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A Fresh Look at the Publication and Citation Gap Between Men and Women: Insights from Economics and Political Science

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Abstract

In recent years, significant efforts have been made to attract more women into academia and to support their careers, with the goal of increasing their representation. Using novel data for economics and political science, collected through web-scraping the corresponding departments of the top 50 universities worldwide, we document three key findings: (i) female scholars, on average, publish less and receive fewer citations than their male counterparts; (ii) this gap is smaller at junior ranks in both disciplines; and (iii) the gap decreases in departments with a higher proportion of female scholars, particularly in political science, where female faculty representation is generally higher compared to economics. Gaps do not differ significantly by field in economics, where a substantial proportion of women are concentrated in microeconomic subfields. Overall, our results underscore a persistent publication and citation gap between men and women in both disciplines, primarily driven by full professors, while suggesting that this gap diminishes in departments with greater sex balance among faculty.

Topic: Labour markets
JEL codes: J16, I23, A14, J71, J44

Résumé

Au cours des dernières années, des efforts considérables ont été déployés pour attirer davantage de femmes dans le milieu universitaire et pour faire avancer leur carrière, dans le but d'accroître leur représentation. Sur les deux disciplines que sont l'économie et la science politique, trois principaux résultats se dégagent des données innovantes recueillies par le moissonnage des sites Web des départements correspondants des 50 plus grandes universités dans le monde : i) en moyenne, les femmes universitaires publient moins que leurs homologues masculins et leurs travaux sont moins cités; ii) cet écart est plus faible aux échelons inférieurs dans les deux disciplines; iii) il est moins marqué dans les départements où il y a une plus grande proportion de femmes, en particulier en science politique, discipline où la représentation des femmes à l'intérieur du corps enseignant est généralement plus élevée que dans les départements d'économie. Les écarts ne varient pas sensiblement d'un domaine à l'autre de l'économie, une proportion importante des femmes étant même concentrée dans les filières de la microéconomie. Dans l'ensemble, nos résultats mettent en évidence un écart persistant entre les hommes et les femmes dans les deux disciplines quant au nombre de travaux publiés et cités, surtout parmi les professeures et professeurs titulaires, tout en donnant à penser que cet écart tend à se réduire dans les départements où l'équilibre entre les sexes est plus élevé au sein du corps professoral.

Sujets : Marchés du travail
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1 Introduction

The social sciences have historically been male-dominated, particularly in quantitative disciplines like economics and political science. Men have traditionally held more faculty positions, advanced faster in their careers, received more awards, published more often, and been cited more frequently (Ceci et al., 2014; Kantola, 2015; Lundberg and Stearns, 2019; Pflaeger Young et al., 2021). Over the past two decades, efforts to increase diversity have included hiring more female scholars, introducing mentorship programs, organizing female-only conferences, and conducting awareness campaigns to address the sex imbalance in academia (Bettinger and Terry Long, 2005; Blau et al., 2010; Buckley, 2019; Ginther et al., 2020; Roos et al., 2020; Allen et al., 2021).

Despite these efforts, questions remain about the progress toward equality between men and women in academia. Do women publish and receive citations at the same rate as men? Are disparities between men and women homogeneous across academic ranks and fields? Are initiatives aimed at increasing female representation helping to level the playing field in terms of the research output and the impacts for both men and women? This paper focuses on these questions in two of the most quantitative social sciences: economics and political science.

Our study makes three key contributions. First, we provide a direct measurement of the individual-level publication and citation gap between men and women, by comparing the outcomes for individual male and female scholars. Second, we show that average comparisons mask substantial heterogeneity in the gap, particularly when measuring by academic rank. Third, we document a nonlinear relationship between female representation and the gap between men and women, a novel fact that aligns with the theories of substantive representation and critical mass.

Previous literature has largely focused on aggregate disparities between men and women, with men producing the majority of published content in both economics and political science (Hamermesh, 2013; Breuning and Sanders, 2018; Grossman, 2020; Card et al., 2020; Closa et al., 2020; Samuels and Teele, 2021; Verney and Bosco, 2022; Bransch and Kvasnicka, 2022; Hengel, 2022; Bosco et al., 2023). In political science, male-authored articles also tend to receive more citations than female-authored ones (Dion et al., 2018; Maliniak et al., 2013; Zigerell, 2015). In economics, the evidence is more mixed: some studies show higher citation rates for female-authored articles published in prominent journals (Hengel and Moon, 2023; Grossbard et al., 2021; Koffi, 2021; Card et al., 2020), while others find no differences between men and women (Hamermesh, 2018).

We posit that men's overrepresentation in publications and citations is at least partly an artifact of their overrepresentation in the academia itself (Ceci et al., 2014; Lundberg and Stearns, 2019). While aggregate analyses, such as those mentioned earlier, provide valuable insights, they often fail to differentiate between systemic patterns and individual-level differences. Specifically, these studies tend to overlook how publication and citation behaviors compare between the average male scholar and the average female scholar, focusing instead on aggregate counts of publications and citations by sex. Only a small body of research explores these individual-level gaps between men and women. In political science, the individual publication gap is inferred by comparing the percentage of female authors published in journals to their membership share in professional associations (Teele and Thelen, 2017; Dion and Mitchell, 2020; Reidy and Stockemer, 2024). In economics, Ductor et al. (2023) document individual publication gaps, using data from EconLit, while other works focus on non-tenured faculty (see Ginther and Kahn, 2004; McDowell et al., 2006; Barbezat, 2020; Gosh and Liu, 2020).

Our study contributes to this literature by directly measuring individual-level publication and citation gaps between men and women. We create a novel dataset with publications and citations of faculty members from economics and political science departments of the top 50 universities worldwide, as ranked by the 2023 QS University Rankings.[1] Data is web scraped from faculty pages and Google Scholar, and we classify individuals into female or male, based on first names. We evaluate the degree to which men and women differ concerning (i) production, measured by the number of publications, and (ii) the impact, measured by total citations, citations of the most-cited article, and average citations per article.

Our findings reveal a substantial gap between men and women at the individual level: Women publish half as many articles as men and receive proportionately fewer citations, both in total and for the most-cited article, though the gap is smaller for average citations per article.

Furthermore, we show that aggregate gaps between men and women are larger than when broken down by more-granular dimensions, particularly academic rank. This is due to substantial heterogeneity, where structural factors–such as the pronounced underrepresentation of women at senior ranks, who typically publish and are cited more–inflate the overall disparity. By accounting

[1] We focus exclusively on economics departments, excluding business schools to avoid skewing the results by including institutions that have broader mandates. For instance, Ginther and Kahn (2021) clarify that advancement in equality between men and women is different in research-focused institutions. We also exclude part-timeand temporary faculty, such as postdoctoral fellows and visiting assistant professors.

for these confounders, we observe a more nuanced and narrower gap. Specifically, we find that the gap is 20-70% smaller at the full professor level–the rank with the largest gap–compared to the overall average in economics, and 10-20% smaller in political science. At the assistant professor level, the gaps are minimal to nonexistent, suggesting that efforts to level the playing field may be succeeding, as differences across sexes have dropped substantially among recent hires. We do not observe a similar pattern when comparing fields in economics: both micro and applied fields (with more women) and macro and finance fields (with fewer women) exhibit similar gaps between men and women.

Finally, we examine the role of female representation as a tool for reducing the gaps between men and women. While increasing female representation is often seen as a way to enhance diversity, theories of substantive representation and critical mass argue that merely increasing the number of women may not be sufficient. Meaningful change occurs only when a critical mass of female representation is reached, allowing women's voices to be heard and their influence to be felt (Pitkin, 1967; Kanter, 1977a,b; Dahlerup, 1988; Mansbridge, 1999; Childs and Krook, 2008).

This part of the study adds to the literature on the impact of increasing female representation, much of which focuses on political decision-making (see, e.g., Chattopadhyay and Duflo, 2004; Ferreira and Gyourko, 2014), or corporate boardroom quotas (see, e.g., Ahern and Dittmar, 2012; Bertrand et al., 2019). Non-linear effects of increasing female representation are documented. Some studies show that increasing the proportion of women is effective only when baseline representation is low (see, e.g., Baskaran and Hessami, 2023; Brito et al., 2024) while others find that a critical mass is required for additional women to influence outcomes (see, e.g., Torchia et al., 2010; Joecks et al., 2013; Karpowitz et al., 2012; Gagliarducci and Paserman, 2012; Wasserman, 2023; Karpowitz et al., 2024). Our findings for publications and citations in economics and political science also support the critical mass theory. We show that women's publication output and influence relative to men's increase in more sex-balanced departments, particularly in political science, where female representation is higher compared to economics. These results suggest that higher female representation may reduce barriers that are preventing women from publishing on par with men, lending support to the theories of substantive representation and critical mass.

The remainder of the paper proceeds as follows. We first present a conceptual framework, discussing the relationship between aggregate and individual gaps between men and women and the non-linear effects of female representation. We then describe the data and methods used, followed by the results structured around the paper's three contributions. Finally, we conclude.

2 Conceptual Framework

2.1 Aggregate vs. Individual-Level Gap between Men and Women

To fix ideas, let's define the gap between men and women as it is commonly presented in the literature. For simplicity, we focus on the publication gap, as the citations gap follows a very similar logic. The aggregate gap is the ratio of the number of male to female authors in published work. Simplifying, assume these publications are single-authored, such that the gap is defined as

$$\text{Gap} = \frac{P^m}{P^f},$$

where P represents the number of publications and the indices denote f for females and m for males. For example, many studies document that the number of female authors is roughly half that of male authors in published work in both economics and political science.

The effort, e, each individual exerts toward publication results in a number of individual-level publications, $\overline{P}^k(e)$, where $k \in \{m, f\}$. The total number of publications is then given by

$$P^k = N^k \overline{P}^k(e),$$

where N^k is the number of individuals of sex k in the discipline. Substituting this into the expression for the gap yields

$$\text{Gap} = \frac{P^m}{P^f} = \underbrace{\frac{N^m}{N^f}}_{\text{Male representation}} \underbrace{\frac{\overline{P}^m(e)}{\overline{P}^f(e)}}_{\text{Individual-level gap between men and women}}, \tag{1}$$

which clarifies that the gap between men and women is influenced by two components:

1. *Representation*, the ratio of men to women in the discipline, denoted by $R^m \equiv \frac{N^m}{N^f}$.
2. *The individual-level performance gap*, denoted by $G(e) \equiv \frac{\overline{P}^m(e)}{\overline{P}^f(e)} = \frac{\frac{P^m(e)}{N^m}}{\frac{P^f(e)}{N^f}}$, which measures the relative publication rates of male and female scholars. This gap depends on the effort exerted

individually, e, and how this effort translates into publications, which may differ between men and women.[2]

Even though both components of the aggregate gap between men and women are significant, to assess sex equity in the publishing process (i.e., whether female authors have the same chance of publishing as male authors), the crucial component is the *individual-level performance gap*, which measures the relative publication rates irrespective of the representation of women or men in the discipline. As clarified in Equation 1, this ratio can be influenced by both the effort, e (e.g., time spent, quality of work) and how much effort pays off for each the sexes, $\overline{P}^k()$.

2.2 Total Gap vs. Rank-Specific Gap

It is also important to note that the representation and, hence, the identification of individual-level gaps between men and women, varies crucially across different groups, especially by rank. When this latter dimension is not included in the analysis, the individual-level gap between men and women implicitly compares individuals across ranks. The average male scholar is more senior and, hence, publishes more and is more cited than the average female scholar. This is because male scholars are overrepresented in senior ranks (e.g., among full professors), while female scholars are overrepresented in junior ranks (e.g., among assistant professors), likely due to the impact of recent sex-inclusion policies. Consequently, the individual-level average gap between men and women tends to overstate the true individual-level gap observed within ranks.

To clarify this, let's write the total individual-level gap as a weighted sum of rank-specific average publications by men and women

$$G(e) = \frac{\sum_r w_r^m \cdot \overline{P}_r^m(e)}{\sum_r w_r^f \cdot \overline{P}_r^f(e)},$$

where $r \in$ {Assistant Professor, Associate Professor, Full Professor} and the weights are $w_r^k = \frac{N_r^k}{\sum_r N_r^k}$. Let's define $G_r(e) = \frac{\overline{P}_r^m(e)}{\overline{P}_r^f(e)}$. Rearranging the terms, we get

$$G(e) = \frac{\sum_r w_r^m \cdot \overline{P}_r^f(e) \cdot G_r(e)}{\sum_r w_r^f \cdot \overline{P}_r^f(e)}. \quad (2)$$

Expression 2 clarifies that $G(e) \geq \min_r G_r(e)$, because $w_r^m \geq w_r^f$ for all r; that is, both disciplines

[2] We abstract from the composition effects that can arise if the effort also affects the representation.

are still male-dominated in all ranks.

2.3 Representation and Critical Mass Theory

The relationship between representation and outcomes can be linked to the concepts of descriptive and substantive representation. Descriptive representation refers to the extent to which institutions mirror the composition of the population, such as the numerical presence of female faculty within each department (Schwindt-Bayer and Mishler, 2005). Substantive representation, by contrast, focuses on whether the actions of representatives align with the interests of the represented, which in this study relates to whether women achieve comparable publication and citation outcomes to men (Mansbridge, 1999; Pitkin, 1967).

The critical mass theory on sex differences in politics suggests that as the number of women increases, their influence grows, enabling more-equitable outcomes, such as passing women-friendly policies (Childs and Krook, 2008). Adapting this logic to academia, we expect higher female representation in departments to enhance the publication and citation performance of female scholars, particularly as representation approaches parity.

Kanter (1977a,b) classifies groups based on representation dynamics:

1. *Uniform groups*: Exclusively male.
2. *Skewed groups*: Male-dominated, where women are treated as tokens with limited influence.
3. *Tilted groups*: Still male-dominated but sufficiently diverse to allow alliances supporting minority interests.
4. *Balanced groups*: Sex balance is achieved, enabling outcomes based on individual merit rather than group identity.

Research suggests that skewed groups are particularly detrimental to women's advancement, as women in these groups often serve as tokens and are not taken seriously by their male colleagues (e.g., Kanter, 1977a,b; Joecks et al., 2013). According to critical mass theory, publication performance differences between men and women are expected to be significant in skewed groups but diminish as female representation increases.

To incorporate these ideas in the conceptual framework, the effectiveness of female scholars' efforts depends on female representation: $\overline{P}^f(e, \eta(R^f))$, where $R^f \equiv \frac{N^f}{N^m}$. Female representation

R^f only reduces the gap ($G(e) = \frac{\overline{P}^m}{\overline{P}f}$) when the female representation is high enough; that is, when the function $\eta()$ is decreasing and concave.

From this conceptual discussion, we formulate the following hypotheses:

- **H1:** The individual publication and citation gaps between men and women should be smaller in departments with higher female representation, $\eta'() < 0$.

