

How do Women Respond to Gender Biases in Recognition for Teamwork?

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Abstract

This paper examines the response of women to new information on gender biases in the labor market. Specifically, we study how coauthorships and productivity of female economists changed following a widely-publicized study in 2015 that demonstrated women receive little credit when coauthoring with men. Comparing the publication history of economists to other social scientists in a difference-in-difference design, we find that the dissemination of the 2015 study caused junior female economists to reduce the number of working papers coauthored exclusively with men. The decrease in male coauthorships was not offset through other forms of collaborations, leading to a net decrease in total publications and citations of preprints published in peer-reviewed journals. In comparison, we find no effects on the coauthorships of tenured female or junior male economists. In the long-run, the decrease in women’s early-career collaborations with men does not persist later into their career. However, the publicity of the 2015 paper had a long-run impact on the collaboration strategies of future generations of young female economists.

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1 Introduction

On average, women earn less than men in the labor market. Various factors contribute to this phenomenon, ranging from employer discrimination to gender differences in workers' preferences (for a review, see [Blau and Kahn 2017](#)). While a large literature has documented the causes of the gender pay gap, less is known about how women adapt once they learn of these factors. In principle, women can change multiple life choices, such as their college major, fertility decision, and type of occupation in response to new research on gender disparities in the labor market. The extent to which women update their beliefs and adjust their strategies after learning about gender disparities can thus have broad economic consequences. However, there remains few empirical studies exploring how women react to new information on gender disparities in real-world settings.

In this paper, we study the response of women to new information about gender bias in how recognition for group work is allocated across genders. As a natural experiment, we leverage the initial dissemination of [Sarsons \(2015\)](#), which found evidence of gender disparity in the way coauthored publications are evaluated during tenure decisions. Most strikingly, she shows that papers coauthored exclusively with men have zero impact on the tenure prospect of junior female economists at the top 30 US economic departments. In contrast, men are not penalized for mixed-gender collaborations. These novel results were widely publicized in outlets such as the *The New York Times* in January of 2016. The initial solo-authored study by Sarsons evolved over time, incorporating additional collaborators, and was ultimately published in the *Journal of Political Economy* in 2021 ([Sarsons et al. 2021](#)), where it has accumulated over 400 citations as of 2024. Given that tenure is a pivotal milestone in an academic career, and considering the broad media coverage and subsequent successful publication of the study, our paper tests whether the results of [Sarsons \(2015\)](#) reduced the likelihood that women in economics coauthor with men.

To identify the causal impact of [Sarsons \(2015\)](#) on coauthorship decisions, we employ a difference-in-differences approach along with detailed data on individuals' academic records. Since Sarsons' paper specifically focuses on faculty in economics departments, the study received more attention by economists than other disciplines. Leveraging this variation in exposure, we compare the research collaboration patterns between economists (treated group) and other social scientists (control group), before and after the study's initial publicity in late-2015. Although researchers from other fields may potentially also pay attention to Sarsons's work, this would likely bias our estimation towards zero, resulting in a more conservative estimate of the impact on economists. Our analysis leverages a database of all papers posted on the Social Science Research Network (SSRN) from 2012 to 2023. A key

advantage of this dataset is that we observe studies when they are still in the working paper stage, so we can approximate when a project began relative to the release of [Sarsons \(2015\)](#). We also link SSRN working papers with data from peer reviewed journals to measure the realized outcome of papers.

We document three set of results. First, following a panel of junior female economists over time, we find that the number of SSRN preprints coauthored exclusively with men dropped by 39% (s.e. 16%) in the three years following 2016. To validate our empirical strategy, we implement a series of falsification and robustness checks. To start, we show that the publication history of female economists and non-economists were trending similarly prior to 2016. Moreover, the drop in male-only coauthorships starts in 2016 and is largest in 2017, suggesting that the results are not driven by heterogeneous responses to the MeToo movement, which started at the end of 2017 and peaked in 2018. We also show that our results are robust to comparing researchers within the same college and same age-cohorts. Finally, as a placebo check, we observe no significant effects on the number of male-coauthored papers among senior female economists who no longer have to worry about tenure or among junior male economists who are not penalized for coauthorships with other men. Overall, our estimates suggest that junior female economists engaged in fewer projects with male-only teams after learning that women are not rewarded for such coauthorships in tenure decisions.

Second, we find that the decrease in male-only coauthorships is not compensated by an increase in other types of collaborations. While it may be individually optimal for junior female economists to avoid coauthoring on male-dominated teams, this may not be socially inefficient if it leads to a reduction in research output and innovation. As evidence of this social cost, we observe no significant effects on the number of solo-authored, mixed-gender coauthored, or all-female coauthored projects. Instead, we document that junior female economists had 60% (s.e. 21%) fewer peer-reviewed publications that started out as SSRN papers post-2016, driven entirely by the fall in male-coauthored publications. We likewise find that total citations fell by 65%, suggesting that women did not substitute the quantity of papers for better quality. Together, our estimates reveal that the reduction in working papers with only male collaborators results in a net decrease in both the quantity and citation-augmented quantity of publications by junior female economists.

Third, the impact on incumbents' publication records is temporary and does not persist late into their careers. In principle, changes in the gender composition of coauthors early in women's careers could have long-run impacts on their networks, specialization, or preferences that lead to a persistent impact on their future publications. Contrary to that hypothesis, our panel analysis finds that the decrease in male coauthorships fully recovers by 2020. This suggests that female economists either re-optimized after experimenting with fewer

male collaborations, or they simply passed the stage of their career where they need to worry about tenure evaluations. We rule out the former explanation by examining repeated cohorts of new economists. If female economists are discovering that they are better off from collaborating in male dominated teams, then we would expect them to pass this knowledge to subsequent cohorts of women they advise.

In contrast to the temporary effect on incumbents, new cohorts of female economists continue to have fewer coauthorships with exclusively men. To study the impact on future generations, we employ a repeated cross-section design where we define each author's cohort to be the first year that they post a paper on SSRN. We restrict the sample to only authors with no prior history of peer-reviewed publication. Comparing authors who post an economics paper in their first year relative to those in other disciplines, we find that female economists reduced the share of papers with only one male coauthor and increased the share of single-author projects from 10% to 25%. This suggests a marked shift towards more independent research among new female entrants to send a clearer signal of their ability. Conversely, there is no statistically significant change observed in other collaboration styles.

Our paper makes several contributions to the existing literature. First, we add to a growing body of research that investigates the impact of information interventions on women's labor market outcomes. Similar to our work, prior studies have likewise found that new information can significantly impact gender differences. Previous randomized control trials have shown that providing students graduating from college with information on the gender gap in wage negotiations (Cortés et al. 2024) and information about the returns to working in a male-dominated sector (Lee 2022) can influence their real job market behaviors. In a less controlled setting, Roussille (2024) finds that the gender pay gap on an online job platform closed after job seekers were provided with the median salary expectation of similar candidates. We add to this literature by exploring a new type of information - gender biases in recognition for group work. Moreover, by leveraging a natural experiment and rich data, we can examine outcomes over a longer horizon than previous studies, allowing us to study the dynamic effects of the information shock both within-individual and across successive cohorts.

This paper also relates to the literature on gender disparities within academia and the economics profession (Lundberg and Stearns 2019). Recent studies have shown that female economists experience different treatment than male economists in promotion (Sarsons et al. 2021; Ginther and Kahn 2021; Kleemans and Thornton 2023), peer review (Card et al. 2020; Hengel 2022), honor societies (Card et al. 2022; Card et al. 2023), citations (Koffi 2021), seminars (Dupas et al. 2021), coauthor selection (Boschini and Sjögren 2007; Ductor et al. 2023; Ductor and Prummer 2024) and online forums (Wu 2020). Rather than documenting

another source of gender disparity, our paper complements the current literature by exploring the reaction of female economists to unequal treatment. We show that gender biases damage not only the career prospects of female economists, but also leads to social inefficiencies, namely through a reduction in academic publications.¹

Lastly, this paper contributes to a literature that examines the impact of economics research on people’s beliefs and decisions. [Hjort et al. \(2021\)](#) showed that government officials in Brazil are willing to pay for economic research findings, and subsequently update their beliefs and implement policies based on these insights. [Vivalt and Coville \(2023\)](#) found that both policymakers and policy practitioners adjust their beliefs in light of program evaluations, though they tend to be more responsive to positive results and less attentive to the confidence intervals of these findings. Similarly, [DellaVigna et al. \(2024\)](#) finds that U.S. government officials incorporate results from randomized control trials in their policies. In contrast to previous studies that focused on the policy impacts of research, our paper explores how the dissemination of an economics paper can influence ordinary workers’ behavior, highlighting the practical significance of academic contributions for the general public.

The remainder of the paper is organized as follows. Section 2 provides the background behind our natural experiment. Section 3 describes the data and the construction of our sample. Section 4 reports our results for the impact of the information disclosure on incumbent female economists. Section 5 analyzes the impact on future generations. Section 6 concludes.

2 Institutional Setting

Our paper leverages the initial post of [Sarsons \(2015\)](#) as an information shock to the economics profession. The paper was posted on December 3, 2015 and featured three main insights that are vital to our paper. First, women incur a penalty in their tenure evaluations when they coauthor with men. Second, men do not experience similar penalties. Third, the penalty for coauthorship diminishes as the number of women on the paper increases. We highlight these three results in the abstract of Sarsons’ paper in panel A of figure 1. We also present the main table of [Sarsons \(2015\)](#), which essentially showed that a paper with only male coauthors has *zero* impact on the probability that a female economist receives tenure. Through a series of tests, [Sarsons \(2015\)](#) shows that the difference in credit for coauthored work is likely due to employer bias, and not the quality of the publications, the seniority of coauthors, women not claiming credit for their work, or taste-based discrimination.

¹Related to our result is the paper by [Glover et al. \(2017\)](#), which found that the performance of minority cashiers fall when scheduled to work with a racially biased manager.

For the paper to change individuals’ behavior, it must have been both new knowledge and widely disseminated. We find evidence that both conditions are satisfied. As evidence that researchers were unaware of the gender penalty for coauthorships, [Sarsons \(2015\)](#) conducted a survey of 389 economists and found that men and women had similar beliefs about the returns to coauthored work. Thus, the findings of [Sarsons \(2015\)](#) did not merely confirmed a widely recognized fact among economists. While we do not have survey evidence on beliefs after the papers’ dissemination, we do know that the paper received significant attention after it was posted. For instance, Panel B of figure 1 shows an article in the New York Times (NYT) published January 6, 2016 that specifically discusses Sarsons’ paper. Although Sarsons was a PhD Candidate at Harvard at the time, the NYT article was written by Justin Wolfers who was a professor at the University of Michigan, suggesting that her paper circulated among economists outside of Harvard.

Given that economists were initially unaware of the gender gap in returns to coauthorship, we predict that the new information would reduce the propensity for female economists to coauthor with men. In fact, the published version of Sarsons’ paper notes that “the coauthorship choices documented in this paper are not a (long-run) equilibrium” and that once women know the biases of tenure committees, they could “either choose not to coauthor or contribute relatively little to coauthored papers” ([Sarsons et al. 2021](#)).

The results of [Sarsons \(2015\)](#) offers several useful sources of heterogeneity with which we construct our empirical design. First, panel A of figure 1 shows that the penalty for coauthorships shrinks as more women are included on the paper. Thus, we expect the largest margin of response to be on the number of papers that are coauthored with exclusively men. Second, men do not experience a penalty for coauthorships, so we expect the results of Sarsons’ paper to have no impact on male economics. Third, the focus of Sarsons’ paper is on tenure decisions, so we predict changes in coauthorship compositions to be greater among junior female economists than senior ones. Thus, our main analysis focuses on junior female economists, and uses junior male and senior female economists as placebo tests.

Our empirical approach compares the evolution of publication records of economists to other social scientists before and after 2015. Although Sarsons’ paper may have influenced subsequent gender studies in other academic fields (e.g. [Ross et al. 2022](#)), this would only serve to bias our estimates towards zero. Moreover, even if other professions learned about gender bias within economics, they may not feel it is as prominent an issue in their field. This would be especially true if the discipline follows a convention where credit is assigned by the order of authors’ names. Strictly speaking though, our analysis should be interpreted as measuring the effect of greater *exposure* to information about the gender gap in credit attribution, rather than the effects of a direct information treatment like one would implement

in a laboratory setting.

One potential confounding factor in our analysis is the influence of the *MeToo* movement, which gained prominence starting in late 2017. This movement might have likewise reduced collaborations between men and women. We address this issue in two ways. To start, our control group of non-economists captures the effects of *MeToo* that were uniform across disciplines.² However, although both the treated and control groups of social scientists were affected by the *MeToo* campaign, there is a concern that economists may have been more influenced by this social event. To address this issue, we rely on the relative timing of events. In appendix figure A1, we compare the Google Search Trends for the terms “Heather Sarsons” and “MeToo”. While there was a surge in Google Searches for “Heather Sarsons” in January 2016, *MeToo* did not become relevant until October 2017. Thus, if we see responses starting in 2016 and peaking in 2017, it is unlikely due to the *MeToo* movement.

3 Data and Summary Statistics

3.1 Dimensions Data: Social Science Research Network (SSRN)

In order to trace an author’s publication history over time, we leverage the Dimensions database (<https://www.dimensions.ai/>). Dimensions extracts bibliographic information from multiple online sources, culminating in a database of over 140 million publications and 4.3 million preprints. This extensive database provides metadata that includes authors’ names, affiliations, publications, preprints, and citation counts. Importantly, Dimensions offers a unique author identifier for each person in its database. That way, we can unambiguously track an author’s publication history even when two different authors have the same name or if one author switches names over time. Previous works, such as Jia et al. (2024) and Yin et al. (2021), have demonstrated the accuracy and reliability of the information in Dimensions for research.

Using Dimensions, we retrieve data on all SSRN publication records from 2008 to 2023. SSRN is a widely-used repository for preprints, aimed at the rapid dissemination of scholarly research in the social sciences. Utilizing SSRN to investigate the impact of new information on gender attribution bias offers two main benefits. First, SSRN is one of the most popular platforms for economists to submit their working papers³. Thus, SSRN provides a more

²Our approach thus differs from previous work by Gertsberg (2022), which examines the impact of *MeToo* on coauthorships using only data within economics.

