				-0.022 (0.044)	0.043 (0.036)	0.031 (0.039)
× Macro				0.130** (0.058)	0.106*** (0.035)	0.094** (0.036)
Observations	650	650	650	650	650	650
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Program FE	No	Yes	Yes	No	Yes	Yes
Field-Year FE	No	No	Yes	No	No	Yes

**Note:** In Panel A, we regress the probability of the NBER SI papers being published in the American Economic Review, Econometrica, Journal of Political Economy and Quarterly Journal of Economics using data on outcomes from [Hengel \(2017\)](#) matched to our sample, limited to papers in the SI before 2015 and controlling for program-by-year fixed effects and clustering at the program level. Panel B and C of this table presents regression results from versions of the following specification:

$$\text{Female Share}_{it} = \alpha_i + \alpha_t + \text{Female Organizer}_{it} + \epsilon_{it}, \quad (6)$$

where the share of women on a program is the dependent variable, the main explanatory variable is Female Organizer Share, which is a continuous measure of what fraction of organizers are women. The unit of analysis is a program-year. In Column 1, we report the coefficients using just year fixed effects. In Column 2, we add program fixed effects. In Column 3, we add field-year fixed effects to the specification from column 2. In Columns 4-6, we mimic the regressions from Column 1-3, but split out the coefficients by field. Programs are coded into fields using the categorization in Table 1. Standard errors are clustered at the program level, and regressions are weighted by the number of papers on a program in a given year. Column 1 reports the probability of publishing in any of the 4, and Columns 2-5 report for each journal individually. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

**Table 6: Organizer Effects on Female Discussant Share**

	Share Female Discussants					
	(1)	(2)	(3)	(4)	(5)	(6)
Share Female Organizers	0.053*	0.033	0.025			
	(0.029)	(0.030)	(0.038)			
× Finance				0.123	0.149**	0.109***
				(0.105)	(0.056)	(0.038)
× Micro				0.026	0.014	0.032
				(0.030)	(0.055)	(0.088)
× Macro				0.072**	-0.004	-0.017
				(0.034)	(0.024)	(0.038)
Observations	289	289	289	289	289	289
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Program FE	No	Yes	Yes	No	Yes	Yes
Field-Year FE	No	No	Yes	No	No	Yes

**Note:** In Panel A, we regress the probability of the NBER SI papers being published in the American Economic Review, Econometrica, Journal of Political Economy and Quarterly Journal of Economics using data on outcomes from [Hengel \(2017\)](#) matched to our sample, limited to papers in the SI before 2015 and controlling for program-by-year fixed effects and clustering at the program level. Panel B and C of this table presents regression results from versions of the following specification:

$$\text{Female Share}_{it} = \alpha_i + \alpha_t + \text{Female Organizer}_{it} + \epsilon_{it}, \quad (7)$$

where the share of women on a program as discussants (Panel B) is the dependent variable, the main explanatory variable is Female Organizer Share, which is a continuous measure of what fraction of organizers are women. The unit of analysis is a program-year. In Column 1, we report the coefficients using just year fixed effects. In Column 2, we add program fixed effects. In Column 3, we add field-year fixed effects to the specification from column 2. In Columns 4-6, we mimic the regressions from Column 1-3, but split out the coefficients by field. Programs are coded into fields using the categorization in Table 1. Standard errors are clustered at the program level, and regressions are weighted by the number of papers on a program in a given year. Column 1 reports the probability of publishing in any of the 4, and Columns 2-5 report for each journal individually. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

**Table 7: Top Share of Papers by Rank and Gender**

Affiliation	Author Share of Papers			Cumulative Share
	Women	Men	All	All
<i>Panel A: Sorted by Total Share</i>				
Harvard University	1.4	5.2	6.5	6.5
University of Chicago	0.6	4.1	4.7	11.3
Massachusetts Institute of Technology	0.9	3.1	4.0	15.3
Stanford University	0.8	2.9	3.7	18.9
University of Pennsylvania	0.5	2.6	3.1	22.0
New York University	0.4	2.3	2.7	24.7
Columbia University	0.6	2.1	2.6	27.3
Princeton University	0.3	2.1	2.4	29.7
Northwestern University	0.4	1.9	2.3	32.0
Yale University	0.5	1.6	2.1	34.1
<i>Panel B: Sorted by Female Share</i>				
Harvard University	1.4	5.2	6.5	6.5
Massachusetts Institute of Technology	0.9	3.1	4.0	10.5
Stanford University	0.8	2.9	3.7	14.2
University of Chicago	0.6	4.1	4.7	18.9
Columbia University	0.6	2.1	2.6	21.5
University of Pennsylvania	0.5	2.6	3.1	24.6
Yale University	0.5	1.6	2.1	26.7
New York University	0.4	2.3	2.7	29.4
University of Michigan	0.4	1.3	1.8	31.2
Northwestern University	0.4	1.9	2.3	33.5

**Note:** This table presents the top ten university affiliations that have the highest cumulative share of authors on the NBER SI programs. This share is calculated only amongst authors for whom affiliation can be identified, which is roughly 70% of the sample.