- **H2:** The effect of female representation on narrowing the individual publication and citation gaps should be larger in political science, where women are more represented—than in economics, where women are underrepresented, $\eta"() < 0$.

3 Data

To compare individual publication and citation patterns between men and women, we constructed a novel dataset comprising publication metrics for economists and political scientists from the top 50 universities worldwide, based on the 2023 QS World University Rankings (see Appendix A for the full list). We focused on these institutions due to their research-intensive nature and substantial output. Data collection occurred between January and March 2024.

First, we web scraped the names and positions of all faculty members from the economics and political science departments of the world's top 50 universities. This process was successful for 78% of these institutions' economics departments and 66% of their political science departments, with the remaining 22% and 33%, respectively, added manually.

Next, we determined each individual's sex according to their first name, using the *Gender API*, an Application Programming Interface (API) which classifies names based on frequency data from the web.[3] Also, to enhance the accuracy of the sex classification, we manually reviewed the names from the Asian universities in the study, those with three-letter first or last names in other universities as proxies for Asian-sounding names, and all others with an accuracy index below 80% according to Gender API, as well as other ambiguous cases that were hand-picked. In the end, we checked about nine out of every ten names in the dataset, confirming an overall classification accuracy of the API of approximately 90%.

[3]The same API, or similar ones, have been used in related studies (see, e.g., Ductor et al., 2023; Koffi, 2021). It is worth noting that this type of coding excludes nonbinary identities and may lead to misgendering, as it does not rely on self-identification.

We then categorized faculty members by rank (assistant, associate, or full professor), using a keyword search of position-related text from faculty webpages. Additionally, we flagged individuals with distinguished titles (e.g., "distinguished," "chair," "honorary," or titles containing personal names), using the English module of the *spacy* Python package. At this stage, we also exclude part-time and temporary faculty, for instance postdoctoral fellows and scholars in the teaching stream.

To gather bibliographic information, we retrieved Google Scholar IDs through automated searches, using keywords such as "Google Scholar," the name of the discipline, the professor's name, and that of their university. In a random sample of 100 names, this method showed a 9% error rate; errors occurred mainly due to short or common names. To address this, we manually verified IDs for faculty members at Asian universities and those with names spelled using three or fewer letters. A second search, excluding the discipline, further improved the ID retrieval process.

Finally, we scraped Google Scholar author page data for individuals with successfully obtained IDs, using the *SerpAPI*. This step allowed us to retrieve data for 75% of economists and 69% of political scientists. Our final dataset includes 1,718 full-time permanent faculty in economics departments (359 women, 1,359 men) and 1,482 faculty in political science departments (500 women, 982 men).

For each scholar, we collected the number of papers with at least ten citations (the i10-index), their total citations, their citations per paper (calculated as total citations divided by the i10-index), and the number of citations for their most-cited paper. Additionally, we retrieved the titles and citation information for the 100 most-cited papers listed on their author page. These metrics (excluding the last one and the citations for the most-cited paper) are available both as overall figures and as figures for the study period(2018-2023). We also gathered annual citation counts, along with the titles, publication outlets, years, and citation counts of all listed publications. Descriptive statistics for the dataset are provided in Table 1.

We rely on Google Scholar as the primary bibliometric source for this study due to its comprehensive coverage and inclusivity. Unlike controlled databases such as Web of Science or Scopus, which primarily index peer-reviewed journal articles, Google Scholar comprises a broader range of academic output, including working papers, books, conference proceedings, and policy reports. This wider scope is particularly advantageous for analyzing gaps between men and women, as women may be more likely to contribute to nontraditional output or take longer to publish in traditional

Table 1: Descriptive statistics

	Economics	Political science
Google Scholar (GS) author page	76%	69%
N. observations with GS author page	1,718	1,482
Rank		
Assistant prof.	21%	24%
Associate prof.	28%	29%
Professor	51%	47%
Distinguished prof.	16%	13%
Country		
USA	43%	37%
UK	13%	20%
China	13%	13%
Australia	13%	7%
Canada	6%	7%
Other	12%	16%
Citations	9,798 (640)	4,847 (296)
Citations most-cited art.	1,670 (110)	890 (53)
Articles with 10+ citations	44 (1.8)	35 (1.3)
Average citations per art.	143 (4.0)	96 (2.4)
Years listed on GS	18 (0.21)	17 (0.21)

Note: Standard errors in parenthesis. The proportion with a Google Scholar author pages is listed on the total full-time, permanent faculty inferred by the position classification.

journals. By capturing these contributions, Google Scholar provides a more inclusive and arguably more accurate representation of the research productivity and impact, especially in the social sciences and interdisciplinary studies that are relevant to this study. Extensive discussion of Google Scholar's accuracy and reliability as a bibliometric tool can be found in Harzing (2013), Halevi et al. (2017), and Delgado López-Cózar et al. (2019).

Google Scholar's advantages extend to its superior coverage of social sciences and humanities, making it particularly suitable for comparing economics and political science. It excels in measuring citations for working papers–prevalent in economics–and books–common output in political science. The platform's automated crawling system and author-level metrics, introduced in 2012 through Google Scholar's author pages, further enhance its utility for studying academic output at the individual level. Scholars can choose to have new publications automatically added to their profiles or manually verify and select publications to include, ensuring greater control over their listed work.

Despite its strengths, Google Scholar has notable limitations. Its automated nature makes it prone to errors, such as double counting due to inconsistencies across versions of the same work or author ambiguity that may bypass its consistency algorithms. Additionally, it lacks the rigorous quality control of traditional databases, therefore, occasionally including irrelevant or even fake publications. However, these downsides are mitigated by using metrics such as the i10-index, which focuses on papers with at least ten citations, and by Google Scholar's ongoing improvements in accuracy and publisher coverage since its inception in 2004.

4 Individual-level Gap: Existence and Magnitude

To explore the individual-level gap between men and women, we compare average values across the sexes within both disciplines. Key indicators include the i10-index, total citations, citations per paper, and citations for the most-cited paper, analyzed overall and over the period 2018 to 2023.

Table 2 shows that men outperform women across all metrics. Although the gaps narrow when focusing on the period 2018 to 2023, they remain significant. For example, the i10-index, which counts articles with at least ten citations, shows that women's publication output is about 40% lower than men's in both disciplines. Similarly, women have less than half the total citations of men but just over half when considering the study period (2018-2023). Additionally, the most-cited article by a male scholar has roughly double the citations of its female counterparts.

Table 2: Research output and impact gaps between men and women, overall, 2018-2023

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
Men	48	11,198	148	1,853	40	6,004	103	1,070
Women	27	4,498	123	979	24	2,574	81	536
Gap (absolute)	22	6,700	25	874	17	3,429	23	534
Percent female output (relative to male), overall	55%	40%	83%	53%	59%	43%	78%	50%
Percent female output (relative to male), 2018-2023	62%	53%	98%		64%	49%	85%	

To assess the statistical significance of the differences between men and women, we estimate the following regression:

$$Y_i = \alpha + \beta Female_i + X_i \gamma + \epsilon_i, \quad (3)$$

where Y_i is the dependent variable (e.g., i10-index, citations, etc.), $Female_i$ is a dummy variable for female researchers (1 if female, 0 otherwise), X_i is a vector of control variables, including rank indicators for associate professor and full professor (assistant professor is the omitted category), a dummy for distinguished professor, and country fixed effects. Robust (Huber-White) standard errors are used.

The regression results (Table 3) confirm that gender differences are statistically significant across most metrics, except for the citations per paper in economics. This pattern holds both overall and when restricted to the years 2018-2023 (see Table A1 in the Appendix).

As seen, men publish substantively more than women and receive more citations overall as well as for their most influential work. However, men have only a slight edge when it comes to the average number of citations per article (citations / i10-index). Notably, the gap in the average number of citations is not significant in the economics discipline. This observation is relevant, considering that there is an emerging literature in economics that suggests that the bar for passing peer reviews in the top journals might be higher for female than for male authors (e.g., Card et al., 2020). Furthermore, there is also evidence that female-authored papers that make it through peer review in top journals are better written because women are held to higher standards (Hengel, 2022) and that reviewers tend to evaluate female-authored papers more critically (Krawczyk and Smyk, 2016). We contextualize this finding. Despite potentially higher-quality content in top journals, the average female article in economics does not trigger a different number of citations than the

Table 3: Regression results for economics and political science

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
Female	-10***	-3,178***	-3	-387**	-11***	-2,438***	-15***	-379***
	(2.41)	(745.48)	(8.51)	(166.50)	(2.19)	(422.63)	(4.03)	(84.85)
Associate professor	13***	3,085***	25**	584***	8***	855***	15**	195***
	(2.25)	(697.21)	(11.40)	(205.25)	(2.28)	(289.53)	(5.93)	(54.48)
Professor	47***	10,452***	73***	1,558***	36***	5,843***	55***	1,050***
	(3.58)	(1,112.42)	(10.83)	(195.20)	(3.09)	(571.77)	(6.67)	(110.14)
Distinguished professor	36***	14,035***	72***	1,892***	20***	4,641***	16*	557**
	(7.06)	(2,692.69)	(12.77)	(422.10)	(5.11)	(1,499.90)	(8.08)	(247.11)
Constant	6**	-1,829**	40**	41	16***	836**	45***	122
	(2.93)	(747.69)	(18.76)	(303.58)	(3.27)	(369.72)	(6.74)	(79.13)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,718	1,718	1,694	1,718	1,482	1,482	1,455	1,482
Adj-R2	0.20	0.14	0.18	0.09	0.18	0.17	0.23	0.16

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. The rank is included as a control variable (assistant professor is the omitted category). The smaller number of observations in the number of citations per paper is due to scholars who do not have papers with more than ten citations.

average male article, suggesting male- and female-authored published articles in general are on par in terms of quality. This observation compares well with findings in an influential paper suggesting objectivity is prime for publishing economics (Abrevaya and Hamermesh, 2012).

Contrary to economics, the gap between men and women in citations per article in political science remains significant, with women receiving fewer citations than men in the overall data and within the period under review(2018-2023). In the broader literature, the persistent gap in publication and citations suggests that the potentially higher acceptance rate for articles authored by women has probably had little impact on overall research metrics (see Stockemer et al., 2020; Bettecken et al., 2022).

4.1 Robustness Checks

We verify the robustness of our results to the influence of outliers, the skewness in the dependent variables, and the potential effect of career length as measured by the authors' number of years listed on Google Scholar.

To address the outliers, we first Winsorize the dependent variables by capping the values below the 5^{th} and above the 95^{th} percentiles. We then re-estimate equation 1, using the Winsorized variables. The results, presented in Table A2, in the appendix, show that while the absolute magnitude of the gaps is slightly reduced, they remain substantial and statistically significant. Additionally, we conduct robust regression analyses, which assign smaller weights to the observations with larger residuals and the quantile regressions at the median. Both approaches confirm that the gaps between men and women in political science persist regardless of the presence of outliers. However, the results for economics are more mixed, with estimates becoming insignificant. This may reflect the "superstar effect," where a small number of highly productive and influential economists disproportionately impact the publication and citation metrics, creating greater variability and reducing the statistical significance of the broader patterns.[4]

We also account for the skewness of the outcome variables by transforming them using their natural logarithms, a method that compresses the influence of extreme values. The qualitative results remain consistent, except for the citations in economics, where the estimates become insignificant. This outcome aligns with the findings from the treatment of the outliers. See Table A3 in the appendix.

Finally, we include the number of years authors are listed on Google Scholar, as an additional control variable in our regression models, to account for potential differences in career length across researchers. While the rank indicators already serve as proxies for the career stage, the inclusion of the years on Google Scholar provides a more direct measure of career length. The results, presented in Table A4, show that the primary findings remain consistent, with the exception of the number of citations for the most-cited paper in economics, which loses statistical significance. This suggests that career length, while relevant, does not fully explain the observed gaps between men and women, reaffirming the robustness of our results.

5 Beyond Individual Gaps: Variations By Rank and Field

So far we have analyzed the average female scholar compared to the average male scholar in top universities, focusing on research output and impact. However, the distribution of women across academic ranks and fields is far from uniform.

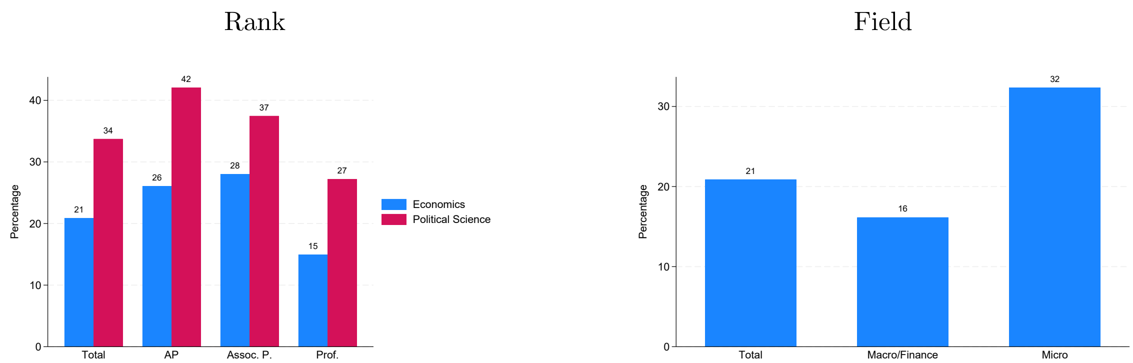
Figure 1 highlights the variation in the proportion of women by rank and field. In economics, women account for 26% of assistant professors, 28% of associate professors, and only 15% of full professors. In political science, these proportions are notably higher but still show a decline among

[4]Results are available upon request.

those in senior levels, with women comprising 42% of assistant professors, 37% of associate professors, and 27% of full professors.

Field-specific variation is particularly relevant in economics. Women are more prevalent in microeconomic subfields, such as labor economics and demographics, where their representation (32%) is double that in macroeconomics and finance (16%).[5]

Figure 1: Proportion of women by rank and field



Note: Percentages correspond to data on full-time permanent scholars with Google Scholar profiles. *AP:* assistant professor; *Assoc. P.:* associate professor; *Prof.:* full professor. The field is only available for economics.

This section delves deeper into how research output and impact gaps between men and women differ across these dimensions, shedding light on the uneven landscape faced by female academics.

5.1 Gaps By Rank

Table 4 details research output and impact indicators disaggregated by sex and rank, highlighting the gaps between men and women. The analysis indicates that the output and impact gap between men and women is most pronounced among full professors, while gaps persist, but are smaller at more-junior ranks. Male full professors make up 44% of faculty members at the top institutions in economics departments and 34% in political science departments, and it is at this rank where the largest disparities between men and women are observed.

[5] Data is classified according to the Journal of Economic Literature (JEL) codes, representing the researchers' main fields of interest. Microeconomic fields include health, education and welfare (I); labor, and demographic economics (J); industrial organization (L); business administration and business economics, marketing, accounting, and personal economics (M); agricultural and natural resource economics, and environmental and ecological economics (Q); urban, rural, regional, real estate, and transportation economics (R); and other special topics (Z). Further details on the classification by field are provided in Section 5.2. The representation of women in our data is in line with the results in Chari and Goldsmith-Pinkham (2017).