³We also try to examine another popular repository, arXiv. However, we found that very few junior female economists submit their works to arXiv during our study period, as it is a more common platform for preprints in mathematics, physics, electrical engineering, and computer science.

immediate record of research activities than relying on official publications. The rapid update of working papers on SSRN is crucial for our analysis because it allows us to track changes in collaboration patterns shortly after the release of Sarsons’s paper in 2015. This timeliness is advantageous over using actual publications as outcomes, where the delay from initial research to publication can span several years, sometimes over a decade, obscuring the precise timing of behavioral changes in response to new information. Second, the non-economics researchers on SSRN often hail from other social science disciplines, such as law and sociology, who serve as a more comparable control group for economists compared with researchers in the natural sciences and humanities.

3.2 Sample Construction

To evaluate the impact of [Sarsons \(2015\)](#) on researchers’ collaboration, we focus our analysis on individuals for whom research output, rather than teaching, is the primary determinant of their tenure review. Specifically, we restrict the sample to social scientists affiliated with top 100 U.S. universities in economics according to the December 2015 rankings on RePEc (Research Papers in Economics). This is also the sample for which the results of [Sarsons \(2015\)](#) is most relevant, since her analysis similarly restricts the data to the top 30 universities. To ensure a sufficient pre-treatment observations, our investigation period spans from 2012 to 2023, with 2016 serving as the first treatment year following the publication of Sarsons’s study at the end of 2015.

We construct two datasets using the Dimensions database: an author-level panel and a repeated cross-section of new entrants. To construct the panel, we query Dimensions for authors affiliated with the top 100 U.S. universities, who had uploaded at least one paper to SSRN between 2008 and 2011.⁴ This approach provides us with a list of 8,071 researchers who use SSRN to post their papers. To build the sample of new researchers, we restrict authors to the first year that they posted a paper on SSRN and only keep individuals who have no peer-review publications prior to that year. Therefore each individual appears only once in our dataset and each year of the data represents a new cohort of researchers.

3.3 Defining Key Variables

The key outcomes in our analysis will be the number of SSRN working papers, broken down by the gender composition of coauthors. In other words, for each author-year, we measure

⁴We show that the main results are also robust to following the sample of researchers who published between 2012 and 2015. We prefer the 2008 – 2011 sample because it can ensure no new entries during the investigation period of our panel analysis. Our method of constructing the sample is similar to [Jia et al. \(2024\)](#).

the total number of their SSRN publications as well as the number of papers that are solo-authored, coauthored with only women, coauthored with only men, and coauthored with both men and women. These outcomes naturally follow from the main results of Sarsons’ 2015 paper (see panel A of figure 1).

To track the subsequent publication of SSRN preprints, we conducted an exact match between the titles of SSRN papers and their published articles in peer-reviewed journals by the same authors. We successfully matched 18% of the preprints in our sample with a future publication. There are two reasons why a SSRN working paper may not match with a published article. First, the authors have not yet published their preprints in any peer-reviewed journals. Second, authors may change the titles of preprints upon publication. However, we show via a placebo test that this potential source of measurement error is consistent across the treatment and control groups over time, and thus unlikely to bias our estimates. Matching SSRN working papers to their subsequent realized outcomes allows us to determine (1) whether an SSRN preprint was successfully published in a peer-reviewed journal and (2) the citation count of the published version.

We define three variables to partition our sample into treatment, control, and placebo groups. Recall that not all researchers are equally likely to adjust their collaboration strategies in response to Sarsons’s 2015 study. The results of the study would likely have the greatest effect on 1) junior faculty who are preparing for tenure, 2) women since they are the ones who bear the penalty of coauthorships, and 3) economists since they are more exposed to the paper than other social sciences. To identify the most impacted authors within our sample, we utilize a built-in function from Dimensions along with a Python package for author identification to characterize authors as “junior”, “female”, and “economists”. This approach allows us to pinpoint the specific subset of researchers most likely to be influenced by Sarsons (2015), as well as their comparable controls, without the need for manually collecting detailed information on each researcher individually. We describe how we define these three key variables next.

Seniority - Since Dimensions does not provide the birth year or graduation information of authors, we use the year of their first *peer-reviewed* publication as a proxy for the author’s seniority. We define a researcher in our panel as a junior if their first peer-reviewed publication was in 2011 or later. Conversely, we define researchers with a first publication year prior to 2011 as senior. We selected this cutoff so that junior researchers are likely within their first six years of publishing in 2015, aligning with the typical period it takes for an assistant professor to achieve tenure as an associate professor. Chen et al. (2013) and García-Suaza et al. (2020) showed that the modal economics PhD candidates had no peer-reviewed publication during their PhD program. We will concentrate on junior researchers who are early

in their academic careers and potentially more responsive to the findings of Sarsons’s study due to their tenure considerations. The main results are robust to other cut-off years around 2011 for the definition of junior.

Gender - We classify the genders of authors based on their first names using the Python package *gender-guesser*. This tool categorizes names into five possible groups: “unknown” (name not found), “andy” (androgynous), “male”, “female”, “mostly male”, or “mostly female”. For our analysis, we classify an author as female if her name is categorized as either “female” or “mostly female”, and similarly for male authors. *Gender-guesser* successfully identified the gender for 84%⁵ of the researchers’ names in our dataset. To validate the accuracy of this tool, we compared the genders of junior female researchers as determined by *gender-guesser* (total 133 researchers) with those inferred from images on their websites. We find that only 3% of the authors identified as female by *gender-guesser* were actually male according to their website images. We also use this program to identify the gender of the coauthors of our sampled researchers.

Economists - We define economists as those individuals who had at least one SSRN working paper categorized under the field of “economics” prior to 2016. Dimensions utilizes a machine learning method to classify research according to the Australian and New Zealand Standard Research Classification (ANZSRC) system⁶. Conversely, we define non-economics social scientists as those who had no papers classified under economics before 2016. To ensure the control group comprises of social scientists comparable to the treatment group, we exclude those who have published a paper in the natural sciences. For our main analysis, the treated group consists of 83 junior female economists, while the control group comprises of 50 junior female non-economics researchers.

3.4 Summary Statistics

3.4.1 Fields of the Treatment and Control Groups

In order to better understand the background of the treated and control authors, Table 1 provides a detailed breakdown of their research fields, academic degrees, and career statuses in 2015. We obtain information for the latter two characteristics directly from the researchers’ professional websites. Panel A shows that “Applied Economics” emerges as the most frequent topic in the treated group, representing 26.19% of their SSRN papers. In contrast, the control group, which comprises of non-economist social scientists, mostly focuses on “Strategy, Management, and Organizational Behavior,” accounting for 12.82% of

⁵A majority of the names with undefined gender are non-English names, such as Chinese names.

⁶Research fields by Dimensions: <https://app.dimensions.ai/browse/categories/publication/for>

their papers. In Panel B, the most common degree among the treated group is a PhD in Economics, held by 42% of the group. Meanwhile, the most prevalent degree among the control group is a Juris Doctor (JD), held by 38%. Regarding the career positions shown in Panel C, 51% of the economists are assistant professors, compared to 42% in the control group. The differences in fields and degrees suggests that our analysis primarily compares economists to researchers in business and law schools.

It is important to note that 13% of researchers in the control group have a PhD in economics even though the control group seldom posts papers in that field. However, as discussed in section 2, our analysis does not rely on the assumption that the control group is unaware of Sarsons’ 2015 paper. Instead, we are assuming that the treatment group is more aware of the paper than the control group.⁷ This assumption is likely satisfied given that our treatment group is more likely to be in economics and more likely to publish in the same sub-field as Sarsons (2015) (i.e. Applied Economics). As a robustness check, we show that our main results hold when defining the treated authors as all individuals with a PhD in Economics, and the control group as the remainder.

3.4.2 Percentage of Women in the Profession

One potential confounding factor in our analysis is the possibility of a coincidental increase in the number of female authors in the economics field concurrent with the publicity of Sarsons’ study. For instance, there may be a push by economics departments to hire more women. If such a trend exists, it would increase the pool of women in the profession and might lead female economists to collaborate less frequently with men, independent of any response to the disclosed information about gender differences in credit attribution.

To address this concern, we analyzed the percentage of female authors in SSRN papers from top-100 U.S. universities over time. As shown in Figure 2, the percentage of female authors in economics papers has remained relatively flat throughout our study period, consistently around 20%. In contrast, there is an increase in the percentage of female authors in non-economics papers on SSRN during the same period. These trends thus run counter to our initial concern. Women in the control professions are the ones experiencing a growing pool of female colleagues, which may potentially lead to a decrease in the number papers coauthored with men. Such a trend would actually bias our estimates *against* our hypothesis that women in economics would choose to not coauthor with men after learning that they receive less credit for their work.

⁷Our analysis would be akin to the many empirical studies that compare groups based on their exposure to a treatment (Goldsmith-Pinkham et al. 2020).

3.4.3 Publication History of the Treatment and Control Groups

Table 2 compares how the treatment and control group of junior female researchers differ in terms of their SSRN publication records prior to 2016. In general, there are four distinct styles of research collaborations: male-coauthor only projects, single-author projects, female-coauthor only projects, and mixed-gender collaborations. Single-author projects are publications authored by one individual without any coauthors. To classify a project as having only female coauthors, all involved collaborators' first names must be identified as female by *gender-guesser*. We identify projects with exclusively male coauthors in a similar manner. For publications involving both female and male authors, we require the presence of at least one individual from each gender. Publications in the mixed-gender category may include coauthors whose genders are unknown.

Since the algorithm cannot perfectly tell the gender of all researchers by their names, an additional scenario involves projects where at least one coauthor has an unknown gender, and it is unclear in which of the above four categories the paper belongs. For instance, a paper with 1 male and 1 female coauthor will always be a mixed-gender collaboration regardless of the gender of the remaining coauthors. However, a project involving a female coauthor and another author whose gender is unidentified could be either a female-coauthor only or a mixed-gender collaboration. We classify ambiguous cases such as these as unknown-gender coauthor publications.

We note four key similarities and differences between our treatment and control group. First, we find that junior female economists tend to have more publications than non-economists between 2012 and 2015. Second, among the publications by economists, about 44% (i.e. $\frac{0.4247}{0.9669}$) of them are coauthored with only men, whereas 24% of non-economists' publications are with only male coauthors. Consistent with the higher percentage of male-coauthor only publications, female economists have 25% more male coauthors overall than the control researchers. One reason for this difference in gender composition of coauthors is that there are simply fewer women in economics relative to other fields (see figure 2). Third, since we define junior researchers to be individuals who published their first peer-reviewed paper after 2010, table 2 shows that the average first year of publication for both the treatment and control groups is 2014. It is likely that many of these researchers are in the pre-tenure review phase of their careers when Sarsons releases her paper in 2015. This timing is critical as individuals in the sample still have time to make adjustments that can influence their tenure outcomes. Lastly, a significant share of the researchers in our panel are affiliated with top 30 universities, with about 46% in both the treatment group and the control group. The sample thus consists primarily of individuals for whom credit for research output weighs heavily in their tenure decisions.

4 Empirical Strategy and Results

4.1 Main Specification

Despite some baseline differences between economists and non-economists, we show in our analysis that the sample of non-economists make for a reasonable counterfactual control group. Our empirical strategy does not require that the two groups are identical at baseline, but rather, that their outcomes are evolving at the same rate over time, which we will validate in the data. To evaluate the impacts of the disclosed gender bias on academic collaborations, we estimate the following difference-in-difference regression:

$$y_{it} = \sum_{\substack{t=2012 \\ t \neq 2015}}^{2023} \beta_t \cdot Econ_i \times D_t + \alpha_i + \gamma_t \times age_i + \epsilon_{it} \quad (1)$$

where y_{it} is an outcome of interest for researcher i in year t , such as the number of projects with only male coauthors. We measure all outcomes in levels rather than logs to avoid issues with log-zeros. $Econ_i$ is an indicator for if researcher i is an economist and D_t equals one at year t . We control for author (α_i) and year-age ($\gamma_t \times age_i$) fixed effects, where age is defined as the number of years since an author’s first SSRN publication. It is common to control for the cohort of researchers in the economics of science literature to ensure that the results are not confounded by the career stage of individuals (Azoulay et al. 2019). We also present the main results with the vanilla two-way fixed effect model and the year interacted with the university affiliation fixed effect.

4.2 Publications with Only Male Coauthors

Figure 3 presents the event-study estimates (i.e. β_t) for our first outcome: the number of SSRN projects coauthored with only men. This is the outcome where we expect to see the largest impact given the results of Sarsons’ paper. We explore other types of coauthorships in section 4.3. Panel A plots the estimates for both the junior and senior female samples. We note four results. First, prior to 2016, we find that the publication counts with only male coauthors are trending similarly between economists and non-economists. This provides empirical support for our parallel trends assumption that absent Sarsons’ 2015 paper, the publication records of both groups would have evolved the same over time. Second, for the junior female economists, we observe a dip in the number of male-coauthored projects starting in 2016, and peaking in 2017 and 2018. This is consistent with our hypothesis that junior women choose to avoid coauthoring with only men after learning about the gender

gap in recognition for group work. Third, we find that the drop in male only coauthorships disappears by 2020, coinciding with around the time most individuals in our sample would have completed their tenure review. Fourth, as a placebo check, we find no decrease in male-only projects among senior female economists who do not have to worry about tenure. Similarly, panel B shows that junior male economists also do not significantly change their patterns of publishing papers with male coauthors.