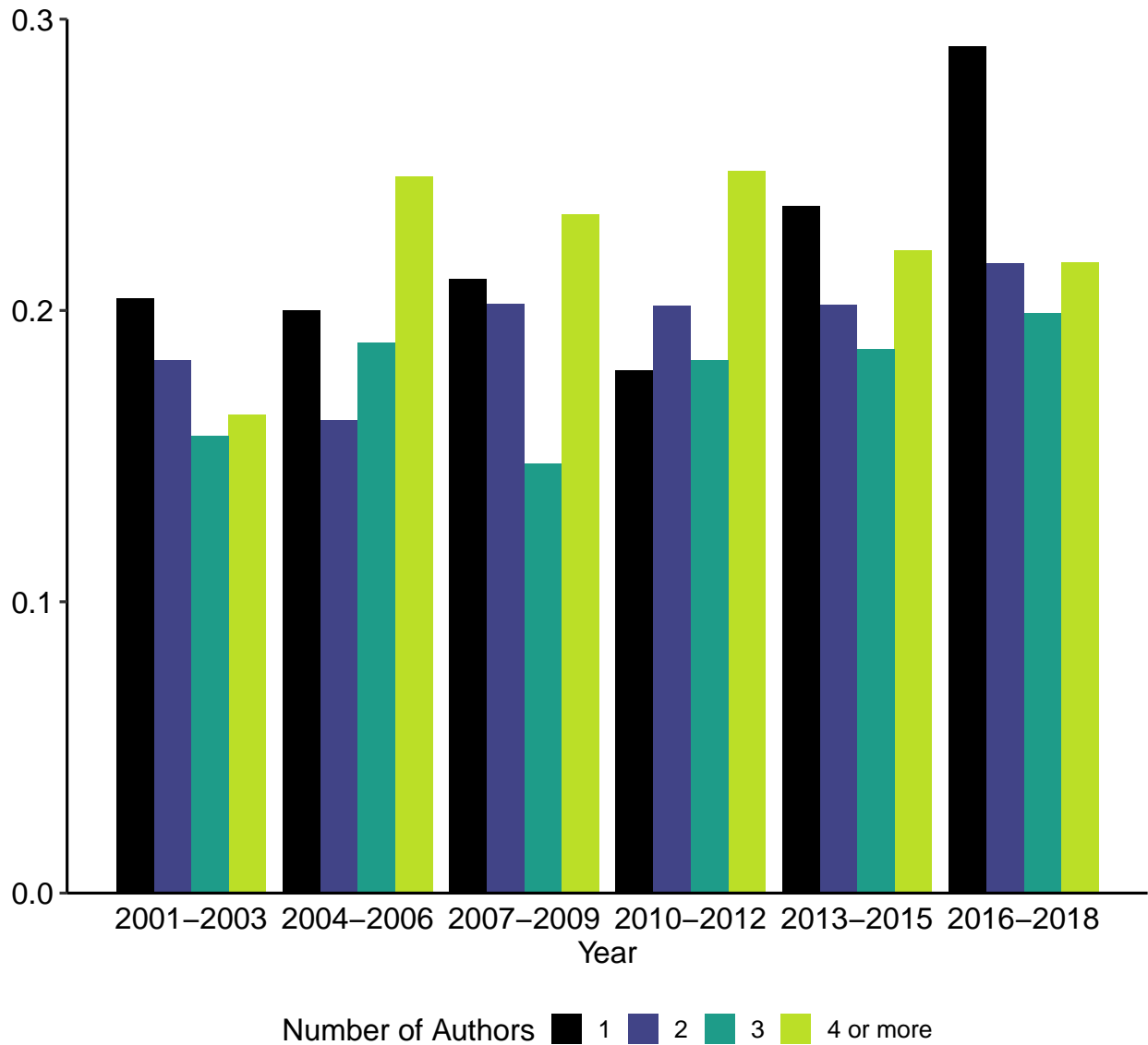


**Gender Representation in Economics Across Topics and Time: Evidence  
From the NBER Summer Institute**