The largest gap is in total citations at the full professor level, where men's articles receive nearly twice as many citations as women's. This gap is driven by a combination of factors: women publish around one third fewer articles than men and they also receive fewer citations per article. Specifically, women receive 5% fewer citations per article in economics and nearly 20% fewer in political science. Furthermore, the most-cited articles show a notable citation disparity between men and women, with women receiving nearly 40% fewer citations in both disciplines.

Encouragingly, some research output and impact gaps between men and women have narrowed over the study period. However, this progress is uneven across disciplines and ranks, with more-substantial improvements observed in specific metrics rather than in a uniform trend across ranks.

One slight difference between the two disciplines in terms of averages relates to the assistant professor level, where the research output and impact gaps between men and women have apparently closed in political science. There are even some indicators, such as overall citations and the number of citations for the most-cited article, where women have a slight edge, based on averages. In economics, however, the gaps persist at the assistant professor level for most indicators. Women publish 20% fewer articles than men, receive half the total number of citations, and garner 30% fewer citations in their most-cited article. The only indicator showing parity between men and women in economics is in citations per article and this parity holds consistently across all ranks.

The statistical significance of the differences between men and women by rank is evaluated by analyzing the differences in the coefficient estimates for the sexes across academic ranks. The regression model is a variant of the previously specified model, with the addition of interaction terms between sex and rank:

$$Y_i = \tilde{\alpha} + \tilde{\eta} Female_i + \sum_k \tilde{\pi}^k Rank_i^k + \sum_j \tilde{\beta}^j (Female_i \times Rank_i^k) + X_i \tilde{\gamma} + \tilde{\epsilon}_i, \quad (4)$$

where $Rank_i^k$ indicates the academic rank ($k \in$ {associate professor, full professor}, with the rank of assistant professor serving as the reference category). The interaction terms $Female_i \times Rank_i^k$ yield six estimates for $\tilde{\beta}^j$, allowing us to evaluate the gap between men and women within each rank. As with the previous model, robust (Huber-White) standard errors are used to account for heteroskedasticity.

A visual inspection of Figures 2 to 5 provides evidence of the statistical significance of the research output and impact gaps between men and women across academic ranks. These figures

Table 4: Research output and impact gaps between men and women, overall, by rank 2018-2023

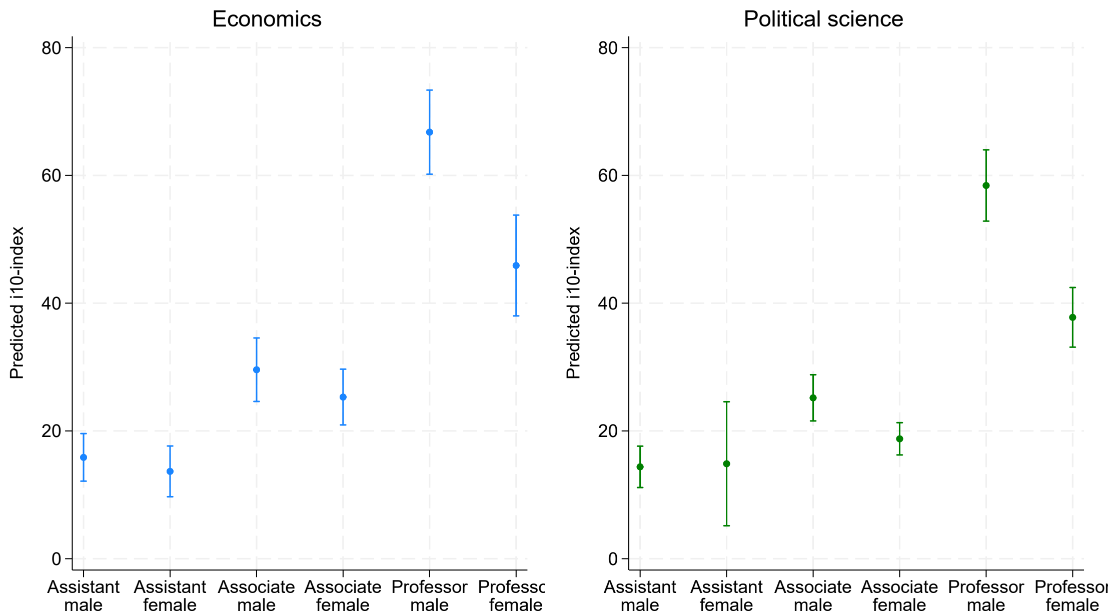
	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
Assistant professor								
Men	10	1,192	86	375	12	833	60	177
Women	8	606	89	266	12	933	58	209
Percent female output (relative to male), overall	80%	51%	103%	71%	100%	112%	96%	118%
Percent female output (relative to male) 2018-2023	79%	59%	102%		90%	76%	90%	
Associate professor								
Men	22	3,316	100	825	22	1,913	75	434
Women	17	1,870	88	672	16	1,157	66	261
Percent female output (relative to male), overall	77%	56%	88%	81%	72%	60%	88%	60%
Percent female output (relative to male) 2018-2023	81%	67%	99%		79%	75%	92%	
Full professor								
Men	74	18,326	191	2,843	62	10,288	135	1,772
Women	51	9,908	181	1,792	40	5,082	110	1,029
Percent female output (relative to male), overall	68%	54%	95%	63%	65%	49%	81%	58%
Percent female output (relative to male) 2018-2023	76%	70%	108%		69%	54%	86%	

present the predicted values for the research output and the impact indicators by rank and sex, based on regression analyses that include interactions between rank and sex. The results show that, at the full professor level, the gap in publications and citations between men and women is statistically significant for nearly all indicators, except for the average number of citations per paper in economics.

When the analysis is restricted to the period 2018-2023, as shown in Figures A1 to A3 in the appendix, the gaps are generally smaller but in many cases remain statistically significant at the full professor level. Notably, some of the gaps at the full professor level seem to be closing, such as in the number of citations per article for political science and in the total number of citations for economics. However, the confidence intervals for the estimates are quite large, suggesting considerable variability.

The differentiation of the gaps between men and women by rank is crucial not only for identifying persistent disparities in the publication output and impact but also for accurately quantifying these gaps. Faculty composition influences sex comparisons as the representation of women varies substantially across ranks (see Figure 1). The higher representation of women in more-junior ranks is likely a result, at least in part, of recent efforts to increase female participation in academia. On

Figure 2: Predicted outcomes by rank and sex, i10-index (number of articles with at least ten citations)



Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

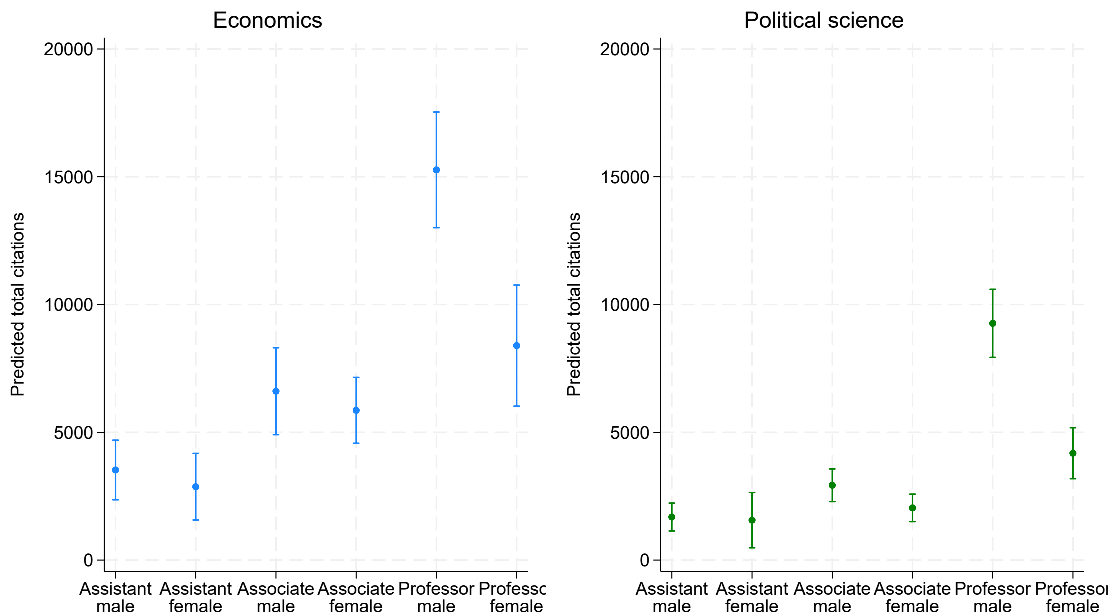
aggregate, women publish 41% fewer articles in political science and 45% fewer in economics (see Table 2). However, the gaps narrow to 35% and 32%, respectively, among full professors, where they remain significant, and they decline substantially at more-junior ranks (see Table 4). This pattern holds true for all other indicators of the research output and the impact.

5.2 Does the Field Matter?

The analysis by groups of fields is restricted to economics due to the well-documented variation in female representation across subfields, which is less clear-cut in political science. In economics, women are more likely to specialize in microeconomic fields such as health, education, and labor economics, which tend to have a higher female representation compared to macroeconomics and finance, where female participation is notably lower.

To classify the data by each researcher's main field of interest, we used the large language model

Figure 3: Predicted outcomes by rank and sex, total citations

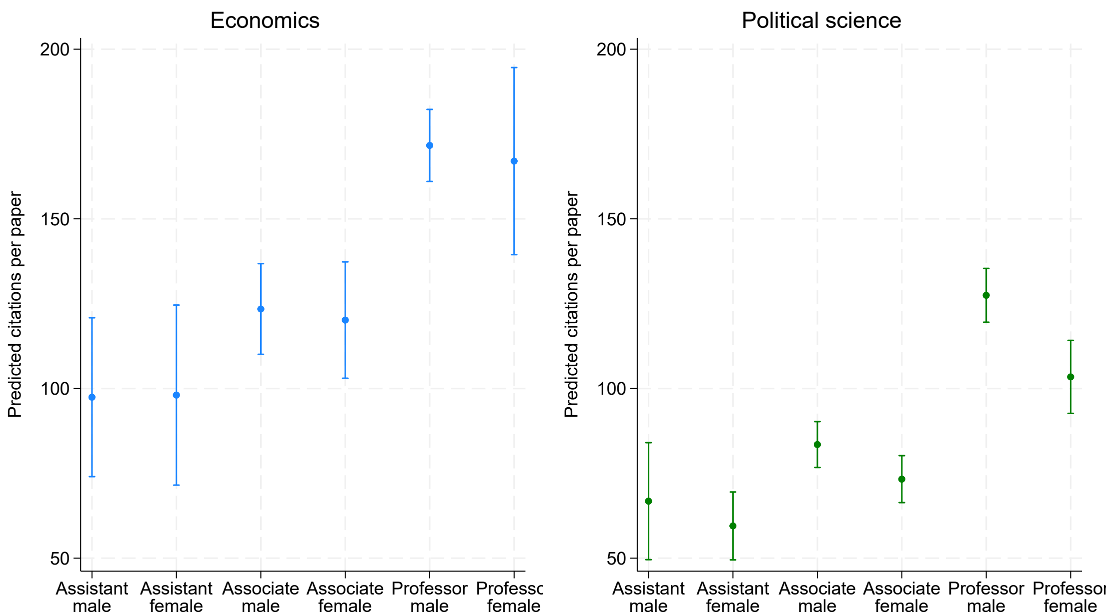


Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

(LLM) developed by OpenAI. We provided the model with cleaned text data from the titles of the 100 most-cited papers for each author and requested each author's main fields according to the JEL classification. The fields were then grouped into *micro* (or *female-oriented*) and *macro/finance* (or *non-female-oriented*), with the former defined as fields exhibiting higher-than-average female representation. These fields include health, education and welfare (I); labor and demographic economics (J); industrial organization (L); business administration, and business economics, marketing, accounting, and personal economics (M); agricultural and natural resource economics, and environmental and ecological economics (Q); urban, rural, regional, real estate, and transportation economics (R); and other special topics (Z).

Table 5 illustrates that, despite higher female representation in microeconomic subfields compared to macro/finance subfields, greater parity in the research output and the impact is not immediately apparent in micro fields. For instance, women produce almost half the number of papers men do (as measured by the i10-index) and garner only slightly above one third of the total number

Figure 4: Predicted outcomes by rank and sex, citations per paper



Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

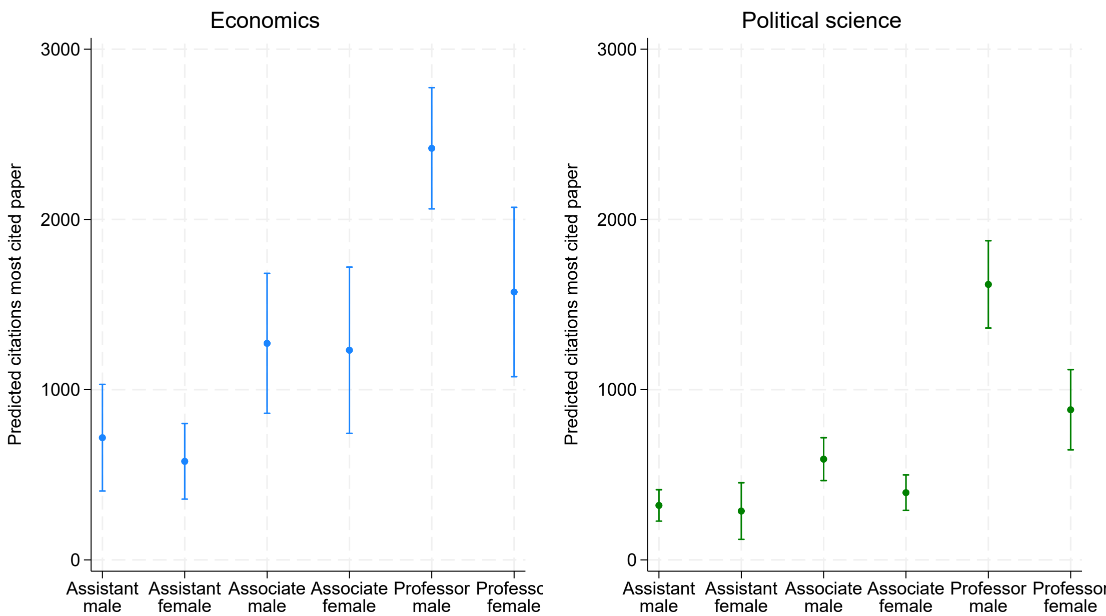
of citations men receive in both types of fields. Furthermore, women receive 60% fewer citations for their most-cited paper in micro fields, compared to 36% fewer in macro/finance fields. Although women have a small edge in citations per paper in micro fields—achieving 14% fewer citations per paper than men, compared to 20% fewer in macro/finance fields—this advantage disappeared over the study period (2018-2023). This null result contrasts with findings in certain female-oriented fields, such as demographics (see e.g., Grossbard et al., 2021).