The number of projects coauthored exclusively with men among junior female economists shows a notable decrease beginning before 2018. This timing suggests that the decline in such collaborations started prior to the significant rise of the *MeToo* movement. Furthermore, an observable recovery in the number of male-only coauthorships occurs after 2018. Together, the timing of the responses suggest that our estimates are not driven by *MeToo*. There are two class of explanations for the recovery in male coauthorships. First, many of the treated junior female economists likely received tenure after 2019, which may reduce their concerns about credit attribution when coauthoring with male colleagues. Second, over time, researchers may forget about Sarson’s results, they may learn that they are not as productive without male coauthors, or departments may change their tenure processes. In the latter case, the effect of Sarson’s paper on coauthorship patterns would also diminish for new cohorts of economists. In section 5, we find evidence against the second mechanism, suggesting that women chose to coauthor with men later in their career. An implication of this result is that the early-career network formation did not have lasting impacts on women’s future research teams.

The results thus far are consistent with the view that Sarsons’ 2015 paper caused young women in economic to decrease the number of collaborations with only male coauthors. As a validation that the estimates truly reflect a decrease in male coauthorships among economists and not an increase among non-economists, we plot the raw number of such projects for both the treated and control groups in Appendix Figure A2. We find that the trend for the control group remains relatively stable over the 10 year period. In contrast, it is the young female economists that see a large drop in male coauthorships followed by a rebound in 2020.

Table 3 tests the robustness of our result to alternative specifications. Given that the bulk of the decrease in male-only coauthorships occurs before 2020, we average the estimates from equation 1 over two time periods: 2017-2019 and 2020-2023.⁸ This aggregation also helps us avoid potential confounding issues related to changes in academic cooperation during the COVID-19 pandemic and maintains a clear focus on the period immediately following the dissemination of Sarsons’ study. Column (1) uses a basic two-way fixed effects model without

⁸We omit year 2016 because many SSRN projects from that year likely commenced before the publicity of Sarsons’ study in late 2015.

any additional controls. Column (2) adds a control for the publication age of the papers to account for differential changes in collaboration patterns across cohorts of researchers. Column (3) controls for the authors' 2015 academic affiliation to assess impacts within the same institutional settings, providing a more precise comparison between treated and control groups by accounting for institutional culture and dynamics. Column (4) incorporates controls for both the publication age and the affiliation of the authors.

The results across all four specifications consistently show a significant decrease in the number of projects with exclusively male coauthors, with estimates ranging from -0.17 to -0.33 papers. This reduction translates to an economically significant 40 – 77% decrease in such collaborations. The findings suggest that the dissemination of Sarsons's paper, which highlighted the low contribution of all-male coauthored papers to female economists' tenure prospects, led these researchers to reevaluate and modify their collaboration strategies. This strategic shift indicates a proactive response by junior female economists to optimize their academic portfolio in ways that could enhance their tenure prospects. However, the treatment effects shrink over time and are no longer statistically different from zero in 2020–2023, suggesting that the decrease in collaborations with men did not persist over in long run.

We also verify the robustness of our results to five choices we made when constructing our sample. First, we experiment with different cutoffs around 2011 for the first year of peer-reviewed publication to define junior researchers. Second, we restrict our treated group to those holding a PhD in economics, as these individuals are more likely to be familiar with Sarsons' 2015 study. Third, we narrow our sample to include only assistant professors, who may be more concerned about the tenure review process than other researchers. Fourth, we redefine economists as those whose publications are at least 50% in the field of economics rather than just individuals who have at least one economics paper. Lastly, instead of restricting the sample to researchers who posted at least one SSRN paper in 2008–2011, we keep all junior researchers who uploaded to SSRN during the pre-treatment period from 2012 to 2015. While this sample could introduce new entrants, such as researchers who first published on SSRN in 2015, leading to an imbalanced panel, it should contain a larger proportion of junior researchers compared to our main analysis. Across all variations, which we show in Appendix Figures A3 to A5, we observe the same patterns in the event study for junior female economists as our main results.

4.3 Total Number of Projects and Other Collaborations

The previous section showed that junior female economists reduced the number of projects coauthored exclusively with males in response to new findings that such collaborations contribute little to tenure success. This strategic adjustment raises a pertinent question: Do these researchers compensate for the reduction in male-only coauthored projects by increasing their involvement in other styles of publication? Specifically, can they offset this reduction through single-author projects, female-only coauthored projects, or mixed-gender collaborations? Moreover, since the number of authors in economics papers is growing over our study period (Jones 2021), the observed decrease in male-only coauthored projects could potentially be driven by an expansion in team size. Namely, if economists are coauthoring with more people in a project, the likelihood of single-gender coauthor teams naturally decrease. However, the data does not support this hypothesis.

Panel A of Figure 4 presents the difference-in-difference event study for the total number of publications. The estimates reveal a similar trend to that observed in Figure 3: there is a decline in total publications beginning in 2016, followed by a recovery starting in 2019. This suggests that the decrease in the male-only coauthorships is not offset by other types of collaborations. Consistent with this view, panels B, C, D and E find no significant change in the number of single-author projects, mixed-gender, female-only or unknown-gender publications. Together, these results indicate that learning about the gender bias in credit attribution had a net negative impact on junior female economists research output.

Table 4 presents the difference-in-difference estimates from the event study analysis pooled over 2017-2019 and 2020-2023 across the various types of coauthorship types. Columns (1) through (7) report the effect on total publications, one-male-coauthor, multiple-male-coauthor, single-author, female-coauthor only, mixed-gender collaborator and unknown-gender coauthor projects, respectively. Column (1) indicates that the total number of SSRN publications decreased by 0.13 papers per year during 2017-2019, which, while not statistically significant, corresponds to a 14 percent reduction from baseline.

Column (2) and (3) decompose the main outcome—number of publications with only male coauthors—into two categories based on the number of authors: two-author projects and projects involving three or more authors. Column (2) shows a significant 0.11 reduction in projects involving just one male coauthor during 2017-2019. In contrast, column (3) shows that projects involving more than one male coauthor see a smaller statistical insignificant reduction of 0.07 papers. Given the imprecision of the estimates, we cannot reject that the effect on each type of coauthor arrangement is equivalent. Nevertheless, the magnitude of the coefficients offer suggestive evidence that female economists are selective in the projects they

turn down and prefer to avoid collaborating in papers with fewer coauthors. One rationale for this preference would be that smaller teams require more investment per coauthor, but they give the same benefit to women’s tenure review.

Columns (4) to (6) suggest that the treatment had no significant impact on the number of single-author, female-coauthor only or mixed-gender projects. Therefore, the observed drop in collaborations with only male coauthors cannot be attributed to a simple increase in team size leading to greater gender diversity. Column (7) reveals that there is also no significant impact on publications with an unknown-gender composition.

4.4 Heterogeneity by Collaborator Networks and University

A key factor in determining researchers’ collaboration structure is their existing coauthor networks. We test whether the initial gender composition of women’s networks is correlated with their response to learning that women receive less credit in coauthorships with men. In Columns (1) and (2) of Table 5, we introduce an interaction term of $Treatment \times Post$ with a dummy variable that equals one if the author’s baseline percentage of male collaborators is below the average among junior female economists. Column (1) shows that the decline in male-coauthored projects is driven solely by economists with more male coauthors at baseline. Junior female economists who have a higher-than-average percentage of male coauthors experience a significant decrease of 0.35 male-coauthored papers. Conversely, those who typically collaborate less with men show a statistically insignificant decrease in coauthorships with men (i.e. $-0.35 + 0.31 = -0.04$). This outcome suggests that there is minimal change in the behavior of researchers who already engage more frequently with female coauthors.

There are at least three reasons why junior female economists who more frequently coauthor with men show a more pronounced reaction to Sarsons’s findings. First, they mechanically have more room for adjustment - women with no male coauthors simply cannot reduce the number of papers with male coauthors below zero. However, even if they had no male coauthors to begin with, they could still accept fewer future coauthorships with men relative to the control group of non-economists. Second, junior female researchers who heavily collaborate with men may feel a stronger impetus to reduce the number of projects with male coauthors because they have fewer solo or female-coauthored projects to signal their productivity. Third, women who primarily coauthor with men might initially be less aware of the gender differences in credit attribution before the publicity of Sarsons’ paper in 2015. In that case, the dissemination of Sarsons’ study would have a stronger effect on their beliefs and subsequent decisions.

Given that the decrease in male coauthorships is driven solely by women with many

male coauthors at baseline, we expect this group to experience a greater decrease in total publications. Column (2) of Table 5 shows the heterogeneous impacts on the total number of SSRN projects by the baseline gender composition of researchers’ collaborators. Consistent with our prediction, we find that researchers who have a higher-than-average percentage of male coauthors experienced a 0.48 decrease in total publications, equivalent to half their number of publications at baseline. In contrast, women who tend to coauthor less with men actually experienced an increase in the total number of publications. These heterogeneous responses reaffirms our finding that the decrease in male coauthorships was not compensated through other types of collaborations.

Since Sarsons (2015) mainly focused on the top 30 economics department in America, we also take a closer look at the impacts of Sarsons’ paper by the ranking of researchers’ affiliation. Columns (3) and (4) of Table 5 include an interaction between $Treatment \times Post$ and a dummy variable that equals one if the researchers are affiliated with the universities ranked between 31 and 100. The point estimate in column (3) reveals that awareness of gender bias in credit attribution led to a reduction of 0.31 male-coauthor projects among junior female economists from top 30 schools. This result suggests that Sarsons’s study had a notable impact on researchers from the highest-ranked institutions, which were specifically mentioned in her paper. Interestingly, column (4) indicates that researchers from these top schools did not experience a decrease in their total number of publications. Furthermore, the interaction term finds no statistically significant differences by university ranking in either male-only or total projects.

4.5 Realization of SSRN Preprints in Scholarly Journals

In the previous sections, we found evidence that Sarsons’ study reduced the production of working papers by junior female economists. Next, we test whether this effect extends to the later publication of these preprints in peer-reviewed journals. In principle, a decrease in SSRN working papers may not translate to a decrease in actual publications or citations if female economists only abandoned low-quality projects. Moreover, by reducing the number of projects, women could also devote more effort to their remaining papers, which would have positive downstream impacts on their publication and citation potential. To determine whether the decrease in SSRN working papers ultimately led to less research output, we estimate equation 1 using the number of peer-reviewed publications and the number of citations as the outcome variables. Since we link realized publications to their original SSRN working paper, the year in our regression is defined by the date that the paper was first posted on SSRN.

Figure 5 plots the impact of Sarson’s 2015 study on junior female economists’ realized research output. In Panel A, we observe a noticeable decline in the number of peer-reviewed publications coauthored exclusively with men after 2016. Although there is a partial recovery after 2019, the number of realized publications never returns to the pre-treatment levels. Furthermore, a similar trend is evident in Panel B for the total number of citations across all publications coauthored with men each year. Unlike the slight recovery in publications, the drop in total citations is more persistent and continues even beyond 2020. Panel C presents the difference-in-differences event-study estimates for the total number of realized SSRN preprints. Similar to the trends observed in projects with only male collaborators, there is a drop in the total number of realized working papers beginning in 2016, and a recovery after 2019. Panel D provides the difference-in-differences estimates for the total citations of the realized SSRN preprints. Consistent with the pattern in Panel B, there is a persistent drop in total citations starting from 2016 and continuing onwards.⁹

To validate our empirical strategy, we examined the trends in realized publication and citation outcomes for two placebo groups: senior female and junior male researchers. The results, as detailed in Appendix Figure A6, showed no change in the realized publication or citation counts after 2016 in either total SSRN projects or those with only male coauthors. The lack of response by senior women or junior men suggests that our results cannot be explained by a shock to the entire economics profession, but is instead due to an event that particularly affected junior women in 2016. Additionally, we extend our analysis to other types of coauthorship projects, including single-author, female coauthor only, mixed-gender coauthor, and unknown-gender coauthor projects. As shown in Appendix Figure A7, there were no significant and persistent changes in either the number or citation of these projects. The null effect along these other dimensions suggest that the decrease in peer-reviewed publications and citations is not due to changes in the match rate between the SSRN data and the data on journal publications.

Table 6 presents the difference-in-differences estimates for the realized publications and citations of SSRN projects. In column (1), we observe a almost 100% drop in the publication of SSRN projects exclusively coauthored with males during the 2017-2019 period. Although the magnitude of the effect diminishes, there still remains a significant 70% reduction after 2020. The estimates in column (2) reveal a similar and near-total drop in the total citations of published SSRN projects that are exclusively coauthored with men after 2016. Relative to Table 3, where we showed a 45% reduction in SSRN preprints with only male coauthors

⁹The persistent impact on realized publications and citations offers suggestive evidence that initial network formation matters. Even if the number of male coauthorships recovered over time, the quality of the male coauthors may be lower, leading to long-run decreases in realized outcomes.

during the same 2017-2019 period, we note a more pronounced percentage decline in realized SSRN preprints. This discrepancy suggests that junior female economists are reducing their involvement not only in male coauthored projects with low prospects of publication but also in those with high publishable potential.

In column (3), we estimate a 60% (s.e. 21%) drop in realized SSRN projects during 2017-2019, all of which can be explained by the decline in male coauthored publications. Moreover, column (4) of Table 6 highlights that there was not just a decrease in the quantity of published projects but also a decline in their net quality and influence, as evidenced by a 63% drop in citations. These findings indicates that the decision by female economists to shift away from male-only projects did not result in an improvement in the quantity or quality of projects from other types of coauthorships. Instead, it has led to a net decrease in their overall academic output and innovation. The social cost could be even more pronounced if we consider evidence from the literature that mixed-gender teams typically produce higher-quality studies with broader perspectives (Yang et al. 2022).

5 Impacts on Future Generation of Female Economists

In the panel regression (1), we investigated changes in the collaboration patterns of incumbent female scholars before and after the exposure to new information on gender differences in credit for group work. That analysis allows us to follow the same individuals over time to see how researchers' response evolves over their career. In this section, we extend our inquiry to examine the impact of the information shock on future generations of female economists.