**Online Appendix**

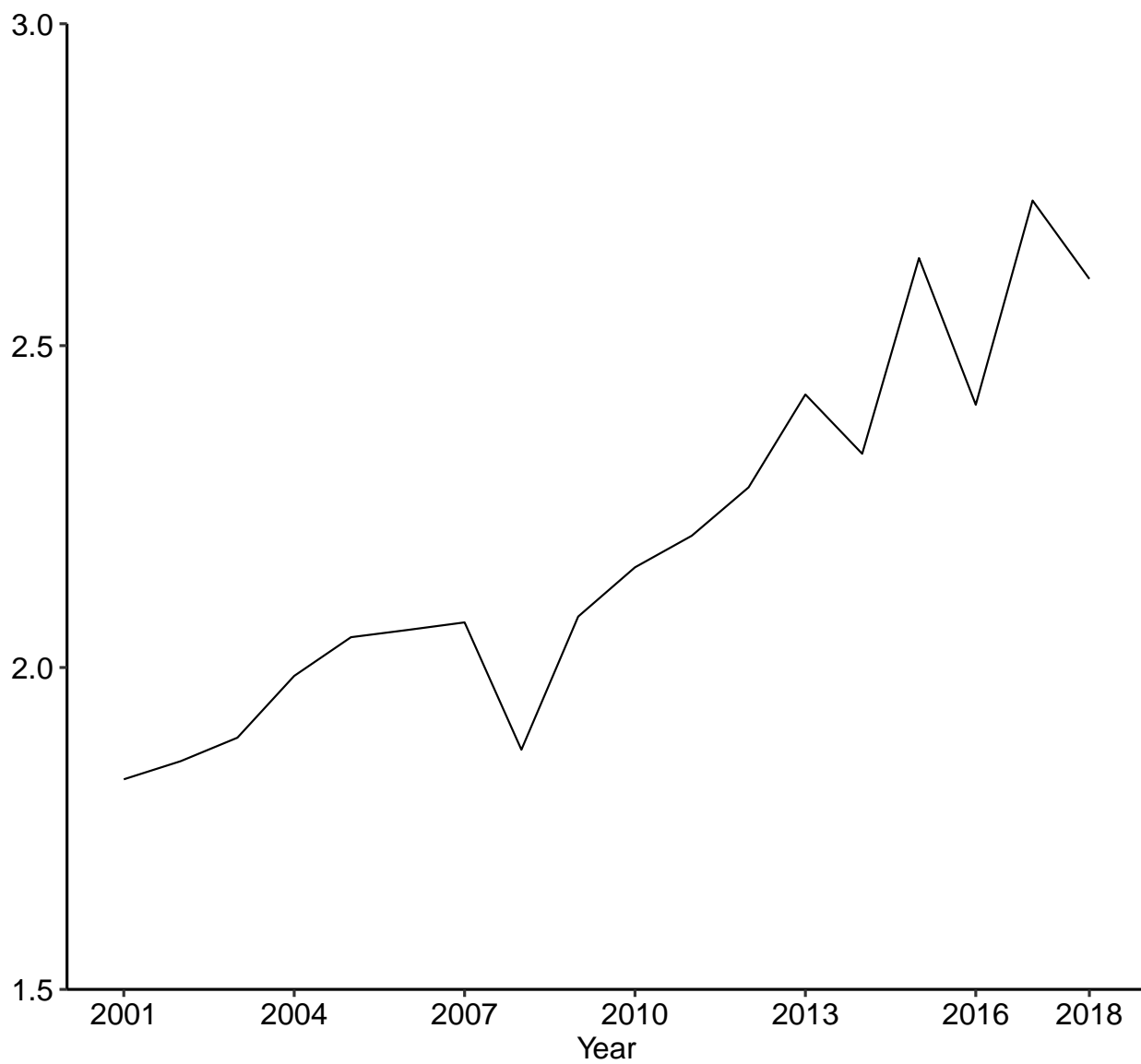
Anusha Chari Paul Goldsmith-Pinkham

Figure A1: Composition of Authorship Gender over Time