To assess the statistical significance of differences between men and women by subfields, we used a regression model similar to the one specified for ranks but one that focused on the interaction with the academic field. The model is expressed as

$$Y_i = \check{\alpha} + \check{\theta} Female_i + \check{\lambda} Field_i + \sum_l \check{\beta}^l (Female_i \times Field_i) + X_i \check{\gamma} + \check{\epsilon}_i, \tag{5}$$

In this specification, $Field_i$ is a binary variable that equals one for micro fields—where women

Figure 5: Predicted outcomes by rank and sex, citations of most-cited paper



Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

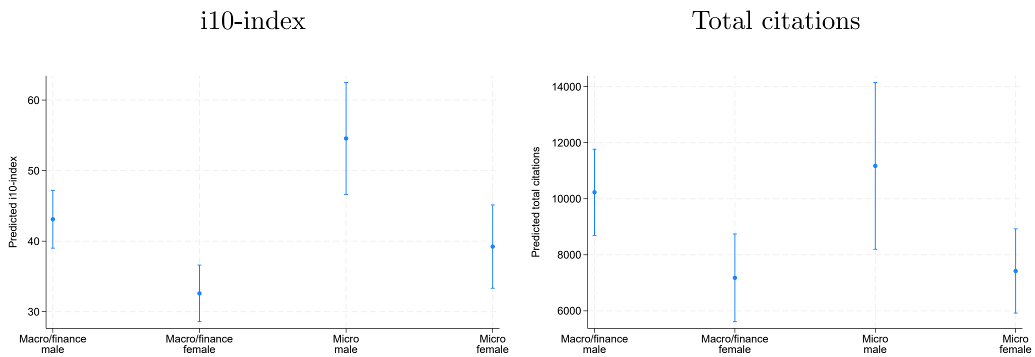
Table 5: Research output and impact gaps between men and women overall and from 2018 to 2023, by field in economics

	i10-index	Citations	Citations per paper	Citations most-cited paper
Micro subfields				
Men	55	11,406	148	1,835
Women	30	4,246	128	732
Percent female output (relative to male), overall	54%	37%	86%	40%
Percent female output (relative to male), 2018-2023	59%	48%	95%	
Macro/finance subfields				
Men	46	11,139	148	1,861
Women	24	4,707	118	1,184
Percent female output (relative to male), overall	53%	42%	80%	64%
Percent female output (relative to male), 2018-2023	59%	54%	95%	

are over-represented—and zero for macro/finance fields, which are male-dominated. The interaction terms $Female_i \times Field_i$ yield four estimates for $\check{\beta}^l$, enabling us to evaluate the sex gaps within each subfield. Robust (Huber-White) standard errors are employed to account for heteroskedasticity.

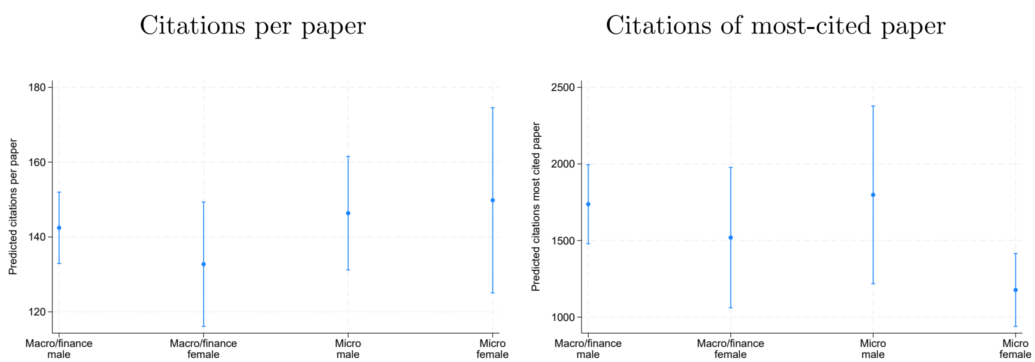
Figures 6 and 7 (and Figures A4 and A5 in the appendix) confirm these results regarding statistical significance. Furthermore, splitting the data by field increases the standard errors of the estimates, leading to many gender gaps that are not statistically significant.

Figure 6: Predicted outcomes by field and sex, i10-index (left), and total citations (right)



Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

Figure 7: Predicted outcomes by field and sex, citations per paper (left), and citations per most-cited paper (right)



Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

The findings suggest that simply having a larger presence of women in a field does not guarantee a more supportive or equitable environment for female researchers. As opposed to the results by rank, the gaps between men and women by field are close to each other and to the average gaps. It may be that professional connections and networks, which are often facilitated by institutional proximity or shared work environments, play a more critical role. In micro fields, where researchers may be distributed across different institutions, opportunities for collaboration and mentorship could be less accessible. Homophily–the tendency to form connections with peers in similar situations–may also be a key factor. Women in fields with higher female representation might still face challenges if their peers are not in comparable career stages or institutional settings.

5.3 Robustness Checks

We conducted robustness checks for the split analyses by rank and field, addressing the influence of outliers, the skewness in the dependent variables, and the career length. See Figures A6 to A23 in the appendix. These checks confirm that gaps between men and women persist primarily at the full professor level in both disciplines, while no significant gaps are observed at other ranks or across subfields in economics.

In economics, the gap at the full professor level becomes slightly smaller but remains significant especially in the number of papers and total citations after the Winsorization and log transformation, suggesting a potential "superstar effect," particularly in the number of citations of the most-cited paper. Including the number of years listed on Google Scholar as a control variable does not alter the primary findings, reaffirming the persistence of gaps between men and women at the full professor rank and the absence of notable differences by subfields in economics.

6 Female Representation and the Gap Between Men and Women: Do We Need a Critical Mass?

After establishing the existence and persistence of gaps between men and women, we analyze the relationship between female representation and these gaps, leveraging the varying levels of representation across disciplines and departments within disciplines. This analysis is crucial to understanding whether increasing female representation is an effective strategy for reducing disparities across the sexes or if additional factors mediate this relationship. By connecting our findings to the substantive representation literature and the concept of critical mass, we aim to shed light on whether achieving a certain threshold of female representation can meaningfully influence equity between men and women in academia.

We begin by visually inspecting the relationship between female representation and gaps across the sexes in publication and citation metrics. Female representation is defined as the proportion of female scholars in each department within our dataset. Gaps between men and women at the departmental level are calculated as the average of each indicator for female scholars in the department, expressed as a percentage of the average for male scholars. This measure captures the inverse of the gap between the sexes: a figure of 50 indicates that women publish or receive citations at half the rate of men, while a figure of 100 signifies parity between the sexes.[6]

Figures 8 to 11 display the proportion of women by department on the horizontal axis and the inverse gap across the sexes for publication and citation indicators on the vertical axis. The blue dots represent economics departments and the green diamonds represent political science departments. Next to the legend, we include the coefficients for the slope of the linear fit.

First, we find that the proportion of women per department is positively related to women's publication and citation performance relative to men's.

Second, the relationship between female representation and the reduction of the gap between men and women is stronger in political science than in economics. Political science, a field with higher female representation (34% in our sample compared to 21% in economics), exhibits steeper slopes across all four dependent variables, indicating a more substantial impact of representation on reducing publication gaps between men and women.

We further test these relationships by estimating the following regression model:

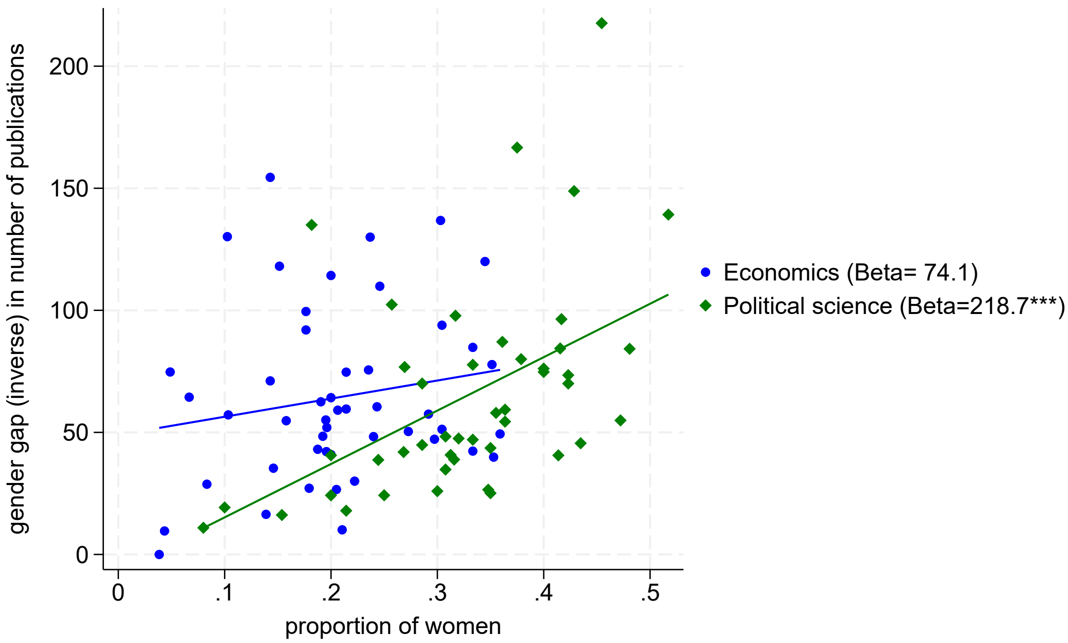
$$InvGap_d = \theta + \beta FemaleProp_d + X_d \kappa + \xi_d, \tag{6}$$

where $InvGap_d$ is the inverse publication and citation gap between men and women, $FemaleProp_d$ is the proportion of female scholars in our data in each department, X_d is a set of controls, including country fixed effects and the proportion of assistant and distinguished professors in our data in each department, to account for differences in rank composition. The results are presented in Table 6. While the coefficient estimates measuring the relationship of female representation on relative female outcomes are positive, in general, and statistically significant for publications and citations of the most-cited paper in political science, they are not significant and negative for economics.

Overall, this implies that although higher proportions of women in a department trigger better publication outcomes and citations performance relative to men, this does so more effectively at higher levels of female representation. It is necessary to reach a critical mass before female

[6]Given the small size of some departments, we conducted thorough verifications of the data for this analysis. In particular, we corrected information for two researchers whose Google Scholar profiles contained inaccuracies.

Figure 8: Relationship between the proportion of women in a department and women's average number of publications (i10-index) relative to men's



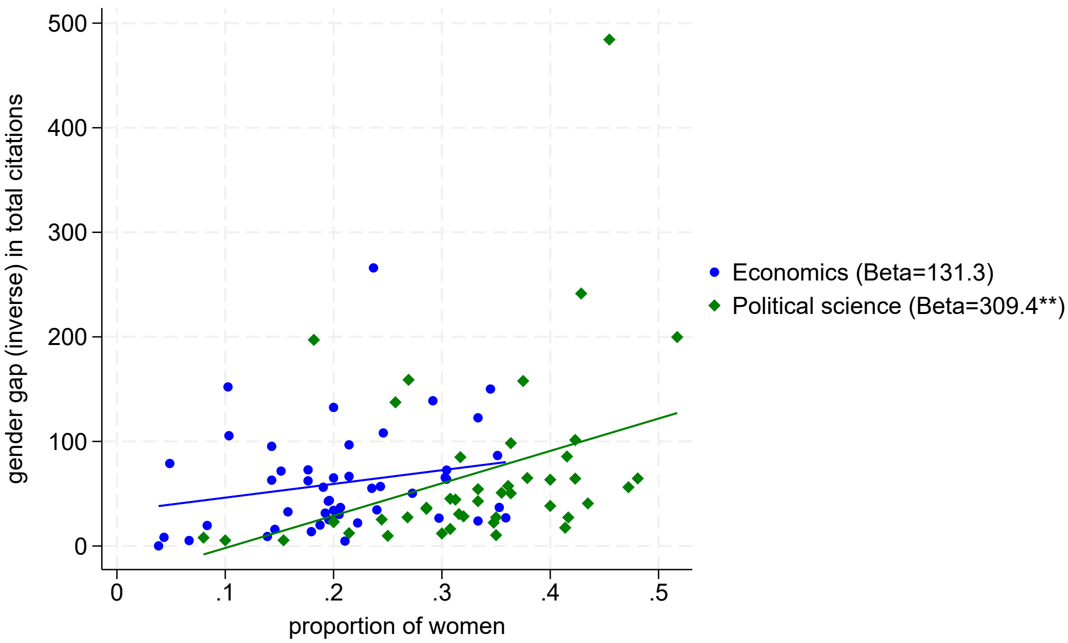
Note: The x-axis shows the proportion of women in each department and the y-axis represents the inverse publication gap between men and women (ratio of female-to-male averages). The blue dots and green diamonds denote economics and political science departments, respectively, with linear fit lines and slope coefficients in matching colors (the stars indicate standard confidence levels). Two economics and five political science departments lack data about the gap between men and women due to missing Google Scholar profiles for women.

representation becomes effective.

7 Discussion

Our findings indicate that neither economics nor political science has yet achieved parity between women and men in the research output and impact. Women in both disciplines continue to face substantial aggregate and individual-level gaps with men. On aggregate, women are underrepresented in faculty positions at top institutions, comprising only 21% of economics faculties and 34% of political science faculties. This underrepresentation contributes to male dominance in the production and dissemination of knowledge. However, our analysis highlights that the gap between

Figure 9: Relationship between departmental proportion of women and women's average total citations relative to men's

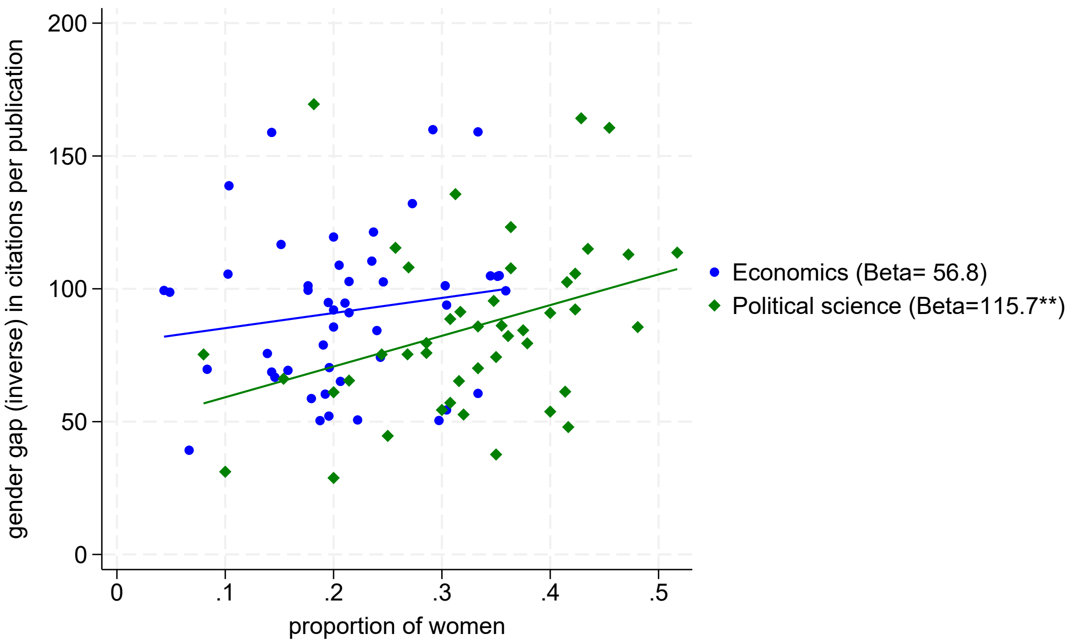


Note: The x-axis shows the proportion of women in each department and the y-axis represents the inverse citation gap between men and women (ratio of female-to-male averages). The blue dots and green diamonds denote economics and political science departments, respectively, with linear fit lines and slope coefficients in matching colors (the stars indicate standard confidence levels). Two economics and five political science departments lack data about the gap between men and women due to missing Google Scholar profiles for women.

men and women goes beyond mere numbers: on average, individual female scholars publish 40% fewer papers than their male counterparts and receive about half as many citations.