5.1 Empirical Strategy

To explore how collaboration change over different cohorts of new female economists, we restrict the data to the first year that each author posts a paper on SSRN and implement a repeated cross-section difference-in-difference analysis:

$$y_{it} = \sum_{\substack{t=2012 \\ t \neq 2015}}^{2023} \beta_t \cdot Econ_i \times D_t + \alpha_i \cdot Econ_i + \gamma_t \times Org_i + \epsilon_{it} \quad (2)$$

where y_{it} represents the outcomes of interest for researcher i in year t , such as the percentage of publications with only male coauthors. $Econ_i$ is an indicator that equals 1 if researcher i is an economist. We classify a researcher as an economist if they publish any economics paper in their first year. Similar to our panel analysis, we exclude natural scientists from

the group of non-economics researchers. D_t is a dummy that equals one at year t . To control for potential confounding factors such as school-specific policies regarding gender, we include an interaction term between year and organization fixed effects: $\gamma_t \times Org_i$. This interaction allows us to control for any time-varying effects that are specific to each university, ensuring that our comparisons between treated and control researchers are within the same institutional context.

One of the inherent limitations of a repeated cross-section analysis is that it only includes observations for authors who actually publish on SSRN. Specifically, this approach does not capture potential researchers who choose to leave academia due to discouragement stemming from perceived gender disparities in credit attribution. This selective omission from the data affects some of the interpretation of our results. Namely, a decrease in the share of papers coauthored with men can either reflect an intensive margin response where new generation of women are choosing a different coauthorship strategy than working with men, or an unobserved extensive margin effect where the women who would have otherwise coauthored with men are leaving the profession.¹⁰ The results from the panel analysis suggests that the intensive margin effect is at least one of the mechanisms at play, but we are unable to directly measure the extensive margin response with our data. Instead, we simply interpret the estimates of equation 2 as the causal impact of Sarsons’ 2015 study on the average outcome of new cohorts of economists, with the understanding that the effect may be driven by both changes in behavior and composition.

5.2 Impact On Research Projects

Figure 6 plots the estimates of equation 2 for four different outcomes: the share of papers with exactly one male coauthor, the share of papers with one female coauthor, the share of single author papers, and the share of papers with multiple male coauthors.¹¹ We make a distinction here between papers with one coauthor and papers with more than one coauthor, as we find that they have different responses. Panel A plots the effect on the share of papers that are coauthored with exactly one male. We highlight three observations. First, leading up to 2016, we find no differences in pre-trends between each successive generation of female economists and non-economists. This validates the parallel trends assumption needed for our identification strategy. Second, starting in 2016, junior female economists became less

¹⁰A third possibility, which we assume to be highly unlikely, is that awareness of gender bias in credit attribution *increases* the likelihood that women who would otherwise have left the profession to remain and these individuals choose to work independently.

¹¹By construction, a cohort is defined as the first year that an author posts a paper on SSRN, so the repeated cohort analysis has no zero values. The outcome is simply which types of coauthorship type does the author pursue, hence why outcomes are measured in shares rather than levels.

likely to write a paper with exactly one male coauthor. Third, unlike the panel analysis, the change in male coauthorships does not appear to converge back to zero in 2020. As a placebo test, Panel B plots the equivalent figure for the share of papers with only one female coauthor. In this case, we find a null effect over time, suggesting that the change in Panel A is not driven by a coincidental expansion in team-size among economists.

The persistent decrease in male coauthorships over successive generations rules out three potential explanations for why the impact in the panel analysis was only temporary: forgetfulness, reoptimization, or changes in tenure review practices. First, if incumbent junior economists simply forgot the results of Sarsons’ study, then they would not pass on this knowledge to the next generation of economists. Second, if incumbents discovered that they are more productive collaborating with men, then they would advise their PhD students against selecting coauthors based on gender. Third, if universities corrected the bias in their review decisions, then incumbent junior female economists would be more willing to coauthor with men. In all three cases, we would expect there to be no long-run decrease in coauthorships with men for future generations of female economists. This distinction between the panel and repeated cohort analysis, as well as the timing of the convergence in the panel analysis, suggests that incumbent women simply obtained tenure and no longer had to worry about the gender of their collaborators.

Given that the estimates of equation 2 represent changes in probability, the decrease in the share of papers with a single male coauthor must mechanically be offset by an increase in a different authorship type. We show in Panel C that there was a sharp increase in the share of solo-authored papers starting at exactly 2016 that offsets the decrease in male coauthorships. This suggests that future generations of female economists are opting to work independently than with men after learning that they would receive less credit for group work.

In contrast to the decrease in papers with a single male coauthor, we do not see any immediate impact of Sarsons’ 2015 paper on coauthorships with multiple male coauthors in Panel D. Instead, we see a sudden increase in multi-male coauthorships starting in 2018. Given the off-timing of this response, we suspect that it is not due to Sarsons’ paper, but rather changes to the gender composition of the control group. Recall from figure 2 that there is a rise in the share of women in the non-economics profession in precisely 2018. By increasing the pool of female candidates for coauthorship, that would mechanically decrease the likelihood that non-economists have male-only coauthorships. The change in non-economists’ gender composition would be reflected in the difference-in-difference estimates as an increase in male-coauthorships among the treated group (i.e. economists). Despite this confounding effect that would bias against our hypothesis, Panel A nevertheless reports a persistent

impact of Sarsons’ 2015 paper.

Another reason for the divergent impacts observed between projects involving one male coauthor and those with multiple male coauthors could be attributed to differences in the inputs required. Female economists might strategically reduce involvement in projects where the marginal costs, measured in terms of time and effort, exceed the marginal benefits, defined by the project’s contribution to their tenure prospects. Although it is challenging to directly measure the effort and time a researcher invests in specific projects, the number of authors can serve as a useful proxy for the level of individual responsibility. As the size of the research team increases, we expect the share of effort required from each individual to decrease. Since [Sarsons \(2015\)](#) did not specifically analyze the impact of coauthor numbers on tenure likelihood, we simply assume that the marginal benefits of projects are relatively similar across different team sizes, as long as they are not single-authored. In that case, after becoming aware of the relatively low marginal benefits of research projects coauthored exclusively with males, female researchers might first reduce their participation in projects with fewer male coauthors.

We conducted a robustness check and a placebo test to ensure the reliability of our estimates regarding the impact on future cohorts of female economists. First, we repeat our analysis for the sample of new researchers from top-30 schools. Appendix Figure [A8](#) shows a similar decline in the percentage of projects involving only one male coauthor and an increase in solo-authored projects. For a placebo test, we do not observe a similar drop in the percentage of projects with only one male coauthor nor a sharp increase in the percentage of solo-author projects among the cohorts of new male economists after 2016 (see Appendix Figure [A9](#)).

Table [7](#) summarizes our results for the response of future generations of female economists to new findings on gender bias in tenure evaluations for coauthored work. Column (1) shows that women are approximately 16 percentage points more likely to solo author after 2016. Column (2) shows that the majority of that response, 15 percentage points, is to compensate for a reduction in the share of papers with a single male coauthor. In contrast, column (3) finds an increase in collaborations with multiple male coauthors, which we ascribe to an increase in the share of women among non-economists due to the timing of the response. We do not find any statistically significant effect on female and mixed-gender coauthorships in columns (4) and (5). Lastly, for completeness, column (6) reports the effect on the share of papers with unknown gender compositions and finds a negative but statistically insignificant response.¹² Together, we interpret the results to suggest that the findings of Sarsons’ 2015 paper had a persistent impact on the coauthorships of future generations of

¹²Appendix Figure [A10](#) presents the event-study plots for the outcomes in columns (4) to (6).

women in economics. However, in contrast to the findings for incumbent female researchers, we do not observe a decline in the publication or citation of SSRN preprints in peer-reviewed journals among the new cohorts of researchers, as detailed in Appendix Figure [A11](#).

6 Conclusion

While a large literature has documented the many biases that women face in their careers, few studies have studied the way women respond after learning of these biases. We use the public disclosure of an academic paper in 2015 as a natural experiment to examine how female workers strategically respond to previously unrecognized information about gender biases in the tenure review process for coauthored papers. Our analysis of the publication records of junior incumbent female researchers reveals that they reduce their involvement in projects coauthored exclusively with male colleagues. Despite the reduction in male-coauthored projects, these researchers do not compensate through other forms of collaboration, translating to a net decrease in peer-reviewed publications and citations. Although coauthorships with men recover later in women’s careers, aversion to male coauthorships still persists among future generations of young female economists. Together, our paper suggests that while reducing involvement in projects that contribute minimally to tenure is a rational response from junior female economists, it can also lead to less innovation and scientific progress. The results of our study thus highlight that gender biases not only impose costs on the women directly affected by them, but also on society due to an inefficient allocation of effort.

A limitation of our study is that it focuses exclusively on the supply side response to gender bias, specifically the reactions of female economists. While we provide some indirect evidence that there were no changes in tenure evaluations, we encourage more research on this topic. Many organizations, both within academia and in the broader labor market, may not be fully aware of their own biases when evaluating group work. Future research could explore whether these institutions implement reforms to promote gender equality upon becoming aware of their own biases. This research would provide a more comprehensive understanding of how both supply and demand forces interact in response to gender discrimination in the labor market.

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Figures & Tables

Figure 1: Results and Media Coverage of Sarsons (2015)

Panel A: The Abstract and Main Results of Sarsons (2015)

Gender Differences in Recognition for Group Work

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December 3, 2015

Abstract

This paper explores whether bias arising from group work helps explain the gender promotion gap. Using data from economists' CVs, I test whether coauthored publications matter differently for tenure by gender. While solo-authored papers send a clear signal about one's ability, coauthored papers do not provide specific information about each contributor's skills. I find that women incur a penalty when they coauthor that men do not experience. This is most pronounced for women coauthoring with men and less pronounced the more women there are on a paper. A model shows that the bias documented here departs from traditional discrimination models.

Table 4: Coauthor gender and tenure		
	(1)	
	Probit	
		x Female
Solo-authored	0.063*** (0.008)	0.009 (0.015)
CA with only fem CAs	0.062*** (0.017)	0.024 (0.027)
CA with only male CAs	0.068*** (0.009)	-0.068*** (0.018)
CA with m and f CAs	0.080** (0.028)	-0.045** (0.036)
Female	0.049 (0.099)	
Observations	542	

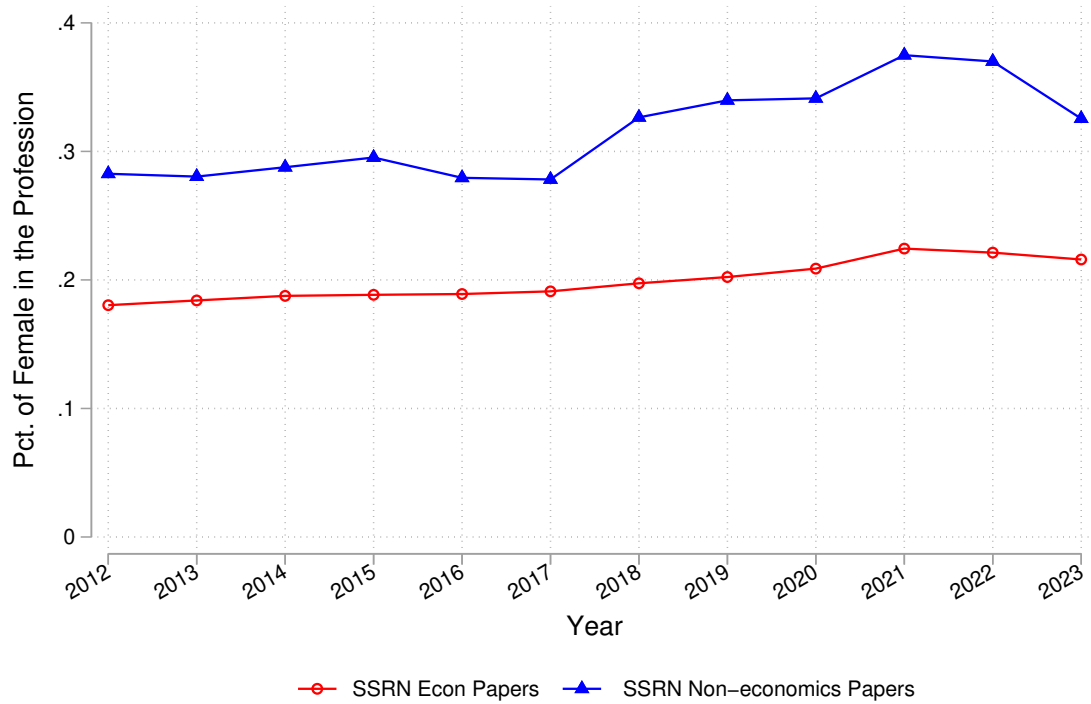
This table presents the results from a single regression. The Y var. is the probability of receiving tenure. "CA with only fem CAs" is the number of papers an individual has in which all coauthors are female excluding the person up for tenure. "CA with only male CAs" is defined similarly but with male coauthors. "CA with m and f CAs" are papers with both male and female coauthors. All regression control for average journal rank and include tenure year, tenure institution, and field fixed effects.

Panel B: Media Coverage of Sarons' 2015 Paper



Note: Panel A shows the abstract and the main outcome estimation from Sarsons (2015). Both the abstract and the regression table suggest that projects with only males contribute little to female economists' tenure. Panel B shows the media coverage of the study.