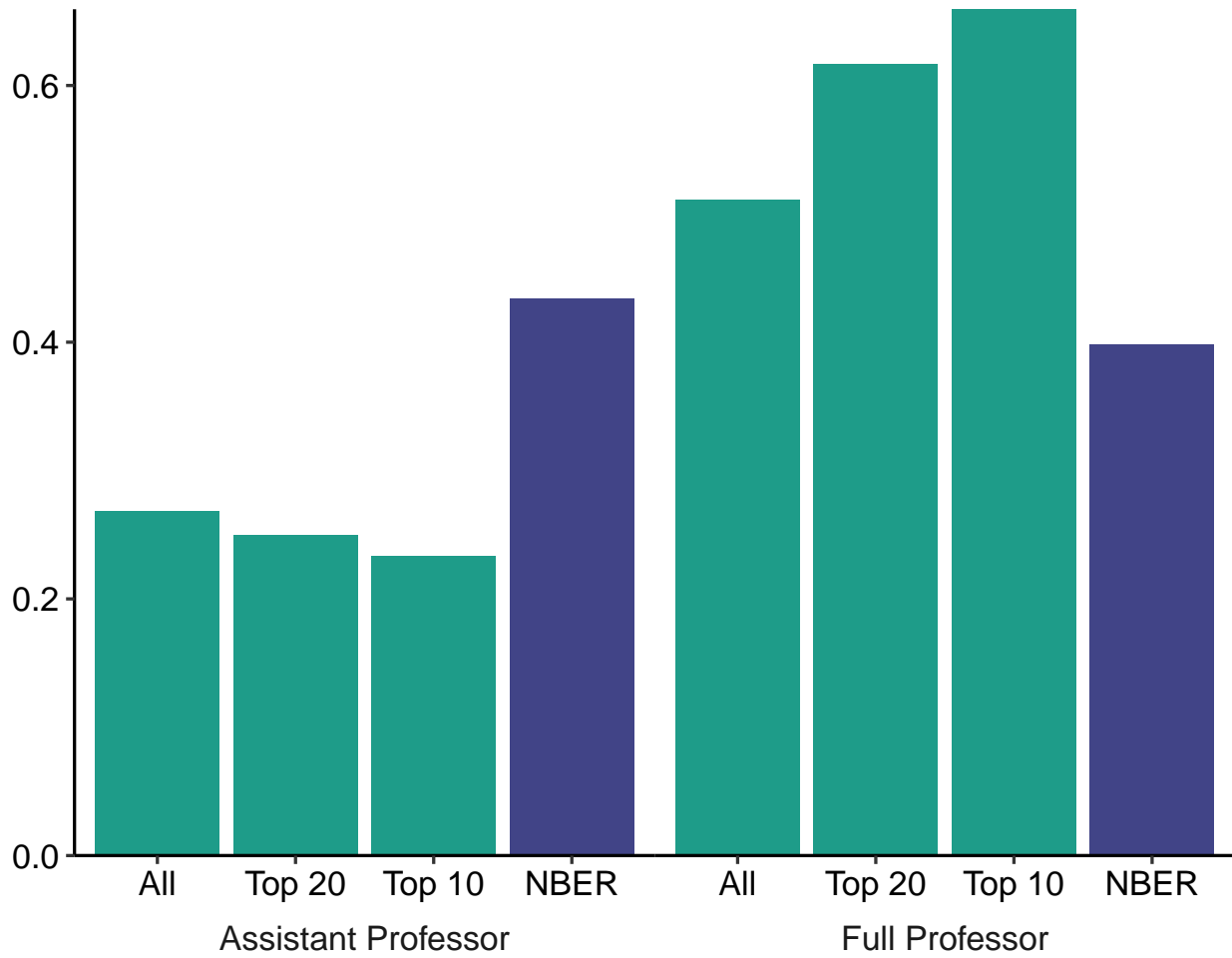
**Note:** This figure plots the composition of authors across accepted papers broken down into categories based on author composition.