While the persistence of these gaps is striking, our study provides a nuanced view of the dynamics at play. Importantly, the gap betwen men and women decreases at the junior ranks, with assistant professors showing much smaller differences in publication and citation performance. This suggests progress over recent cohorts, as data from the study period (2018-2023) reveal that individual research output and impact gaps between men and women are shrinking. Nonetheless, these improvements will take years, if not decades, to translate into parity at the aggregate level, given the slower turnover at senior ranks.

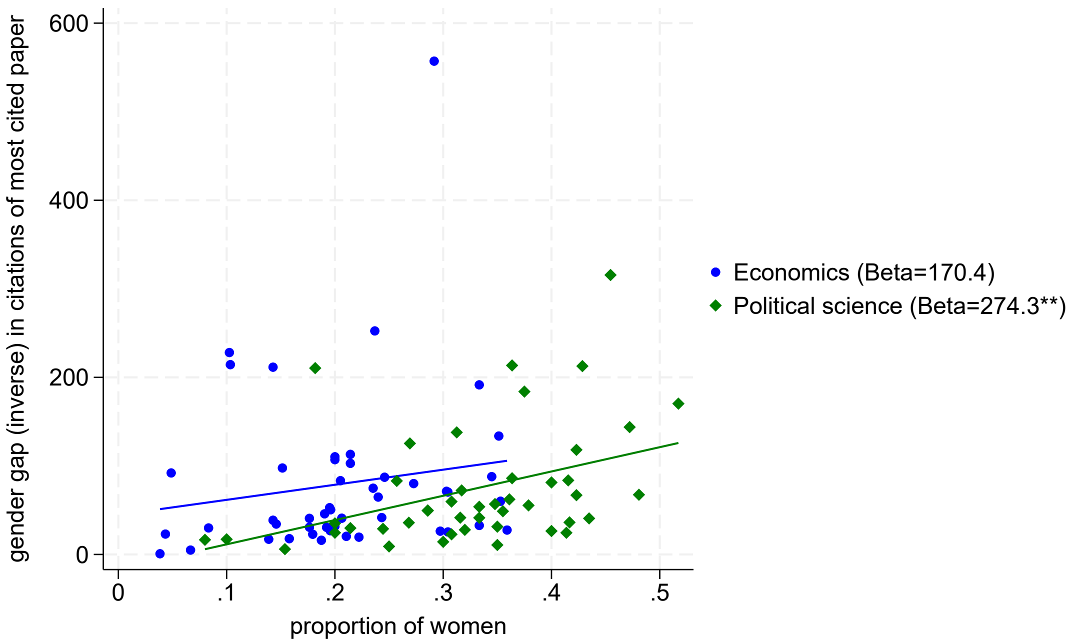
Figure 10: Relationship between departmental proportion of women and women's average citations per publication relative to men's



Note: The x-axis shows the proportion of women in each department and the y-axis represents the inverse citation-per-publication gap between men and women (the ratio of female-to-male averages). The blue dots and green diamonds denote economics and political science departments, respectively, with linear fit lines and slope coefficients in matching colors (the stars indicate standard confidence levels). Two economics and five political science departments lack gender gap data due to missing Google Scholar profiles for women.

We also find that the gap between men and women does not differ significantly by field in economics, indicating that the challenges women face are structural and pervasive rather than field-specific. The fact that gaps between men and women are most pronounced at the full professor level may partly reflect selection effects. Women who encounter greater challenges early in their careers might be less likely to persist and advance to senior ranks. However, this does not diminish the importance of addressing disparities from the outset. Targeted support for women at the beginning of their academic journeys is essential to ensuring equitable opportunities throughout their careers. Such support could also help mitigate potential selection effects by retaining more women in the pipeline to senior ranks, ultimately narrowing gaps at the highest levels.

Figure 11: Relationship between departmental proportion of women and women's citations for the most-cited publication relative to men's



Note: The x-axis shows the proportion of women in each department and the y-axis represents the inverse gender gap in the number of citations of the most-cited paper (ratio of female-to-male averages). The blue dots and green diamonds denote economics and political science departments, respectively, with linear fit lines and slope coefficients in matching colors (stars indicate standard confidence levels). Two economics and five political science departments lack data about the gap between men and women due to missing Google Scholar profiles for women.

A critical factor in narrowing disparities across the sexes is female representation at the department level. Departments with a higher proportion of women, particularly in political science, exhibit smaller gaps between men and women, with some departments that are near parity even showing equivalent performance between the sexes. This aligns with the concept of critical mass, suggesting that increasing female representation beyond token levels triggers processes of inclusion, empowerment, and improved performance. These virtuous cycles may include greater representation of women in influential roles, such as editorial boards and professional organizations, further reinforcing progress.

However, these processes appear to operate more effectively in political science than in eco-

Table 6: Regression results for inverse gaps between men and women on the proportion of female scholars and controls, for economics and political science departments

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Most-cited paper	i10-index	Citations	Citations per paper	Most-cited paper
Proportion of female scholars	-76	-92	-34	-192	218*	309	96	331**
	(127.26)	(143.37)	(78.29)	(228.12)	(109.27)	(216.51)	(67.13)	(146.70)
Constant	112**	132***	114***	220	4	-7	81**	-1
	(42.64)	(48.09)	(31.98)	(137.22)	(47.97)	(91.96)	(30.40)	(65.15)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	48	48	47	48	45	45	45	45
Adj-R2	-0.03	-0.01	0.10	-0.06	0.13	-0.00	0.32	0.10

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
Control variables include country fixed effects and the proportion of assistant professors and of distinguished professors.

nomics, where the lower percentage of female scholars limits their impact. Achieving balanced representation is thus essential not only for equity but also for fostering an environment where women can perform on par with men.

Our results underscore the importance of policies aimed at increasing female representation in academia. Hiring more women is critical to creating sex-balanced departments and reducing both aggregate and individual gaps between men and women. Moreover, supporting junior female faculty through mentorship, research funding, and family-friendly policies can help sustain the observed improvements in younger cohorts. Until such efforts are widely implemented, academic productivity gaps between men and women and their impact are likely to persist, particularly in disciplines like economics, where women remain underrepresented.

By addressing these barriers and promoting balance between men and women, academia can create a more inclusive environment that not only benefits women but also enhances the quality and diversity of scholarly contributions across disciplines.

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Appendix

A Universities in the Sample

Australian National University, California Institute of Technology, Carnegie Mellon University, City University of Hong Kong, Columbia University, Cornell University, Duke University, ETH Zurich, Fudan University, Harvard University, Johns Hopkins University, King's College London, Kyoto University, Massachusetts Institute of Technology, McGill University, Nanyang Technological University, National University of Singapore, New York University, Northwestern University, Peking University, Princeton University, Seoul National University, Seoul University, Shanghai Jiao Tong University, Stanford University, Technical University of Munich, the Chinese University of Hong Kong, the Hong Kong University of Science and Technology, the London School of Economics, the University of Edinburgh, the University of Hong Kong, the University of Manchester, the University of Melbourne, the University of New South Wales, the University of Queensland, the University of Sidney, the University of Tokyo, Tsinghua University, University of California Los Angelos, University of California San Diego, University of Cambridge, University of Chicago, University of Michigan Ann Arbor, University of Oxford, University of Pennsylvania, University of Toronto, Yale University, Zhejiang University

B Additional Tables

C Additional Figures

Table A1: Regression results for economics and political science, 2018-2023

	Economics			*Political science*		
	i10-index	Citations	Citations per paper	i10-index	Citations	Citations per paper
Female	-5***	-766***	4	-6***	-850***	-8**
	(1.65)	(266.50)	(6.14)	(1.46)	(164.19)	(2.95)
Associate professor	9***	977***	-0	6***	470***	4
	(1.75)	(240.24)	(8.33)	(1.59)	(106.89)	(5.40)
Professor	30***	3,516***	15*	22***	2,112***	14**
	(2.20)	(362.40)	(7.84)	(2.11)	(251.80)	(5.62)
Distinguished professor	23***	4,041***	23***	12***	1,506***	5
	(4.13)	(816.21)	(5.92)	(3.54)	(574.65)	(4.59)
Constant	4*	-443	53***	10***	374**	44***
	(2.05)	(279.40)	(14.27)	(1.74)	(145.90)	(5.35)
Constant	4*	-443	53***	10***	374**	44***
	(2.05)	(279.40)	(14.27)	(1.74)	(145.90)	(5.35)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,718	1,718	1,686	1,482	1,482	1,450
Adj-R2	0.22	0.16	0.07	0.16	0.13	0.08

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Rank included as control variables (assistant professor is the omitted category). The smaller number of observations in the number of citations per paper is due to scholars who do not have any papers with more than ten citations.

Table A2: Regression results for economics and political science, Winsorized outcomes

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
	-5***	-1,163***	-0	-110*	-9***	-1,793***	-13***	-292***
	(1.62)	(382.92)	(4.79)	(66.45)	(1.31)	(268.08)	(3.19)	(48.02)
Associate professor	11***	1,979***	29***	364***	9***	922***	19***	184***
	(1.45)	(333.14)	(5.23)	(59.78)	(1.33)	(217.92)	(3.35)	(40.51)
Professor	39***	7,519***	73***	1,090***	34***	5,263***	56***	881***
	(1.83)	(459.24)	(5.70)	(72.18)	(1.85)	(353.89)	(4.12)	(62.12)
Distinguished professor	23***	6,994***	51***	927***	14***	3,052***	14**	405***
	(2.98)	(789.23)	(6.97)	(121.54)	(3.17)	(754.03)	(6.80)	(126.09)
Constant	7***	-689	27***	-57	14***	826**	43***	156**
	(2.14)	(508.88)	(6.18)	(85.71)	(2.25)	(345.59)	(4.93)	(69.68)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,718	1,718	1,694	1,718	1,482	1,482	1,455	1,482
Adj-R2	0.38	0.39	0.36	0.32	0.31	0.29	0.33	0.28

Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Rank included as control variables (assistant professor is the omitted category). Winsorized outcomes: outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles. The smaller number of observations in the number of citations per paper is due to scholars who do not have papers with more than ten citations.

Table A3: Regression results for economics and political science, outcomes in natural logarithms

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
Female	-0.13**	-0.10	0.01	-0.03	-0.28***	-0.41***	-0.11***	-0.32***
	(0.054)	(0.082)	(0.041)	(0.078)	(0.045)	(0.067)	(0.030)	(0.061)
Associate professor	0.89***	1.40***	0.35***	0.99***	0.82***	1.32***	0.30***	1.01***
	(0.067)	(0.108)	(0.053)	(0.098)	(0.066)	(0.093)	(0.040)	(0.084)
Professor	1.88***	2.81***	0.75***	2.02***	1.65***	2.49***	0.67***	1.95***
	(0.066)	(0.106)	(0.052)	(0.096)	(0.069)	(0.099)	(0.042)	(0.087)
Distinguished professor	0.50***	0.86***	0.37***	0.73***	0.34***	0.47***	0.12**	0.38***
	(0.066)	(0.095)	(0.047)	(0.089)	(0.071)	(0.102)	(0.048)	(0.095)
Constant	1.50***	4.88***	3.59***	3.96***	1.98***	5.51***	3.69***	4.23***
	(0.085)	(0.133)	(0.066)	(0.127)	(0.088)	(0.127)	(0.057)	(0.123)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,694	1,718	1,694	1,718	1,455	1,482	1,455	1,482
Adj-R2	0.51	0.54	0.39	0.45	0.43	0.49	0.39	0.45

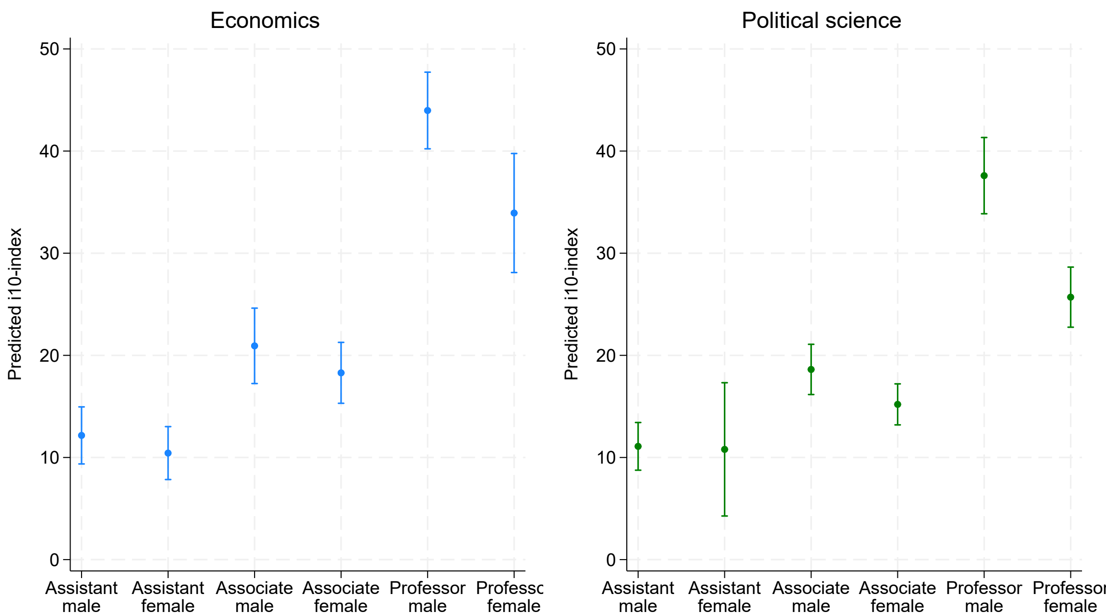
Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Rank included as control variables (assistant professor is the omitted category). The smaller number of observations in the i10-index and the number of citations per paper is due to scholars who do not have papers with more than ten citations.