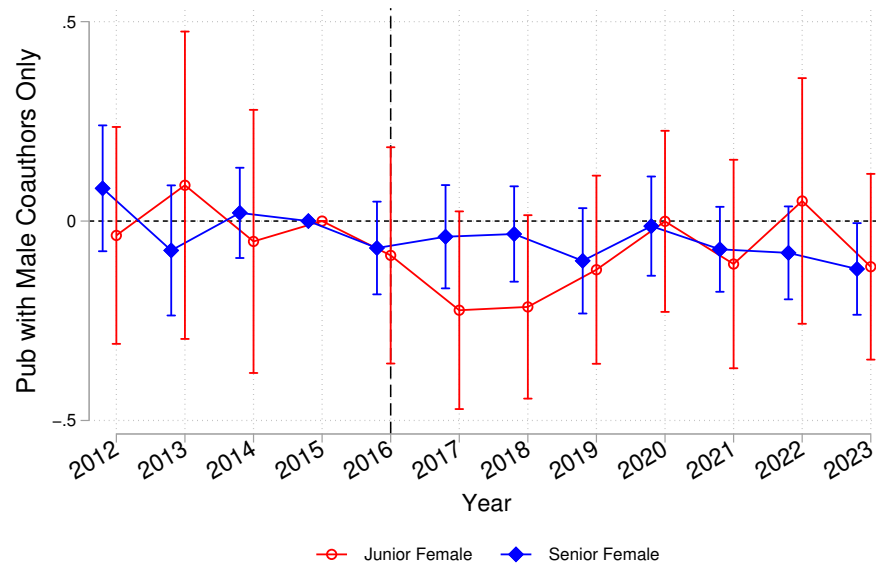
Figure 2: Share of Women in the Profession from 2012 to 2023



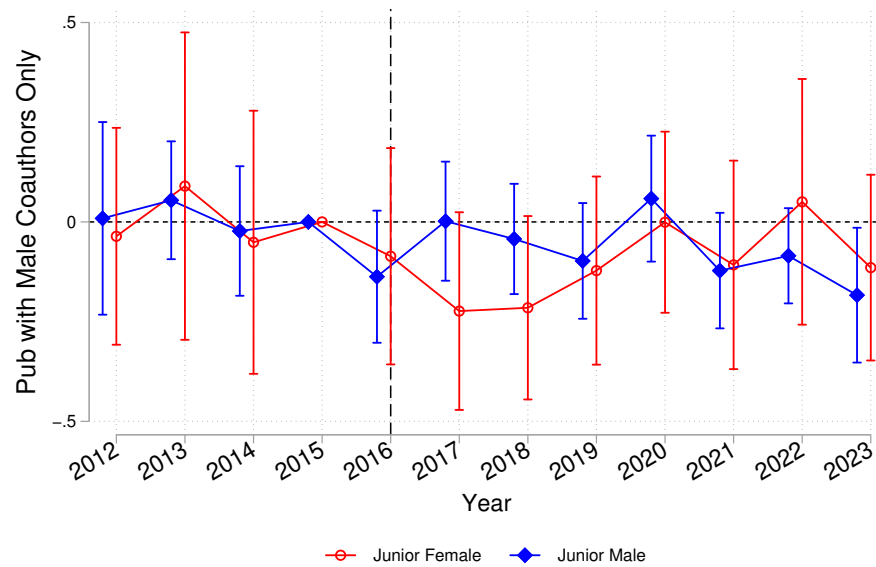
Note: This figure presents the percentage of unique female authors in the top 100 universities by economics papers and non-economics papers in SSRN from 2012 to 2023.

Figure 3: Impact on the Number of SSRN Papers with Only Male Coauthors

Panel A: Junior Female and Senior Female



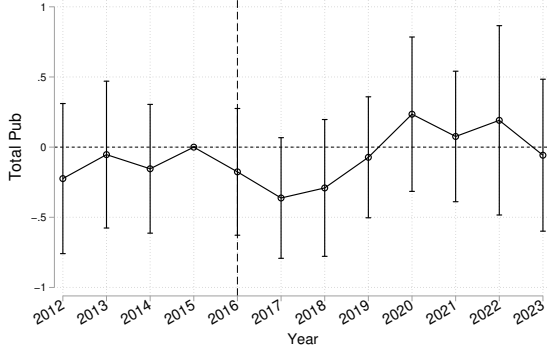
Panel B: Junior Female and Junior Male



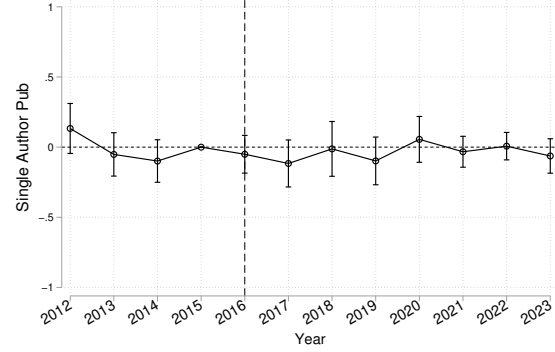
Note: This figure shows the event study estimates from equation 1 where the outcome is the number of SSRN publications with only male coauthors. All models control for individual fixed effects and year interacted with publication age fixed effects. Panel A displays the results for junior female economists (red) and senior female (blue) economists. Panel B compares the event study for junior female (red) and junior male (blue) economists. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure 4: Impact on the Number of SSRN Papers by Coauthorship Type

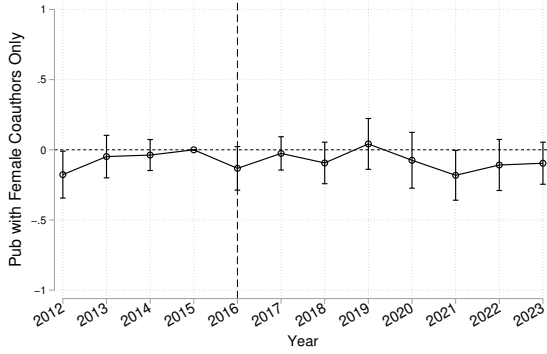
Panel A: Total Projects



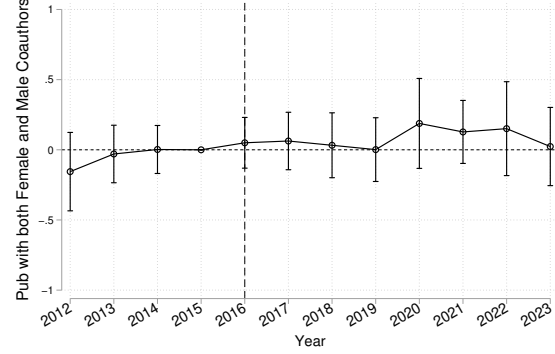
Panel B: Single-author Projects



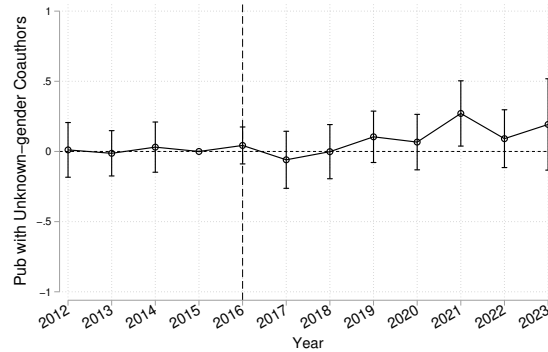
Panel C: Female-coauthor Only Projects



Panel D: Mix-gender Coauthor Projects



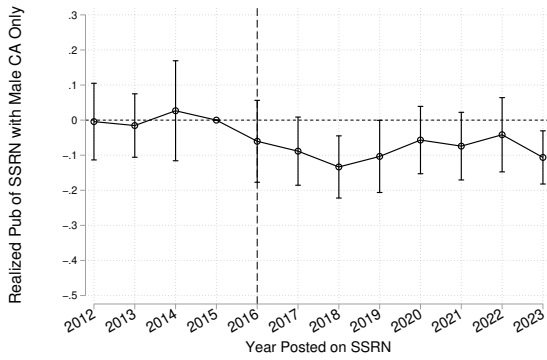
Panel E: Unknown-gender Projects



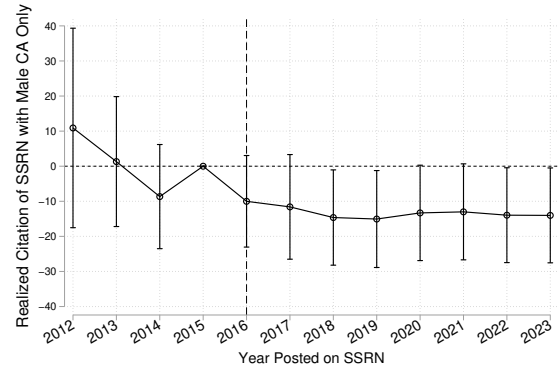
Note: This figure shows the event study estimates from equation 1 for five different outcomes. Panels A-E present the estimates on total, single-author, female-coauthor only, mixed-gender, and unknown-gender coauthored SSRN projects. All models control the individual fixed effects as well as the year interacted with publication age fixed effects. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure 5: Impact on Number of Realized Publications and Citations of SSRN Papers

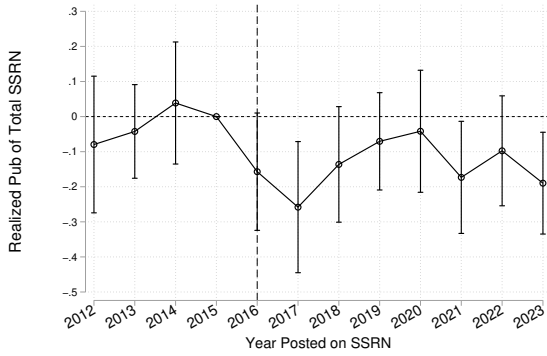
Panel A: Realized Publications of SSRN with Male CA Only



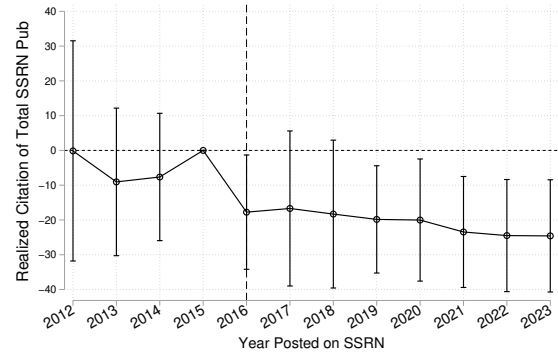
Panel B: Realized Citations of SSRN with Male CA Only



Panel C: Realized Pub of Total SSRN



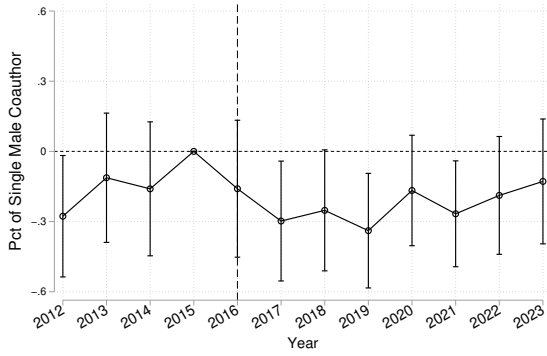
Panel D: Realized Citations of Total SSRN



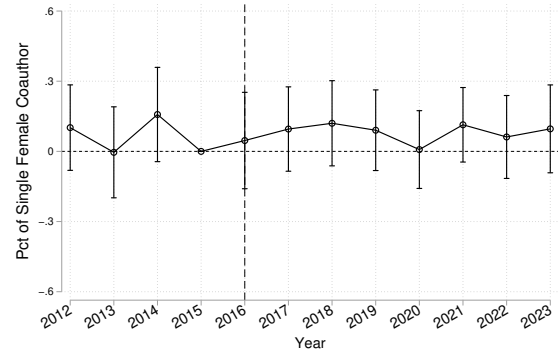
Note: This figure shows the event study estimates from equation 1 for four different outcomes. Panels A-B presents the estimate on the number of peer-reviewed publications and citations of SSRN projects with only male coauthors. Panels C-D presents the estimate on the number of peer-reviewed publications and citations of all SSRN projects. All models control the individual fixed effects as well as the year interacted with publication age fixed effects. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure 6: Impact on the Pct. of Coauthorships in Future Cohorts of Female Economists

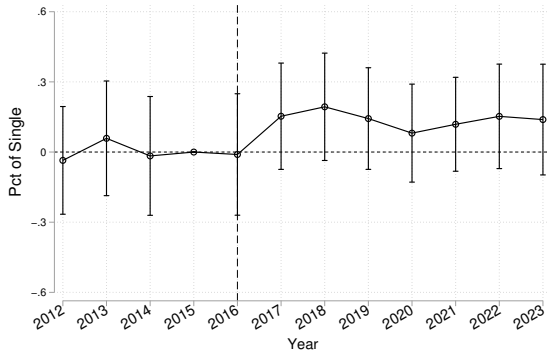
Panel A: Exactly One Male Coauthor



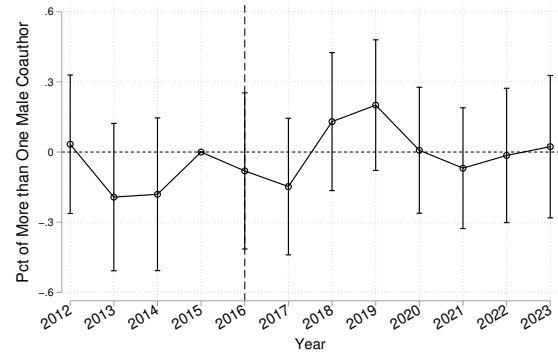
Panel B: Exactly One Female Coauthor



Panel C: Single Author



Panel D: Multiple Male Coauthors



Note: This figure shows repeated cross-section difference-in-difference estimates from equation 2. Panels A-D present the effects on the share of projects with a single male coauthor, a single female coauthor, no coauthors, and multiple male coauthors, respectively. The sample is restricted to junior female researchers in the first year they posted a SSRN paper. All models control the individual fixed effects as well as the year interacted with school fixed effects. Each vertical bar represents the 95% confidence interval of the estimate.

Table 1: Area of Research and Career Status of the Treatment and Control Groups

Ranking	Treatment		Control	
	Category	Pct.	Category	Pct.
<i>Panel A: Publication Category</i>				
1	Applied Economics	26.19%	Strategy, Management and Organizational Behavior	12.82%
2	Banking, Finance and Investment	23.57%	Accounting, Auditing and Accountability	10.26%
3	Accounting, Auditing and Accountability	10.17%	Public Law	9.62%
4	Strategy, Management and Organizational Behavior	9.71%	Commercial Law	8.97%
5	Economic Theory	7.09%	Banking, Finance and Investment	8.33%
<i>Panel B: Academic Degree</i>				
1	PhD. in Economics	41.89%	JD	37.78%
2	PhD. in Finance	17.57%	PhD. in Accounting	13.33%
3	PhD. in Business Administration	13.51%	PhD. in Business Administration	13.33%
4	PhD. in Accounting	9.46%	PhD. in Economics	13.33%
5	JD	5.41%	PhD. in Political Science	6.67%
<i>Panel C: Career Position at 2015</i>				
1	Assistant Professor	50.60%	Assistant Professor	42.00%
2	Tenured Professor	19.28%	Tenured Professor	28.00%
3	Researcher	8.43%	Researcher	8.00%
4	PhD. Student	4.82%	Teaching Faculty	6.00%
5	Private Industry	4.82%	PhD. Student	4.00%

Note: This table details the academic background of the treated and control researchers in the sample of junior female authors. Panel A shows the distribution of topics among researchers' SSRN papers. Panel B shows the researcher's highest academic degrees. Panel C shows their career status in 2015.