**Figure A2: Number of Coauthors per Paper Over Time**



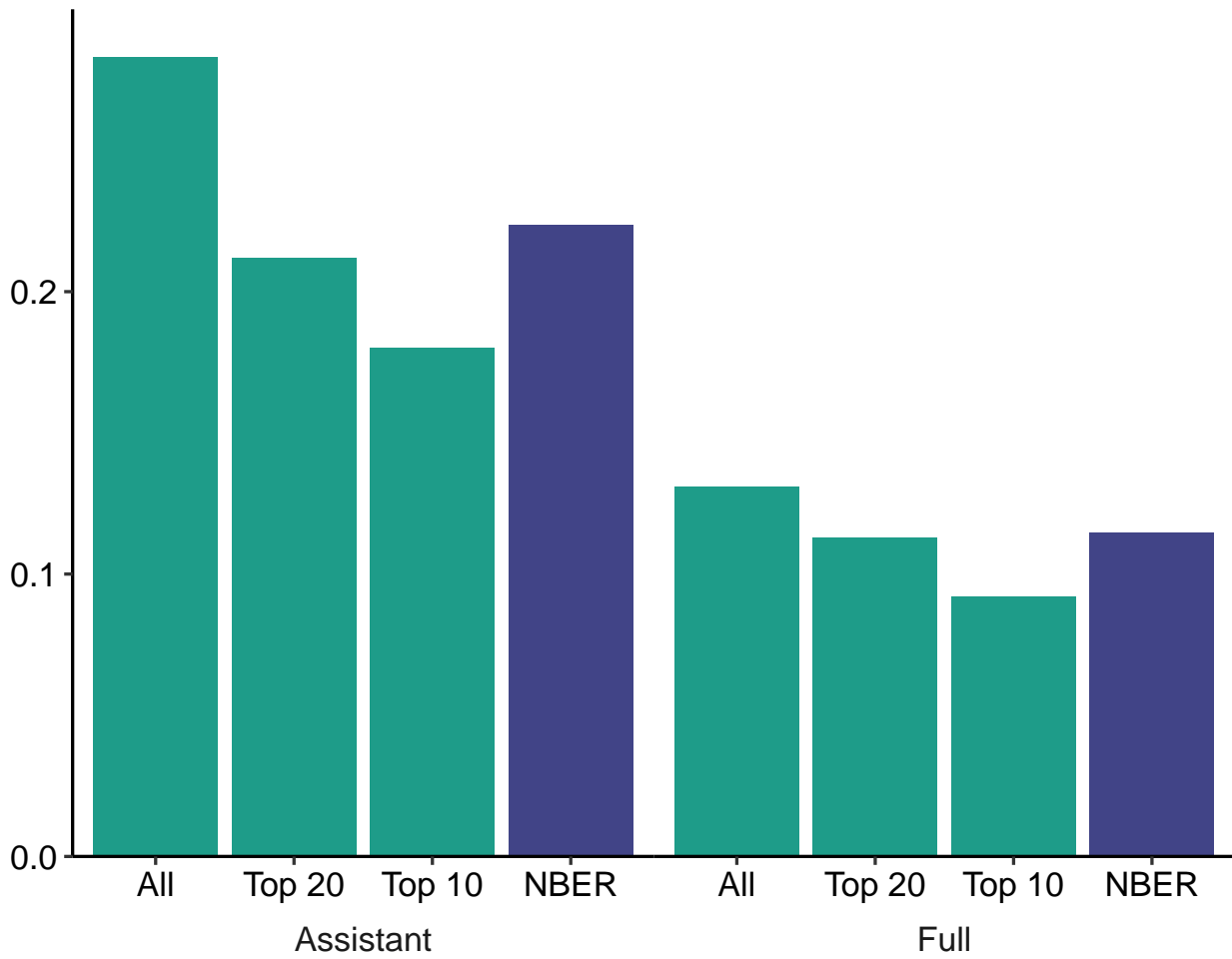
**Note:** This figure plots the average number of co-authors on a paper by year.

**Figure A3: Seniority Share at Universities and the NBER Summer Institute**



**Note:** This figure plots the share of seniority at the NBER and at economics departments with doctoral programs. The left four columns are the share of faculty that are assistant professors (including both men and women), with the first three columns corresponding to economics departments with doctoral programs as reported by CSWEP, and the fourth column corresponding to the authors on the NBER programs. The right four columns repeat the same exercise, but for the share of Full professors. All data is for 2016, and for the NBER data in both panels, we only include authors from universities to match the CSWEP Data.

**Figure A4:** Female Share at Universities and the NBER Summer Institute, by Seniority



**Note:** In this figure we report, for a given faculty rank – either assistant or full professor – the share of female economists either in an economics department or on the NBER programs. The left four columns are the share of assistant professors that are women, with the first three columns corresponding to economics departments with doctoral programs as reported by CSWEP, and the fourth column corresponding to the authors on the NBER programs. The right four columns repeat the same exercise, but for full professors. All data is for 2016, and for the NBER data in both panels, we only include authors from universities to match the CSWEP Data.