Table A4: Regression results for economics and political science, controlling for years listed on Google Scholar

	Economics				*Political science*			
	i10-index	Citations	Citations per paper	Citations most-cited paper	i10-index	Citations	Citations per paper	Citations most-cited paper
Female	-5**	-1,474**	4	-102	-7***	-1,894***	-13***	-294***
	(1.98)	(640.06)	(8.22)	(155.06)	(2.26)	(411.63)	(4.01)	(81.03)
Associate professor	-13***	-4,593***	-6	-701***	-7**	-1,220***	6	-120*
	(2.98)	(1,049.84)	(12.76)	(226.77)	(3.54)	(410.44)	(5.88)	(68.06)
Professor	-0	-3,229**	18	-731**	4	1,268*	34***	348***
	(3.64)	(1,573.11)	(15.43)	(338.43)	(5.72)	(752.46)	(6.89)	(124.04)
Distinguished professor	23***	10,113***	56***	1,236***	14***	3,726**	11	422*
	(6.83)	(2,546.75)	(12.34)	(394.83)	(4.82)	(1,471.99)	(8.10)	(248.90)
Years listed on Google Scholar	4***	1,094***	5***	183***	3***	411***	2***	62***
	(0.37)	(146.88)	(0.73)	(25.54)	(0.37)	(50.17)	(0.32)	(9.09)
Constant	-30***	-12,400***	-5	-1,725***	-14***	-3,473***	24***	-533***
	(4.85)	(1,786.06)	(17.19)	(379.26)	(4.25)	(613.36)	(7.53)	(115.58)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,714	1,714	1,694	1,714	1,468	1,468	1,442	1,468
Adj-R2	0.32	0.22	0.21	0.16	0.31	0.22	0.24	0.19

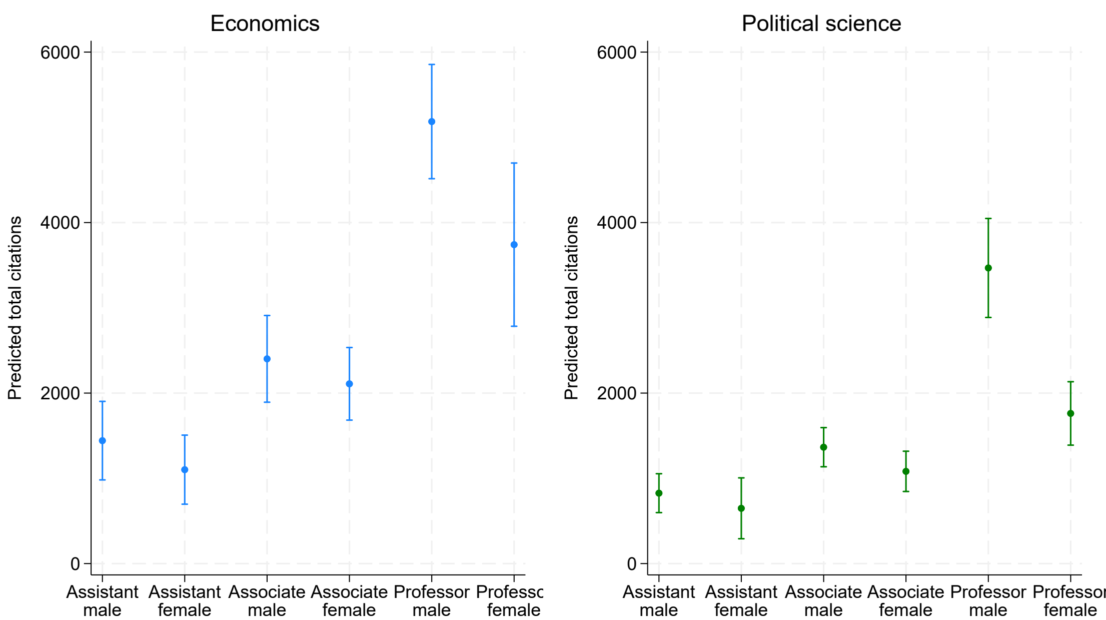
Note: Robust standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Rank included as control variables (assistant professor is the omitted category). The smaller number of observations in some variables is due to scholars who do not have papers with more than ten citations or do not have the number of years listed on Google Scholar.

Figure A1: Predicted outcomes by rank and sex, 2018-2023, i10-index (number of articles with at least ten citations)



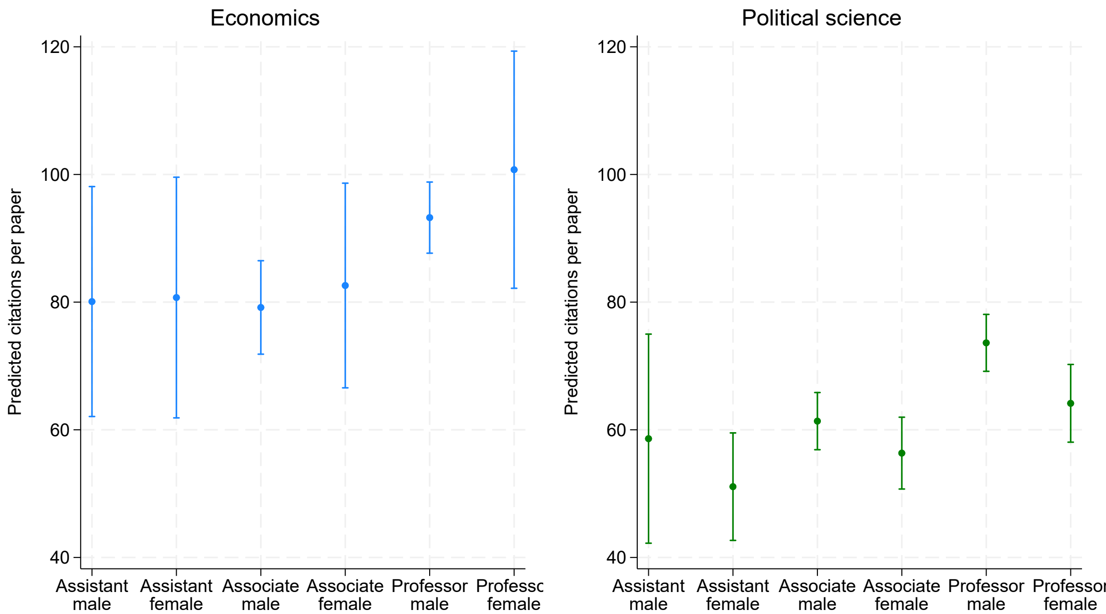
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A2: Predicted outcomes by rank and sex, 2018-2023, total citations



Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A3: Predicted outcomes by rank and sex, 2018-2023, and citations per paper

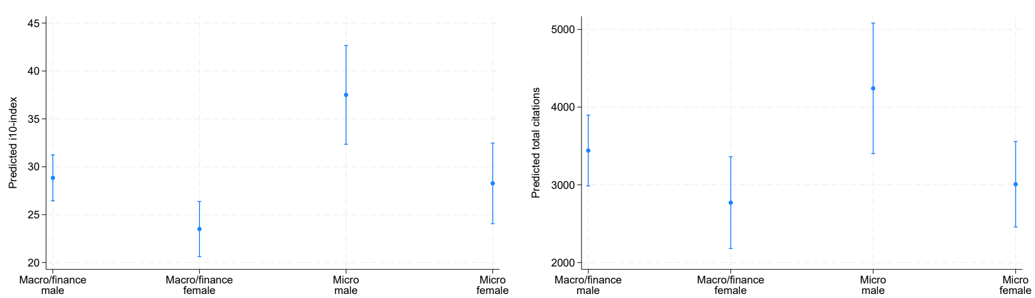


Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A4: Predicted outcomes by field and sex, 2018-2023, i10-index (left), and total citations (right)

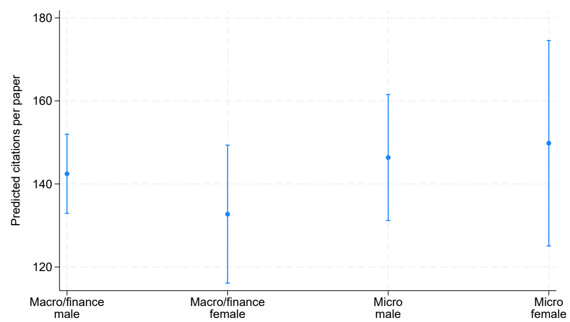
i10-index

Total citations



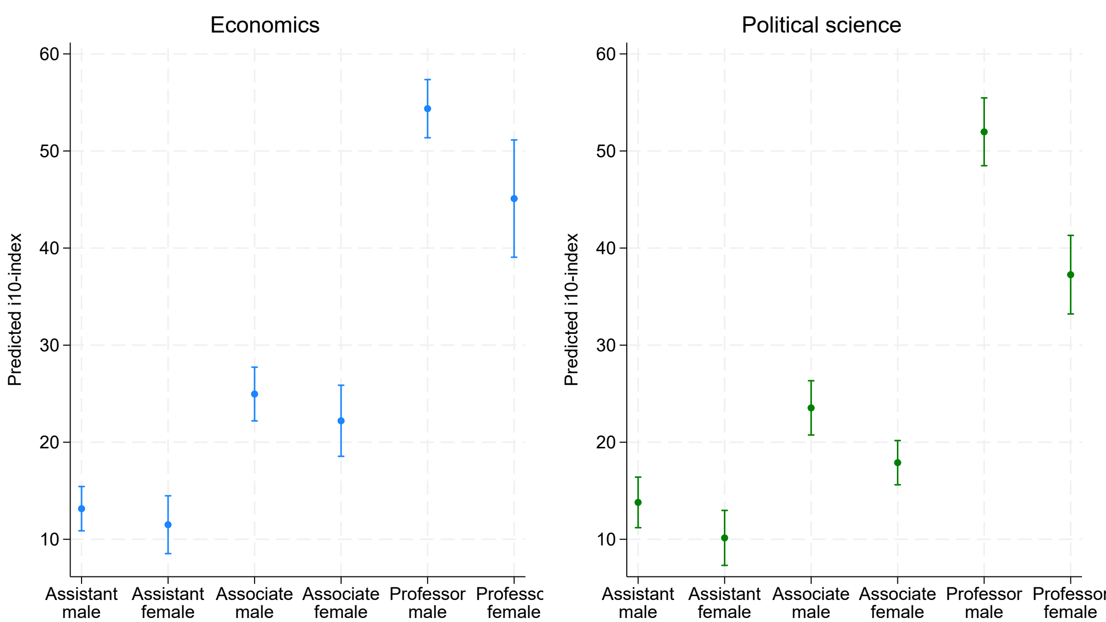
Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

Figure A5: Predicted outcomes by field and sex, 2018-2023, and citations per paper



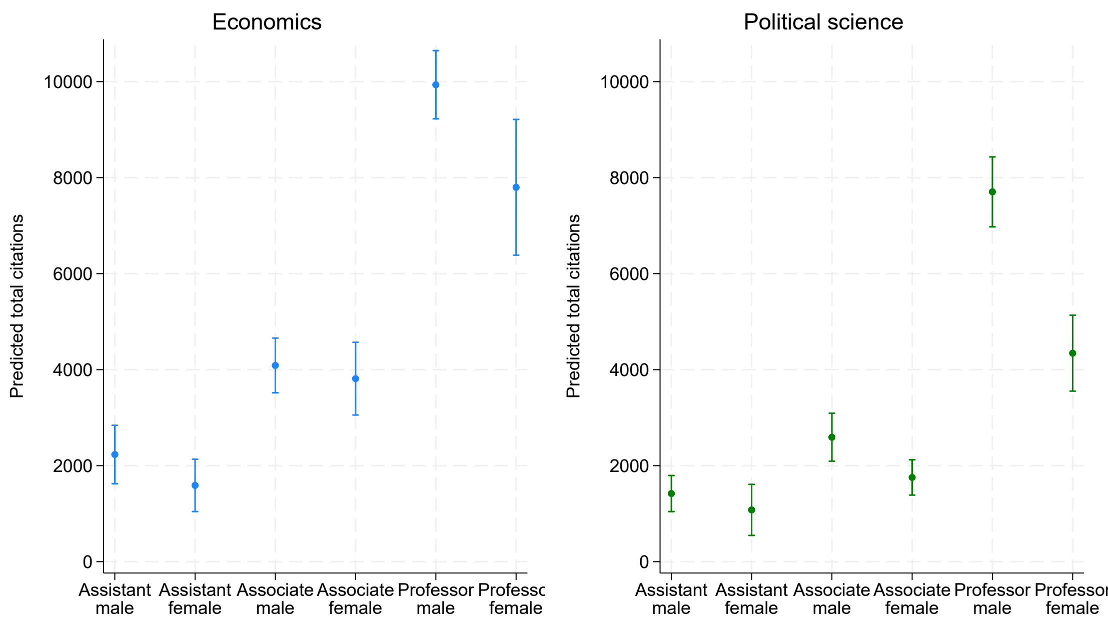
Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

Figure A6: Predicted Winsorized outcomes by rank and sex, and i10-index (number of articles with at least ten citations)



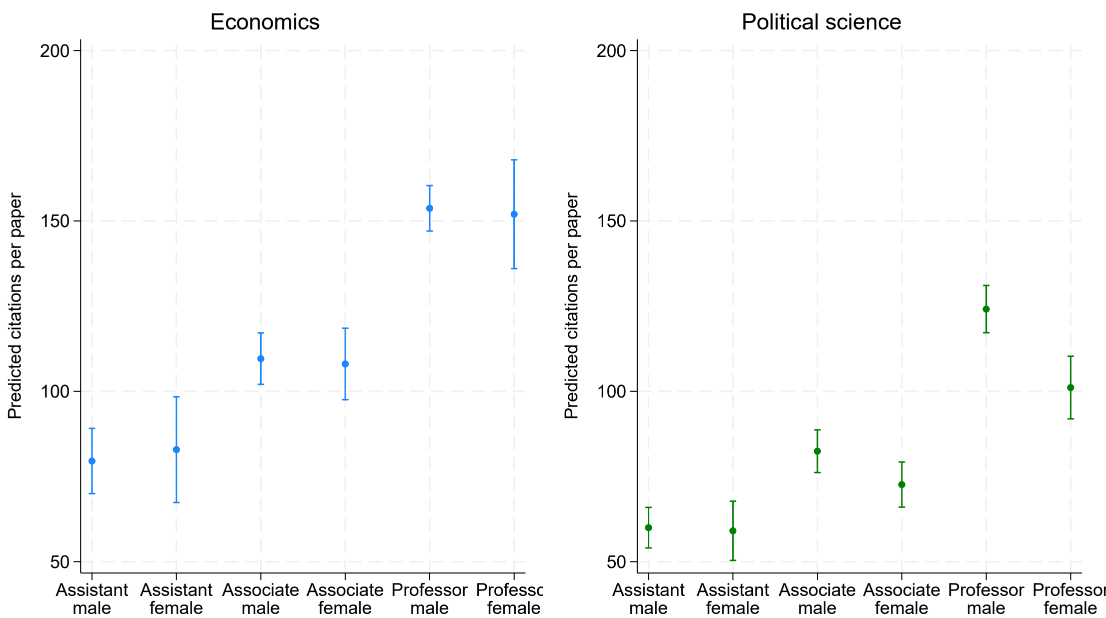
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals. Winsorized outcomes: outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A7: Predicted Winsorized outcomes by rank and sex, total citations