Table 2: Summary Statistics

Baseline (2012-2015)	Treatment		Control		T – C
	Mean	St. Dev.	Mean	St. Dev.	Difference
Total Pub	0.9669	0.9914	0.4950	0.3292	0.4719***
Male-coauthor Only Pub	0.4247	0.7165	0.1200	0.2097	0.3047***
Single-author Pub	0.1145	0.2002	0.1600	0.2709	−0.0455
Female-coauthor Only Pub	0.1054	0.2347	0.0700	0.1678	0.0354
Female and Male Coauthor Pub	0.1476	0.2706	0.1050	0.1827	0.0426
Unknown-gender Coauthor Pub	0.1747	0.2915	0.0400	0.1169	0.1347***
Pct. of Male Coauthors	0.5440	0.3547	0.4076	0.4009	0.1364**
First Actual Pub Year	2013.5753	2.9435	2014.0556	2.6827	−0.4802
Top 30	0.4578	0.5012	0.4600	0.5035	−0.0022
Number of obs	83		50		33

Note: This table provides a summary of baseline characteristics for treated and control female researchers during the pre-treatment period (2012 – 2015). The first six rows count the number of publications within each category. Row (7) is the share of coauthors across all papers who are men. Row (8) is the first year that an author publishes in a peer-reviewed journal. Row (9) is the share of authors affiliated with a top-30 university. The sample is restricted to junior female researchers. Column (5) is the difference between the treatment and the control. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3: Impact on Number of SSRN Publications with Only Male Coauthors

	No. Publications with Only Male Coauthors			
	(1)	(2)	(3)	(4)
Treatment $\times \mathbb{1}[2017-2019]$	-0.1664** (0.0698)	-0.1876** (0.0818)	-0.2313** (0.0987)	-0.3283** (0.1366)
Treatment $\times \mathbb{1}[2020-2023]$	-0.0103 (0.0867)	-0.0438 (0.0954)	-0.0998 (0.1273)	-0.1656 (0.1646)
Baseline Mean	0.4247	0.4247	0.4247	0.4247
R^2	0.3497	0.3970	0.5246	0.5870
Number of Obs	1463	1430	1166	1133
Individual FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	No	No
Year \times Age FE	No	Yes	No	Yes
Year \times School FE	No	No	Yes	Yes

Note: This table shows difference-in-difference estimates of the effect of Sarsons' 2015 paper on the number of SSRN papers with only male coauthors. The treatment group is junior female economists and the control group is junior female non-economists. Column (1) adopts the two-way fixed effects model. Column (2) controls for academic age. Column (3) controls for university affiliation. Column (4) controls for both academic age and school. The post-treatment period spans from 2017 to 2019 in row (1) and from 2020 to 2023 in row (2). Standard errors are clustered at the author level and shown in the parentheses. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4: Effect on the Number of SSRN Publications by Coauthorship Types

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Total Pub	One Male CA Pub	Multiple Male CA Pub	Single Author Pub	Female CA Only Pub	Female and Male CA Pub	Unknown-gender CA Pub
Treatment \times $\mathbb{1}[2017-2019]$	-0.1339 (0.1214)	-0.1137** (0.0480)	-0.0739 (0.0647)	-0.0712 (0.0637)	0.0398 (0.0483)	0.0779 (0.0501)	0.0073 (0.0604)
Treatment \times $\mathbb{1}[2020-2023]$	0.2190 (0.1532)	-0.0546 (0.0520)	0.0108 (0.0663)	-0.0040 (0.0385)	-0.0495 (0.0563)	0.1681 (0.1080)	0.1481* (0.0754)
Baseline Mean	0.9669	0.2289	0.1958	0.1145	0.1054	0.1476	0.1747
R^2	0.4656	0.3625	0.2856	0.2570	0.2861	0.3436	0.4770
Number of Obs	1430	1430	1430	1430	1430	1430	1430
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year \times Age FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table shows difference-in-difference estimates of the effect of Sarsons' 2015 paper on different types of coauthorships in SSRN projects. Columns (1) to (7) show the estimates on the number of total publications, single-male coauthor, multiple-male coauthor (with no female), single-author, female-coauthor only, mix-gender and unknown-gender publications. The post-treatment period spans from 2017 to 2019 in row (1) and from 2020 to 2023 in row (2). Standard errors are clustered at the author level and shown in the parentheses. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5: Heterogeneous Impacts on Total SSRN Papers and Papers with Only Men

	(1)	(2)	(3)	(4)
	Male CA	Total	Male CA	Total
	Only Pub	Pub	Only Pub	Pub
Treatment $\times \mathbb{1}[2017-2019]$	-0.3483** (0.1518)	-0.4837** (0.2206)	-0.3063** (0.1479)	0.0393 (0.2195)
Treatment $\times \mathbb{1}[2017-2019] \times \mathbb{1}[\text{Low Male CA}]$	0.3059** (0.1516)	0.6082** (0.2700)		
Treatment $\times \mathbb{1}[2017-2019] \times \mathbb{1}[31-100 \text{ Univ}]$			0.2158 (0.1547)	-0.3137 (0.2812)
Baseline Mean	0.4247	0.9669	0.4247	0.9669
R^2	0.4918	0.4997	0.4763	0.4952
Number of Obs	910	910	910	910
Individual FE	Yes	Yes	Yes	Yes
Year \times Age FE	Yes	Yes	Yes	Yes

Note: This table shows the heterogeneous treatment effects of Sarsons' 2015 paper on the number of SSRN papers written by junior female economists with only male coauthors. Columns (1) and (3) show the effect on the number of SSRN projects with male coauthors. Columns (2) and (4) show the effect on the total number of SSRN projects. Row (2) interacts the treatment with the primary post-treatment period (2017-2019) and a dummy variable representing economists whose percentage of male coauthors is below the mean. Row (3) interacts the treatment with the primary post-treatment period (2017-2019) and a dummy variable representing economists affiliated with a university ranking between 31 and 100. Standard errors are clustered at the author level and shown in the parentheses. Statistical

Table 6: Impacts on Number of Peer-Reviewed Publications and Citations of SSRN Projects

	(1)	(2)	(3)	(4)
	Realized Male CA Only Pub	Realized Male CA Only Citation	Realized Total Pub	Realized Total Citation
Treatment $\times \mathbb{1}[2017-2019]$	-0.1102*** (0.0279)	-14.6504*** (5.5406)	-0.1342*** (0.0478)	-14.0695* (8.0452)
Treatment $\times \mathbb{1}[2020-2023]$	-0.0715** (0.0281)	-14.4651** (5.7157)	-0.1048** (0.0495)	-18.9289*** (6.6120)
Baseline Mean	0.1114	13.9669	0.2229	21.7530
R^2	0.2592	0.2397	0.3200	0.2941
Number of Obs	1430	1430	1430	1430
Individual FE	Yes	Yes	Yes	Yes
Year \times Age FE	Yes	Yes	Yes	Yes

Note: This table shows difference-in-difference estimates for the effect of Sarsons' 2015 paper on the outcome of female economists' SSRN projects in peer-reviewed journals. Column (1) and (2) show the impacts on the number of realized publications and citations for SSRN projects with only male coauthors. Column (3) and (4) show the impacts on the number of realized publications and citations for all SSRN projects. The post-treatment period spans from 2017 to 2019 in row (1) and from 2020 to 2023 in row (2). Standard errors are clustered at the author level and shown in the parentheses. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: Impacts on the Percentage of Publication by Coauthorship Types, Cohort Analysis

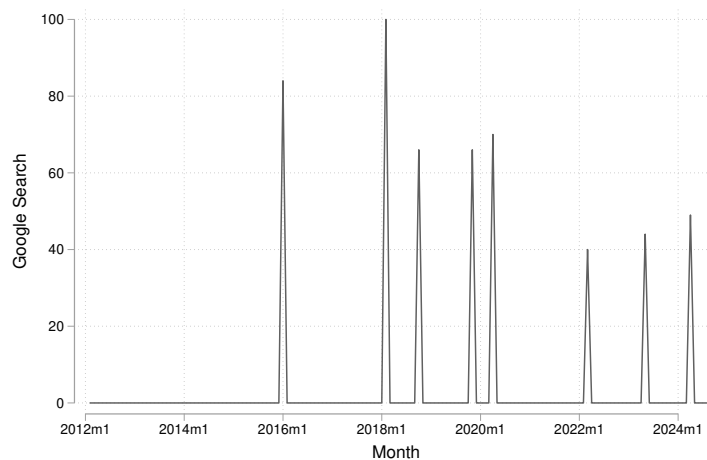
	(1)	(2)	(3)	(4)	(5)	(6)
	Pct. of	Pct. of	Pct. of	Pct. of	Pct. of	Pct. of
	Single Author	One Male	Multiple Male	Female Only	Female and Male	Unknown Gender
Treatment $\times \mathbb{1}[2017-2019]$	0.1617*** (0.0561)	-0.1492** (0.0662)	0.1466* (0.0756)	-0.0208 (0.0569)	-0.0694 (0.0924)	-0.0689 (0.0753)
Treatment $\times \mathbb{1}[2020-2023]$	0.1181** (0.0499)	-0.0535 (0.0588)	0.0498 (0.0672)	-0.0423 (0.0505)	-0.0490 (0.0821)	-0.0231 (0.0669)
Baseline Mean	0.0950	0.2277	0.1906	0.0915	0.2168	0.1784
R^2	0.3236	0.3118	0.3142	0.3053	0.3602	0.3168
Number of Obs	1124	1124	1124	1124	1124	1124
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Year \times School FE	Yes	Yes	Yes	Yes	Yes	Yes

Note: This tables show the estimates from the repeated cross-section regression in equation 2. The sample is restricted to junior female researchers in their first year of publication on SSRN. Columns (1) to (6) show the estimated effect on the percentage of single-author publications, only one male-coauthor publications, multiple male-coauthor (with no women) publications, female-coauthor only publications, mixed gender publications and unknown-gender publications. The post-treatment period spans from 2017 to 2019 in row (1) and from 2020 to 2023 in row (2). Standard errors are shown in the parentheses. Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

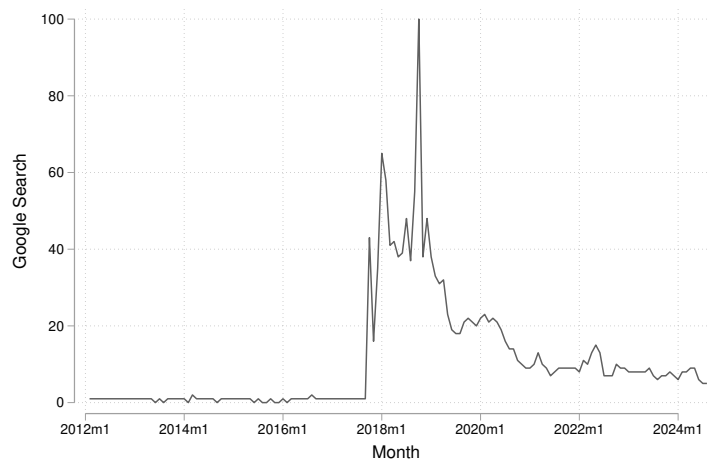
Appendix A Additional Figures

Figure A1: Google Search Trends

Panel A: Search for “Heather Sarsons”

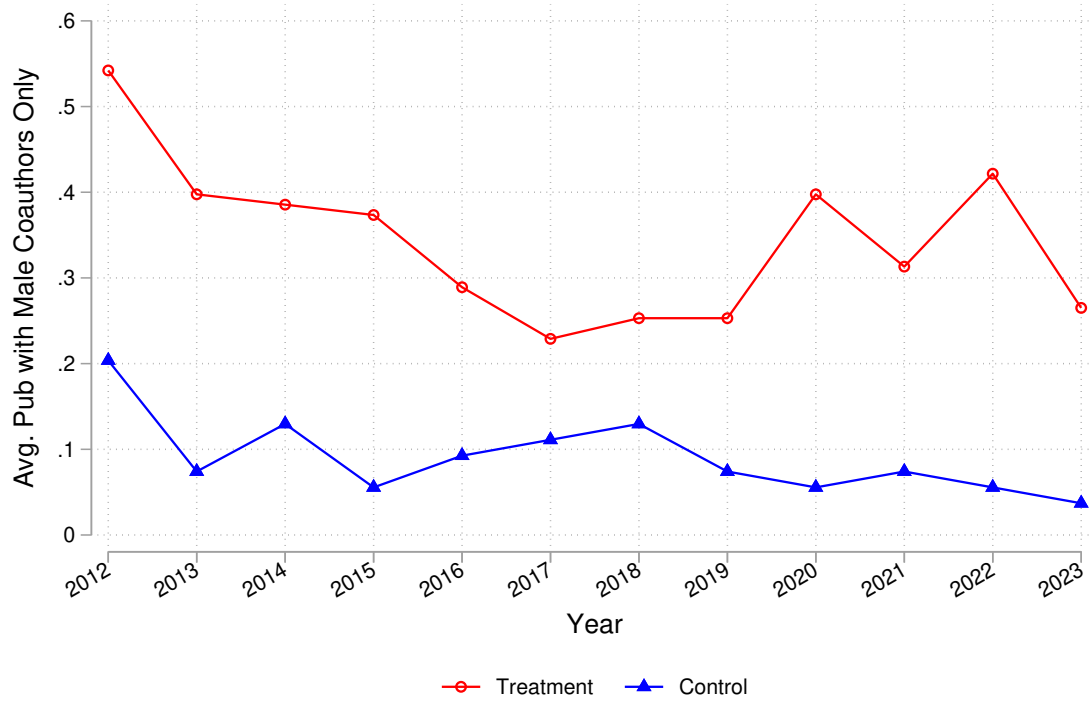


Panel B: Search for “MeToo”



Note: This figure plots Google Search trends for the terms “Heather Sarsons” and “MeToo”, respectively. The y-axis is scaled so that 100 represents the month when the term was most popular.