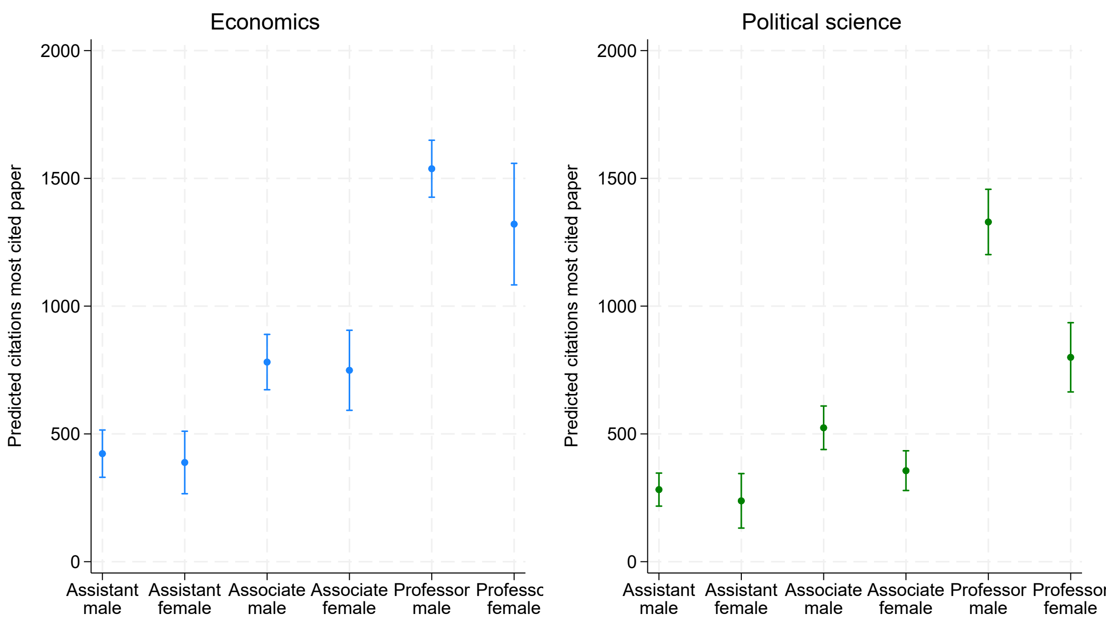
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals. Winsorized outcomes: the outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A8: Predicted Winsorized outcomes by rank and sex, citations per paper



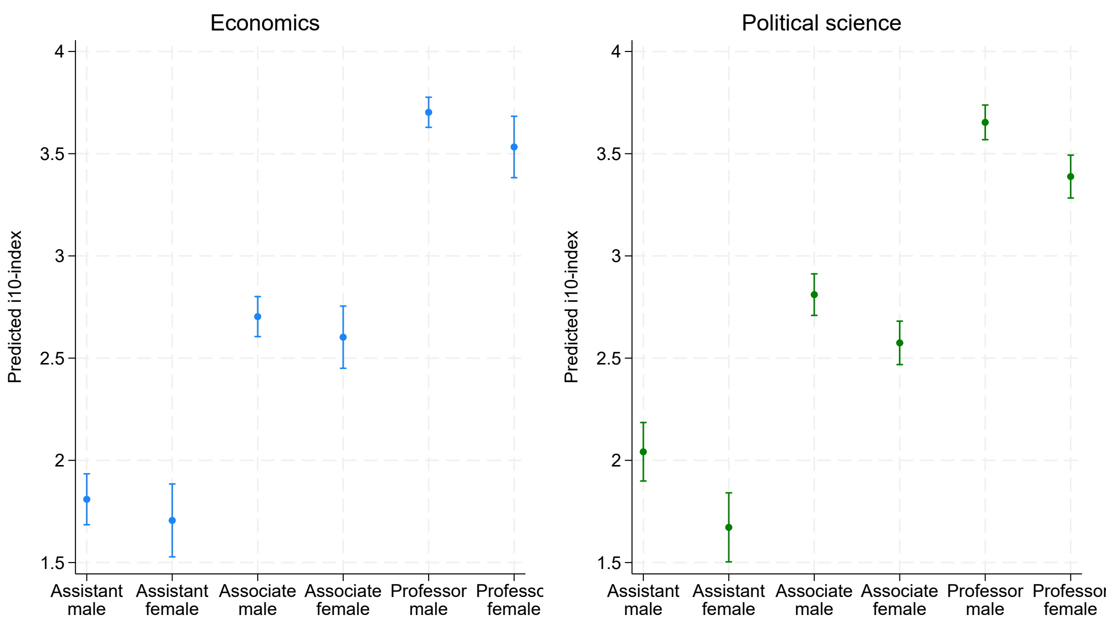
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals. Winsorized outcomes: the outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A9: Predicted Winsorized outcomes by rank and sex, citations of most-cited paper



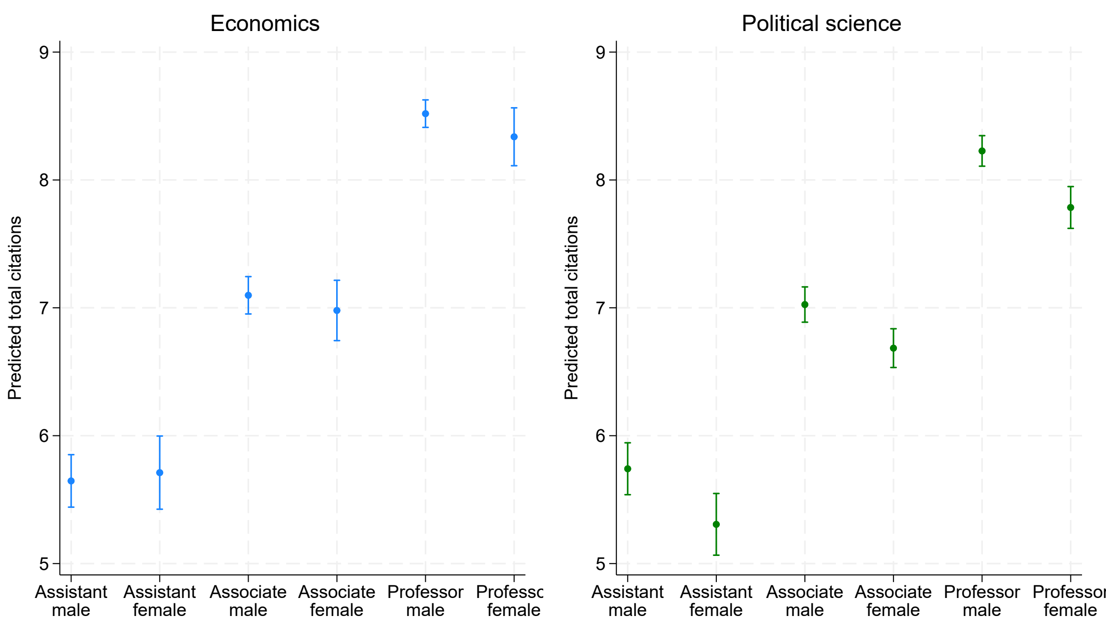
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals. Winsorized outcomes: the outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A10: Predicted outcomes in natural logarithms by rank and sex, i10-index (number of articles with at least ten citations)



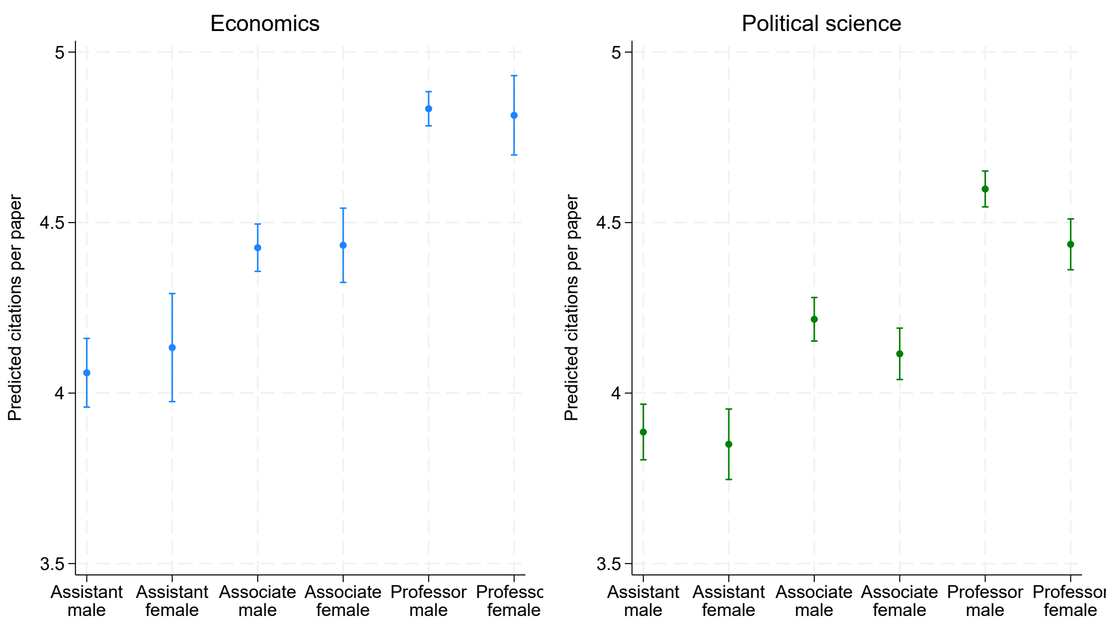
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A11: Predicted outcomes in natural logarithms by rank and sex, total citations



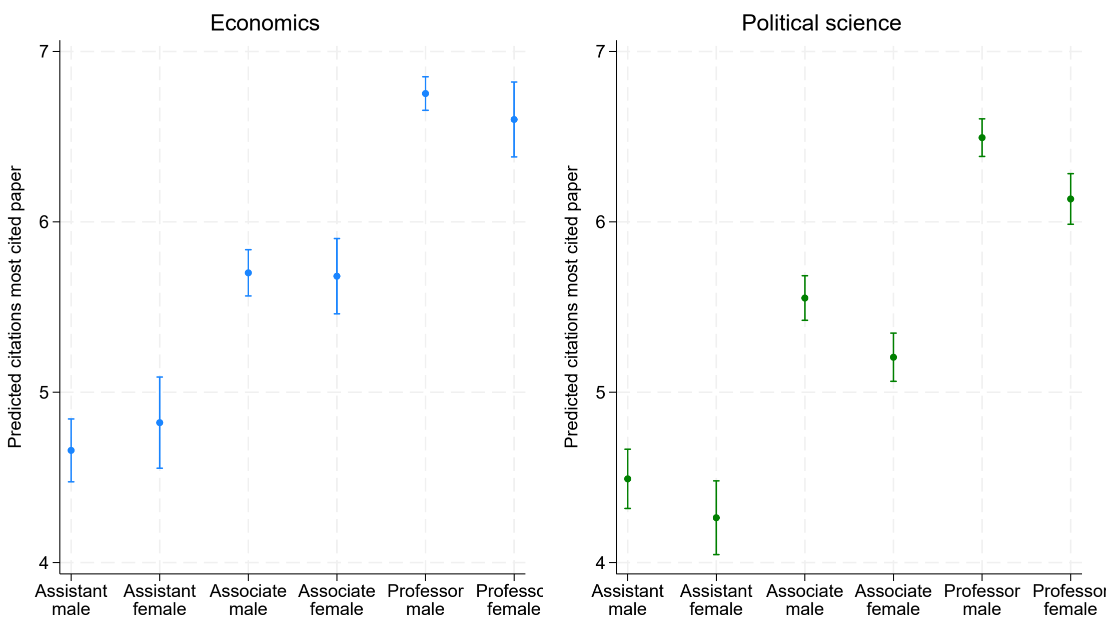
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A12: Predicted outcomes in natural logarithms by rank and sex, citations per paper



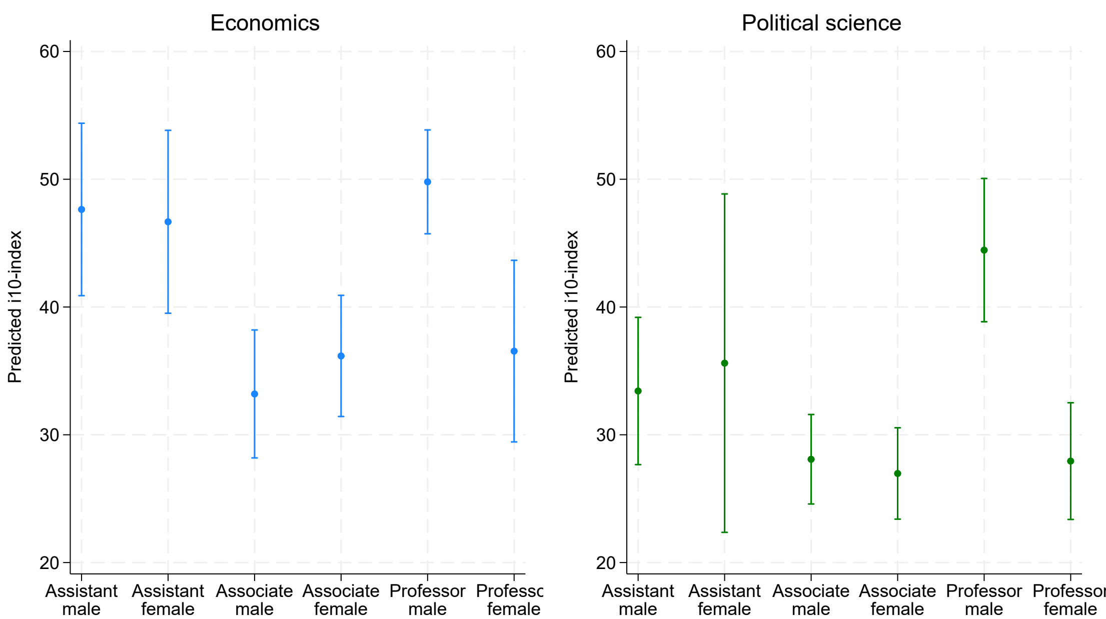
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A13: Predicted outcomes in natural logarithms by rank and sex, citations of most-cited paper