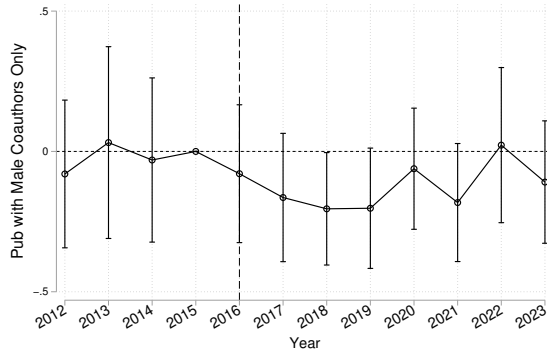
Figure A2: Raw Average Number of Publications with Only Male Coauthors



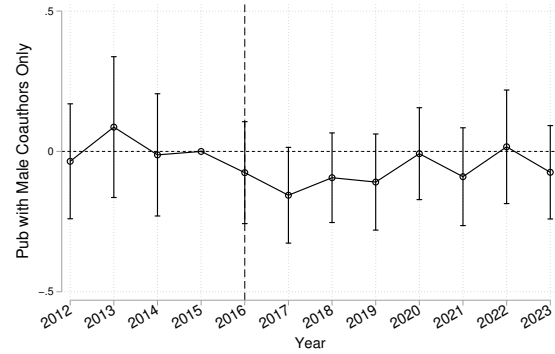
Note: This table shows the raw average of the number of publications for junior female researchers in the treatment and control groups.

Figure A3: Robustness Check for the Definition of Junior Researchers: Impact on the Number of SSRN Papers with Only Male Coauthors

Panel A: 2012 as Junior Cutoff

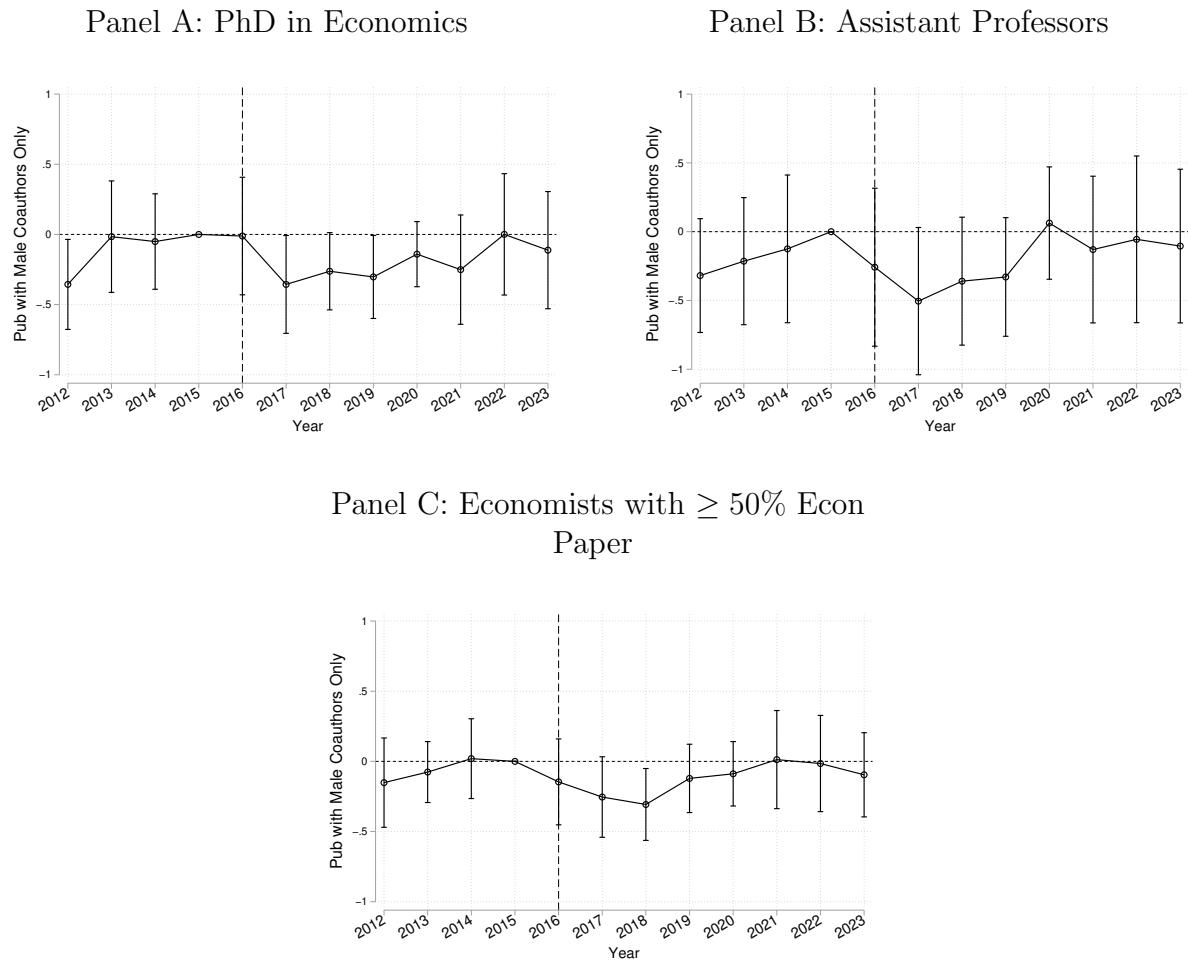


Panel B: 2010 as Junior Cutoff



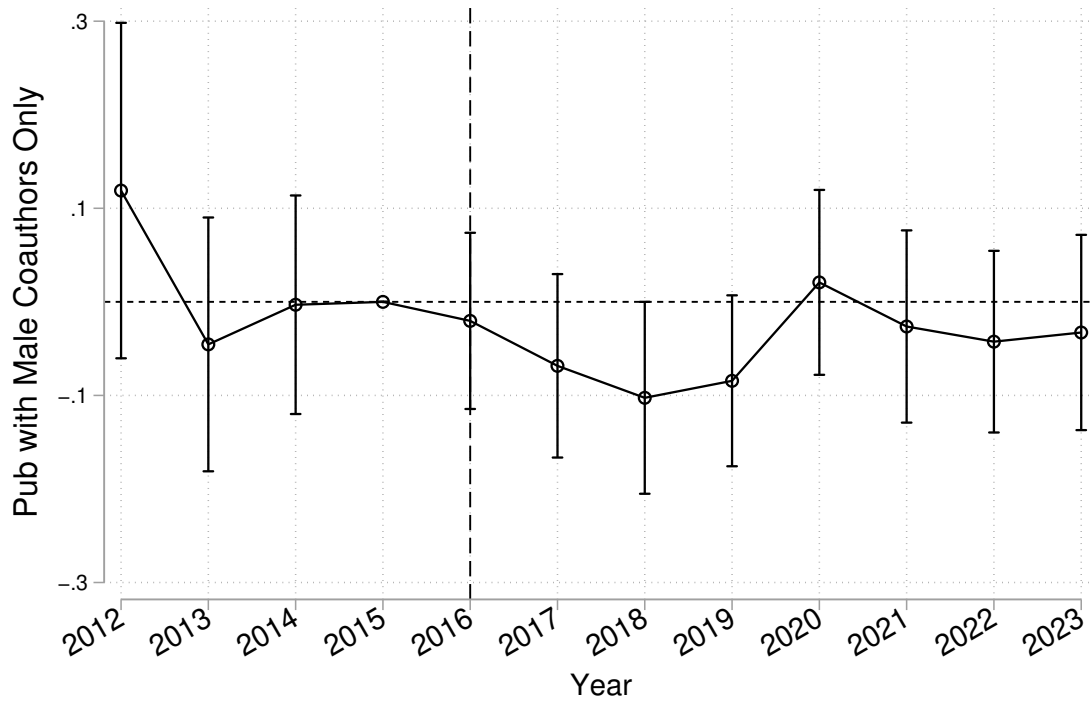
Note: This figure shows the robustness of the event study estimates from equation 1 where the outcome is the number of publications with only male coauthors. In Panel A, junior researchers are those who published their first paper in 2012 or later. In Panel B, junior researchers are those who published no earlier than 2009. All models control for individual fixed effects and year interacted with publication age fixed effects. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure A4: Robustness Check for the Definition of Treatment/Control: Impact on the Number of SSRN Papers with Only Male Coauthors



Note: This figure shows the robustness of the event study estimates from equation 1 where the outcome is the number of publications with only male coauthors. In Panel A, the treated authors are those with an economics PhD and economics paper and the control are researchers who published no economics paper. In Panel B, we restrict the sample to only assistant professors. In Panel C, the treated economists are those with no less than 50% of their papers under the economics topics and the control are researchers who published no economics paper. All model controls for individual fixed effects and year interacted with publication age fixed effects. Each vertical bar represents the 95% confidence interval of the estimate.

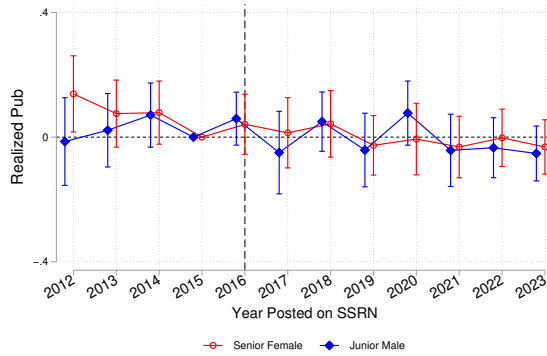
Figure A5: Impact on the Number of SSRN Papers with Only Male Coauthors (2012-2015 researcher sample)



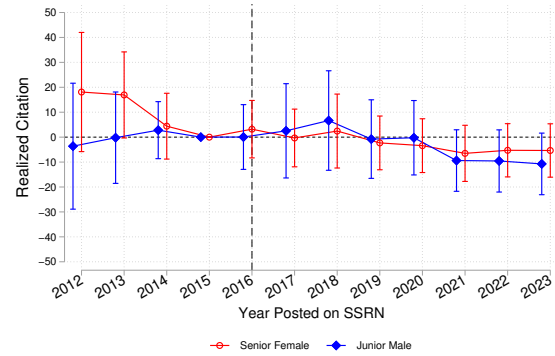
Note: This figure shows the robustness of the event study estimates from equation 1 where the outcome is the number of publications with only male coauthors. We keep all researchers who uploaded at least one paper to SSRN during 2012-2015. Besides the first year of actual publication, we also control for the first SSRN publication year and the affiliation of the researchers. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure A6: Impact on Realized Publications and Citations of SSRN Papers (Senior Women vs Junior Men)

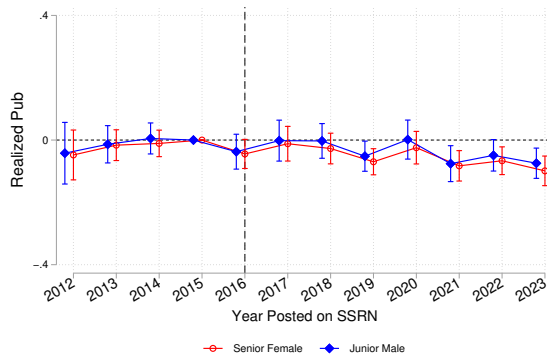
Panel A: Actual Pub of SSRN Projects



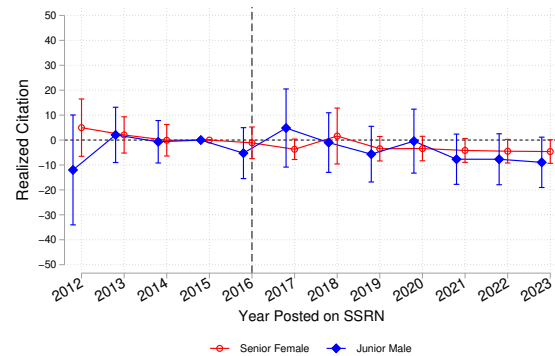
Panel B: Actual Citations of SSRN Projects



Panel C: Actual Publications of SSRN Projects with Male CA Only



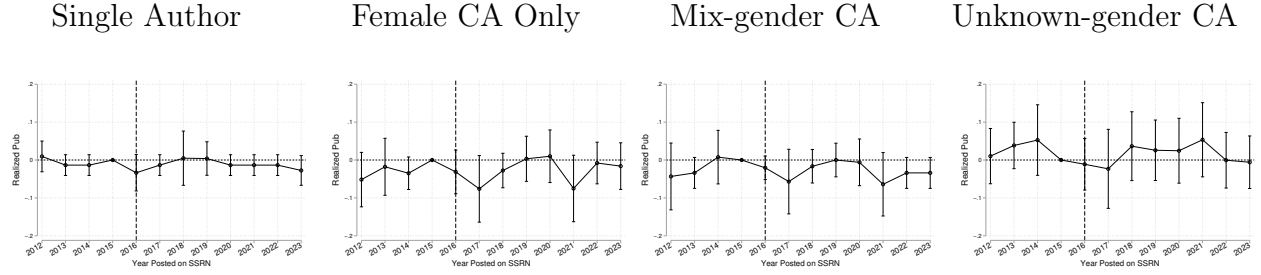
Panel D: Actual Citations of SSRN Projects with Male CA Only