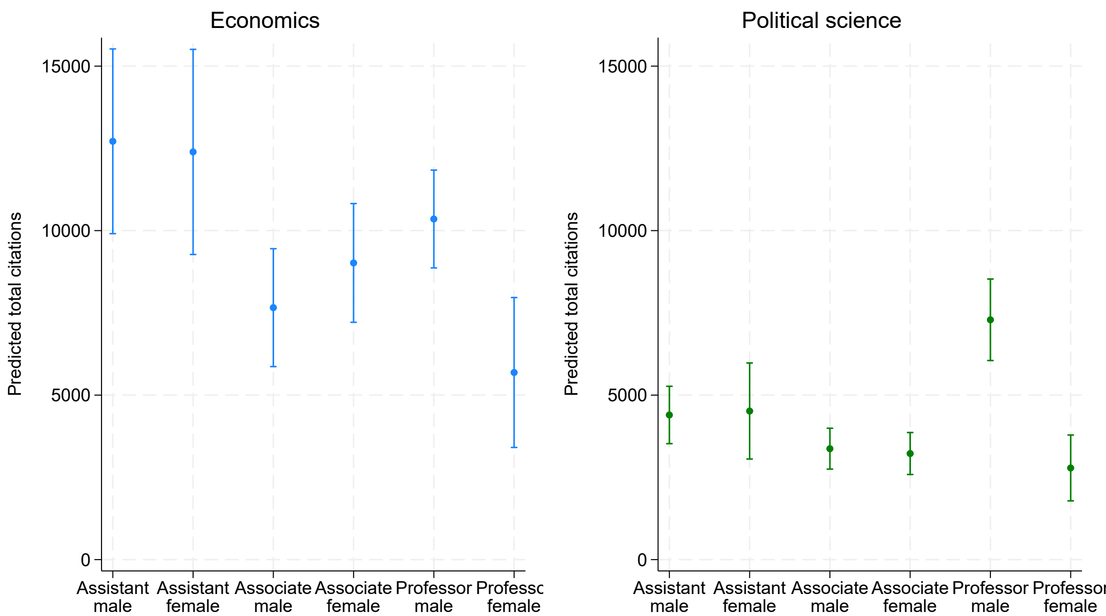
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A14: Predicted outcomes by rank and sex, controlling for number of years listed on Google Scholar, i10-index (number of articles with at least ten citations)



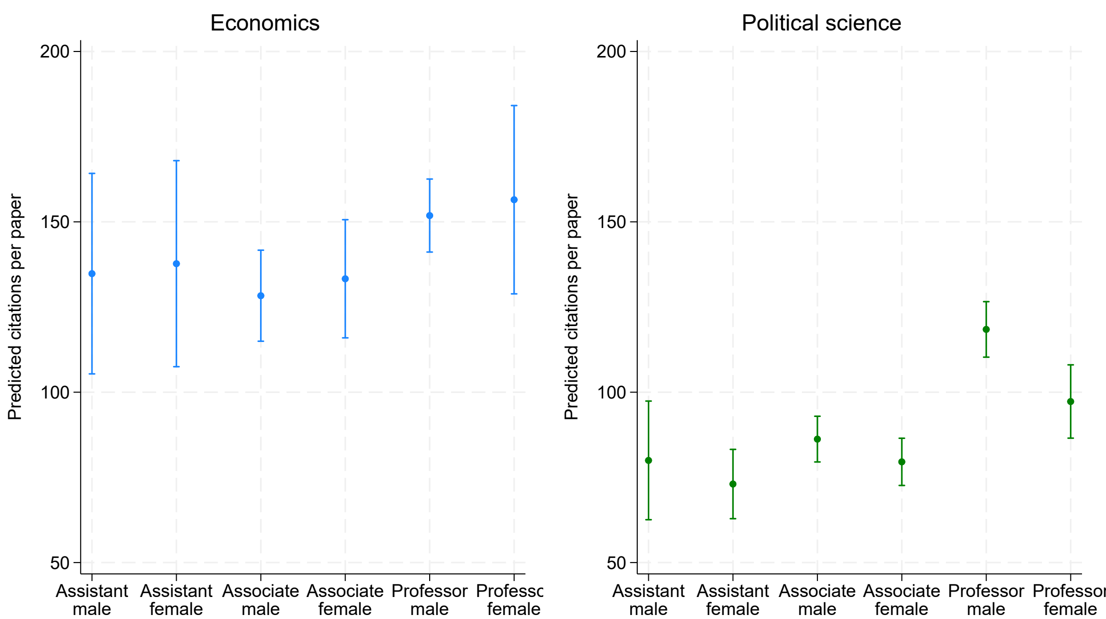
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A15: Predicted outcomes by rank and sex, controlling for the number of years listed on Google Scholar, total citations



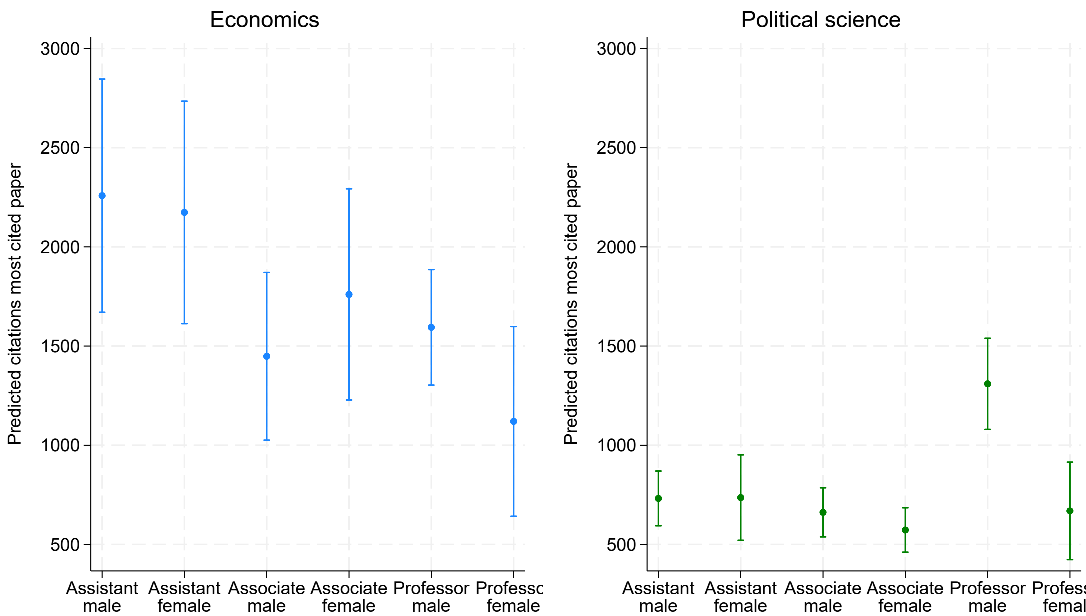
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A16: Predicted outcomes by rank and sex, controlling for number of years listed on Google Scholar, citations per paper



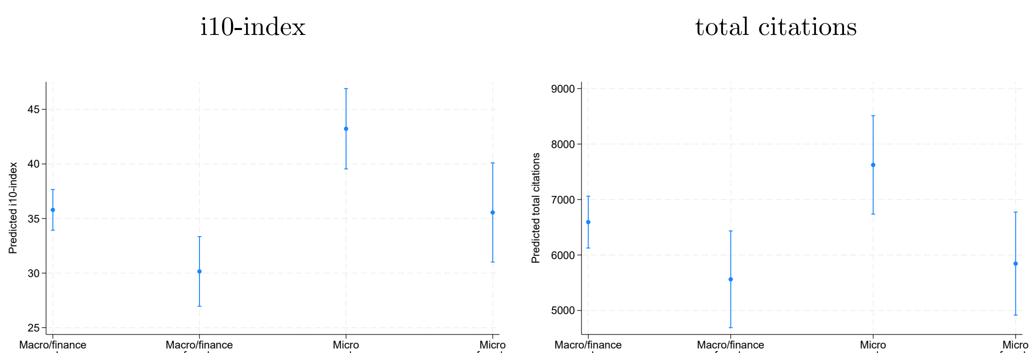
Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

Figure A17: Predicted outcomes by rank and sex, controlling for the number of years listed on Google Scholar, citations of most-cited paper



Note: Point estimates for $\tilde{\beta}^j$ in Equation 4, with the spikes representing 95% confidence intervals.

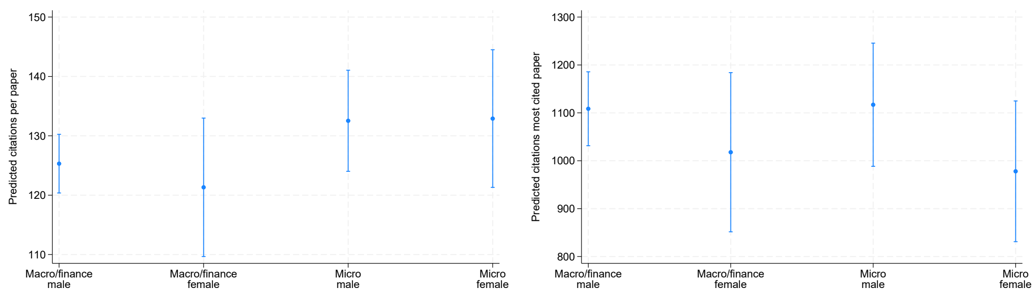
Figure A18: Predicted Winsorized outcomes by field and sex, i10-index (left) and total citations (right)



Note: Point estimates for $\tilde{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals. Winsorized outcomes: the outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A19: Predicted Winsorized outcomes by field and sex, citations per paper (left) and citations of most-cited paper (right)

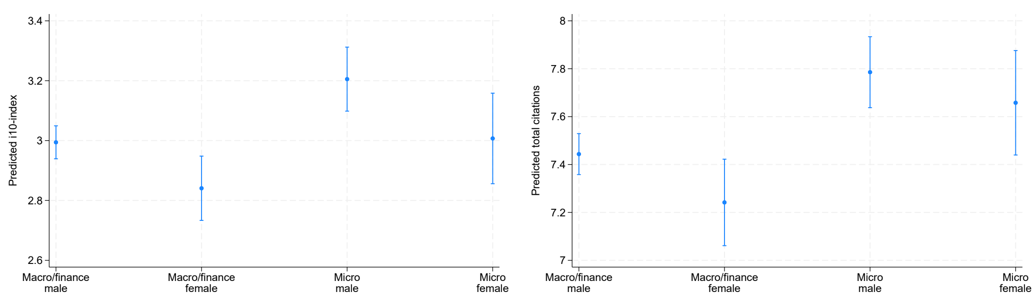
citations per paper | citations of most-cited paper



Note: Point estimates for $\breve{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals. Winsorized outcomes: the outcome variables are trimmed below the 5^{th} and above the 95^{th} percentiles.

Figure A20: Predicted outcomes in natural logarithms by field and sex, i10-index (left) and total citations (right)

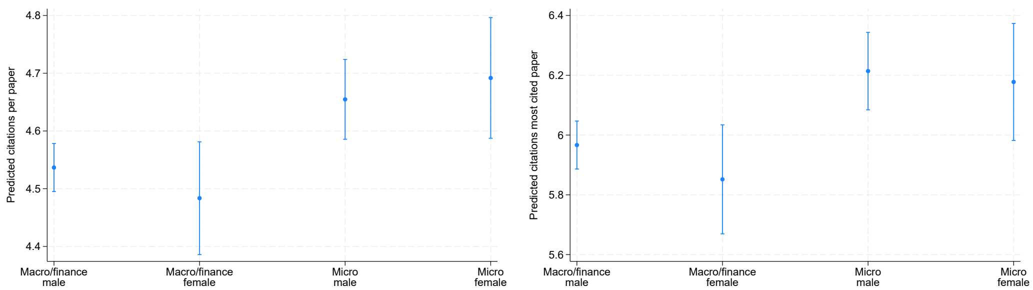
i10-index | Total citations



Note: Point estimates for $\breve{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

Figure A21: Predicted outcomes by field and sex in natural logarithms, citations per paper (left), and citations of most-cited paper (right)

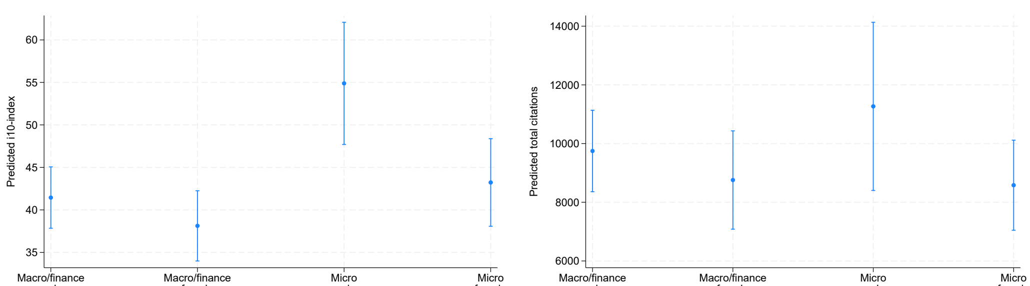
Citations per paper　　　　Citations of most-cited paper



Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

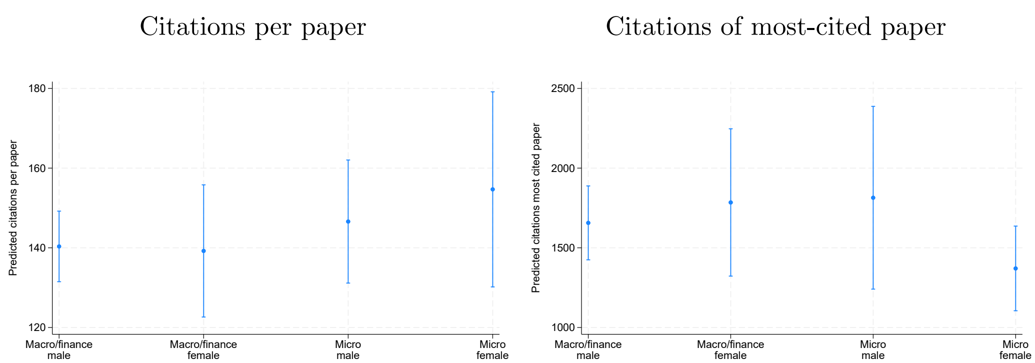
Figure A22: Predicted outcomes by field and sex, controlling for the number of years in Google Scholar, i10-index (left), and total citations (right)

i10-index　　　　Total citations



Note: Point estimates for $\check{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.

Figure A23: Predicted outcomes by field and gender, controlling for the number of years listed on Google Scholar, citations per paper (left), and citations of most-cited paper (right)



Note: Point estimates for $\breve{\beta}^j$ in Equation 5, with the spikes representing 95% confidence intervals.