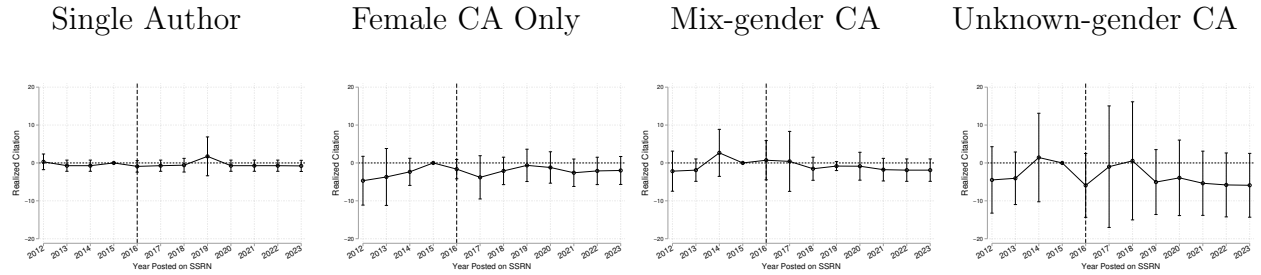
Note: This figure shows the event study estimates from equation 1 for four different outcomes. Panels A-B present the effect on the number of realized publications and citations of all SSRN projects later published in peer-review journals. Panels C-D present the effect on the number of actual publications and citations of SSRN projects with only male coauthors. The red line represents the the sample of senior female researchers and the blue line represents the sample of junior male researchers. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

Figure A7: Impact on Realized Publications and Citations of SSRN Projects

Panel A: Realized Publications of SSRN Projects

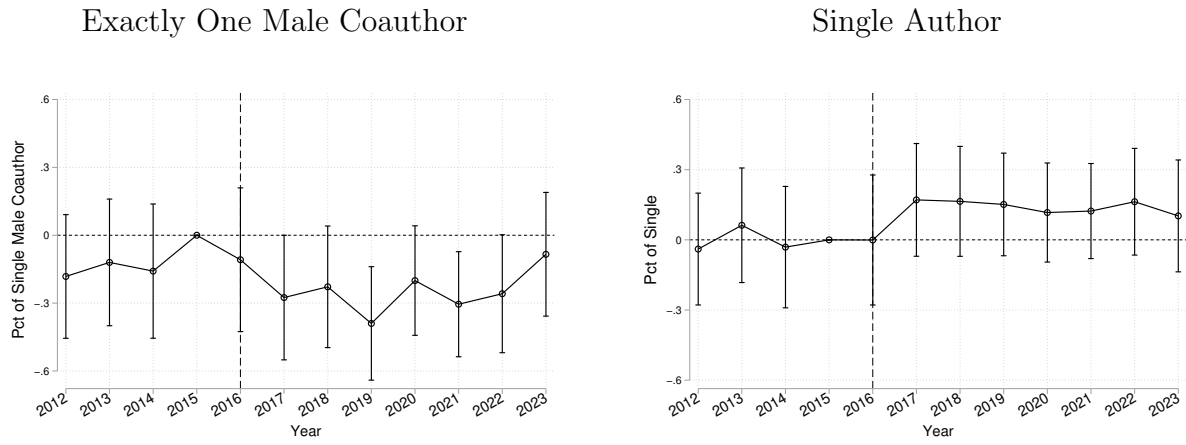


Panel B: Realized Citations of SSRN Projects



Note: This figure shows the event study estimates from equation 1 for eight different outcomes. Panels A presents the effect on the number of peer-reviewed publications for different coauthorships of SSRN projects (from left to right: single author, female coauthors only, mix-gender coauthors and unknown-gender coauthor projects). Panels B presents the effect on the number of realized citations in peer review journals for the same coauthorship patterns in panel A. Standard errors are clustered at the author level. Each vertical bar represents the 95% confidence interval of the estimate.

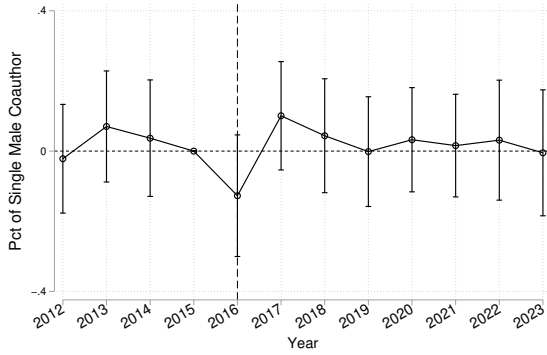
Figure A8: Robustness Check: Impact on the Pct. of Coauthorships in Future Cohorts of Female Economists (Top 30)



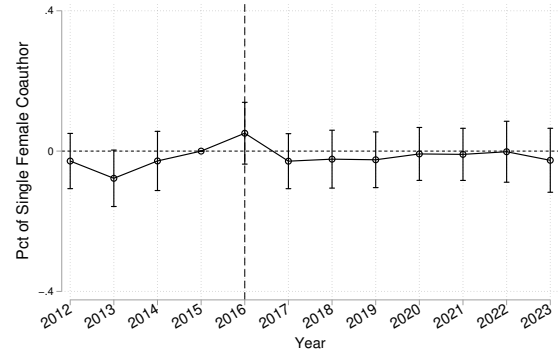
Note: This figure shows repeated cross-section difference-in-difference estimates from equation 2 for researchers in the top 30 universities. Each vertical bar represents the 95% confidence interval of the estimate.

Figure A9: Impact on the Pct. of Coauthorships in Future Cohorts of Male Economists

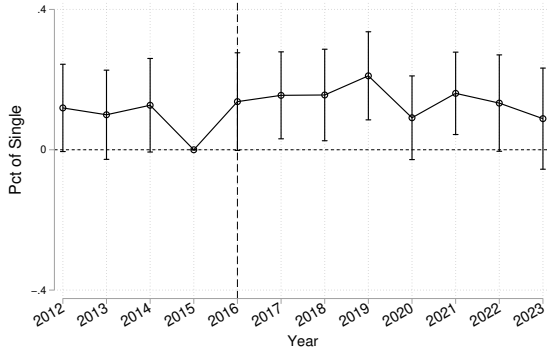
Panel A: Exactly One Male-Coauthor



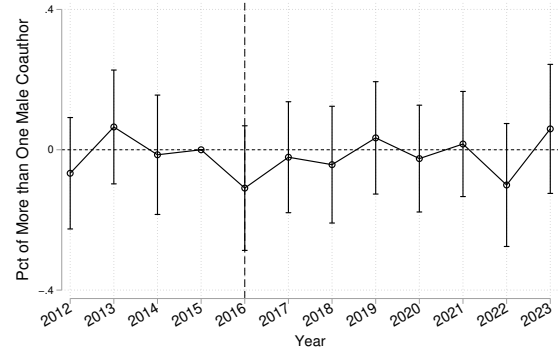
Panel B: Exactly One Female-Coauthor



Panel C: Single Author

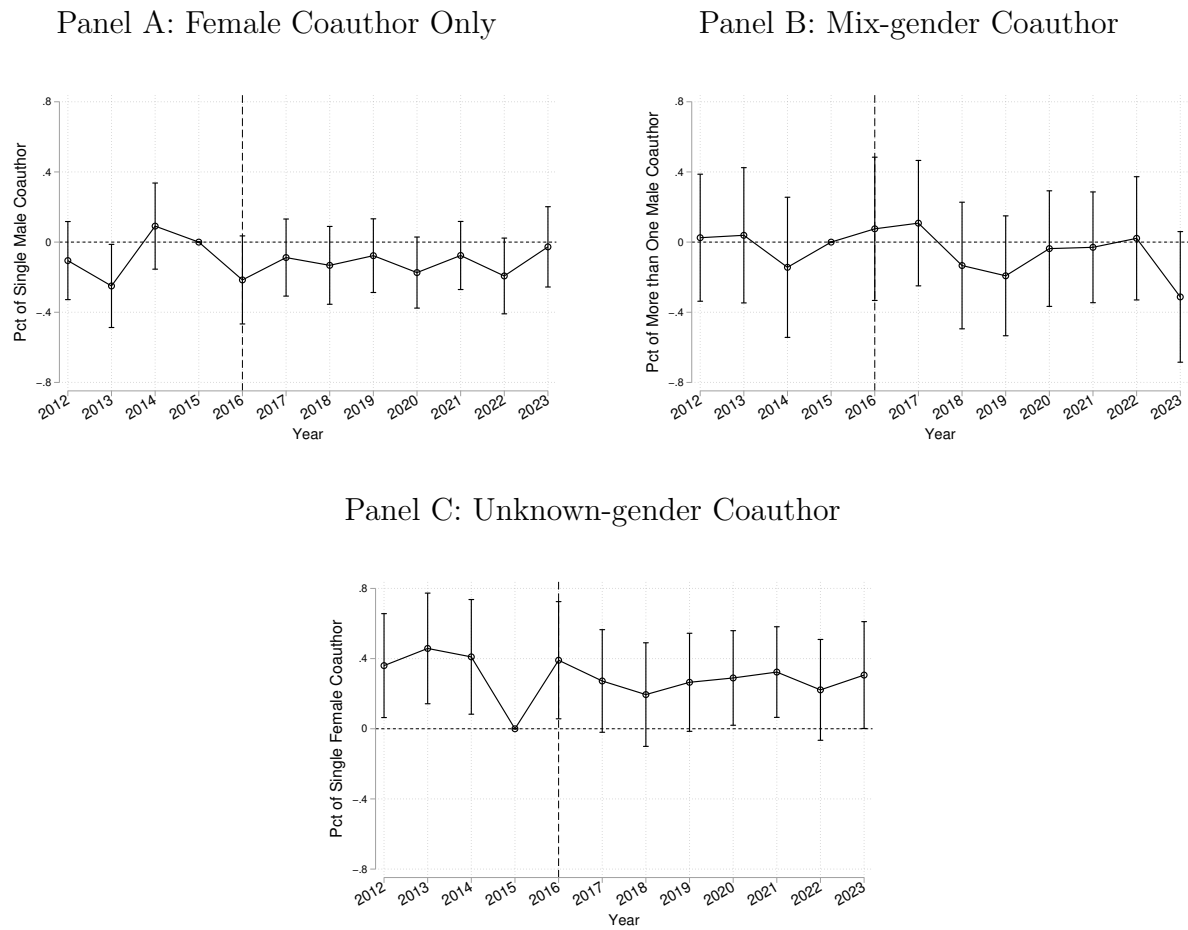


Panel D: Multiple Male-Coauthors



Note: This figure shows repeated cross-section difference-in-difference estimates from equation 2. Panels A-D present the effect on the share of projects with a single male coauthor, a single female coauthor, no coauthors, and multiple male coauthors, respectively. The sample is restricted to junior male researchers. Each vertical bar represents the 95% confidence interval of the estimate.

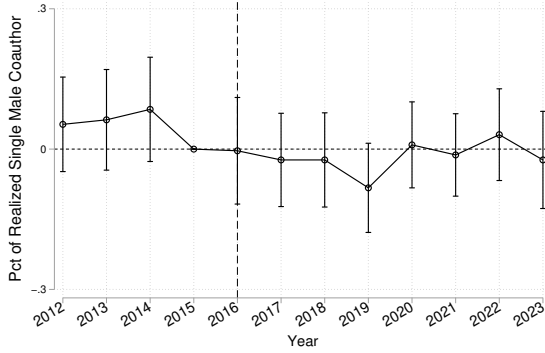
Figure A10: Impact on the Pct. of Coauthorships in Future Cohorts of Female Economists



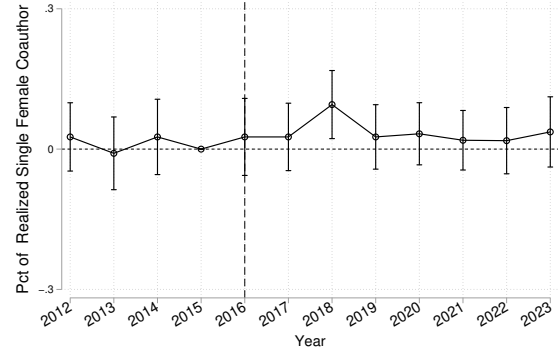
Note: This figure shows repeated cross-section difference-in-difference estimates from equation 2. Panels A-C present the effects on the share of projects with female coauthor only, mix-gender coauthor, and unknown-gender coauthors, respectively. The sample is restricted to junior female researchers. All models control the individual fixed effects as well as the year interacted with school fixed effects. Each vertical bar represents the 95% confidence interval of the estimate.

Figure A11: Impact on the Pct. of Realized SSRN in Future Cohorts of Female Economists

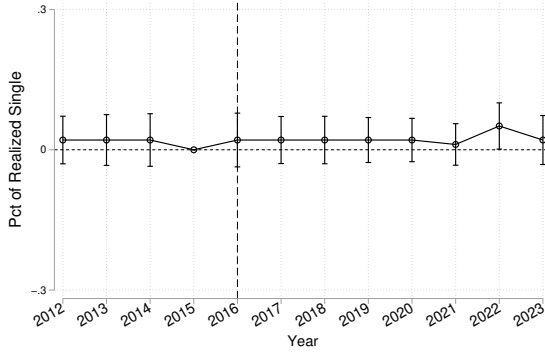
Panel A: Exactly One Male-Coauthor



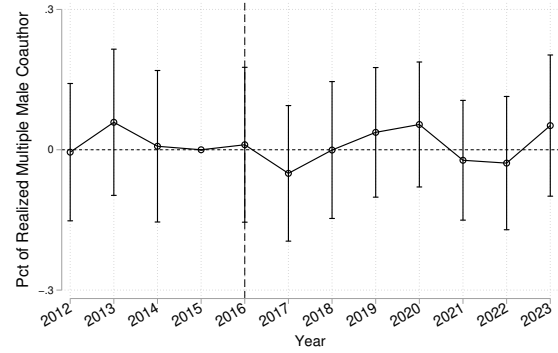
Panel B: Exactly One Female-Coauthor



Panel C: Single Author



Panel D: Multiple Male-Coauthors



Note: This figure shows the repeated cross-section difference-in-difference estimates from equation 2. Panels A-D present the effects on the share of realized publications with a single male coauthor, a single female coauthor, no coauthors, and multiple male coauthors in peer review journals, respectively. The sample is restricted to junior female researchers. Each vertical bar represents the 95% confidence interval of the estimate.