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Is the bar higher for female scholars? Evidence from career steps in economics☆

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HIGHLIGHTS

- We investigate whether female scholars are held to higher standards in economics.
- We use outcome tests to compare achievement thresholds between males and females.
- Female and male scholars face similar thresholds for faculty appointments.
- Female threshold is lower for receiving grants, joining networks and becoming editors.

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ABSTRACT

Do gender disparities in academia reflect that female scholars are held to higher standards than males? We address this question by comparing the academic achievements of male and female scholars in economics who make the same career step. Across four domains—faculty appointments, network invitations, grant awards and editor appointments—we find no evidence that standards are higher for females. By contrast, the average female has fewer citations and publications than the average male who makes the same career step. In most domains, this reflects a gender gap for "marginal" scholars, consistent with a lower bar for females.

1. Introduction

Across scientific fields, males tend to occupy most of the top positions in academia (e.g., European Commission 2023). While females are more likely to complete university education, a "leaky pipeline" into doctoral programs and at each rung of the academic career ladder implies that professors are predominantly male. This pattern mirrors gender asymmetries in other parts of society. For instance, males continue to occupy the vast majority of the leading positions in business (e.g., Grant Thornton 2023), politics (e.g., United Nations 2023) and public administration (e.g., UNDP 2021) despite long-run increases in female participation in professional and political life.

A potential explanation for the low share of women in top academic positions is that female scholars are held to higher standards than male scholars. Such unequal treatment would resonate with broader patterns of discrimination against women in the labor market (e.g., Goldin and Rouse 2000; Neumark et al. 1996; Sin et al. 2022). It would also carry a somber message about the academic labor market being unfair, by putting female scholars at a disadvantage, and inefficient, by misallocating female scholarly talent.

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In this paper, we study whether female scholars in economics need more academic achievement than males to be selected for the same career steps.[1] Our empirical methodology is motivated by a simple conceptual framework, in which scholars are selected for career steps based on their academic achievement, but selection committees may apply different achievement thresholds to males and females because of idiosyncratic gender preferences. The framework suggests that we can learn about systematic gender differences in the unobserved thresholds by comparing the academic achievement of males and females who successfully make the same career step at the same time. Intuitively, if achievement thresholds are higher for females than for males, females who make a given career step would tend to have more academic achievement than the males who make the same career step. Conceptually, this is an outcome test, which has previously been used to study, for instance, racial discrimination (e.g., Knowles et al. 2001; Arnold et al. 2018).

We implement this approach empirically in two steps. First, we identify a large set of instances where male and female economists made precisely the same career step at the same time. Concretely, they were appointed to the same *faculty position* in the same economics department, they received the same type of research *grant* from the same research council, they became affiliates of the same academic *network* within the same program area or they were appointed *editor* at the same journal. Second, we compare two measures of academic achievement across male and female economists who successfully made the same career step at the same time: the number of journal *publications* adjusted for journal quality and the number of *citations* that their academic work has attracted.

A key advantage of this empirical approach is that it only requires information about successful candidates. A common alternative approach estimates how the probability of success depends on gender conditional on academic achievement (e.g., Sarsons et al. 2021; Card et al. 2022, 2023) and therefore also requires data on unsuccessful candidates, which is generally difficult to come by: economics departments, research councils and scientific journals publish who is on the faculty, who receives a grant and who is the editor, but generally do not reveal the names of candidates who were considered but not selected. Our approach allows us to study a range of distinct career steps in a unified empirical framework using data available in the public domain.

Across all four types of career steps and both measures of academic achievement, we find that female scholars, on average, have less academic achievement than male scholars at the time they make the same career step. For faculty positions, the estimated difference is around 0.1 log-points, which corresponds to a gap of around 10%. The difference widens to around 0.2 log-points for editor positions, 0.3–0.4 log-points for network affiliations and 0.5–0.7 log-points for research grants. Qualitatively, these results hold when we use alternative measures of achievement, discount co-authored work, and assume forward-looking selection committees. They are also robust to granular controls for subfields within economics (e.g., macro, public, trade) and for academic age. Finally, the estimates are similar across subsamples when we separately consider different faculty positions (assistant, associate and full professor), different networks (NBER and CEPR), and grants from different research councils (France, United States, Germany and United Kingdom).

The systematic gender difference at the mean suggests that achievement thresholds are lower for females than for males. However, this conclusion comes with three important caveats. First, publication and citation scores are imperfect measures of academic achievement and may potentially be gendered (Card et al., 2020; Hengel, 2022; Hengel et al., 2026). Second, selection for career steps generally reflects other qualities than publications and citations, e.g., teaching skills for faculty appointments and organizational skills for editor appointments. These two caveats point to distinct identification assumptions. To interpret gender differences in achievement as unequal treatment, one generally must assume that gender is uncorrelated with, first, the measurement error in academic achievement and, second, qualities other than academic achievement affecting selection. If the same paper is harder to publish and less likely to be cited when the author is female or if female scholars possess qualities such as teaching skills and organizational skills to a larger extent than males, we cannot make inferences about unequal bars. While not necessarily innocuous, these two identification assumptions mirror those of related papers using publications or citations to measure academic achievement (Card et al., 2022, 2023).

Third, gender differences in the distribution of academic achievement are a possible confounder: If the set of candidates considered by selection committees includes relatively more males than females with extremely high achievement scores, it may create a gender difference in means even if achievement thresholds are the same. To interpret mean differences in achievement as unequal treatment, one therefore needs to assume that male and female scholars considered by a given selection committee are drawn from the same achievement distribution. This is a strong assumption, which we relax by comparing quantiles in the distribution of academic achievement rather than means. Intuitively, comparing male and female scholars at the bottom of their respective distributions—"marginal" scholars who just barely clear the bar for a successful career step—provides a test of gender differences in achievement thresholds that is unaffected by imbalances in the right tail.

The distributional analysis adds important nuance to the conclusions. For faculty positions, the academic achievement of males and females is almost perfectly aligned through the bottom half of the distribution, suggesting that achievement thresholds are similar for males and females. The gender difference at the mean identified in the main analysis reflects a small gap in the upper part of the distribution. For other types of career steps, females have significantly less academic achievement than males at the bottom of the distribution, consistent with lower achievement thresholds for females.

Our paper makes methodological contributions to the literature that studies unequal treatment of men and women in academia (e.g., Sarsons et al. 2021; Card et al. 2022, 2023). Unlike most existing work, we rely on outcome tests, which can be conducted using publicly available data and thus make it possible to study a range of career steps within a unified empirical framework. Our key methodological innovation is a distributional outcome test that identifies gender differences in achievement thresholds by comparing marginally successful male and female scholars. Importantly, this test is insensitive to gender differences at the right tail of the achievement distribution.

Our results inform debates about unequal treatment in economics, a mechanism often invoked to explain the low representation of females in the profession. Our findings generally resonate with Card et al. (2022, 2023) who document that the bar for being admitted to the most prestigious scientific societies is currently lower for females than for males; however, the scope of our analysis is broader in two dimensions. First, we consider a range of outcomes that go beyond peer recognition and involve high stakes for the scholars involved, i.e., faculty positions and research grants. Second, our analysis covers a broad group of economists at different levels of seniority and productivity and not just the absolute top.[2]

[1] Recent work documents the low share of women in top positions in economics (Auriol et al., 2022) and finance (Sherman and Tookes, 2022) and lays out historical trends (Lundberg and Stearns, 2019).

[2] Other relevant literature includes: Kleemans and Thornton (2021) study the determinants of NBER membership and, among a number of determinants find, consistent with our results, a lower probability for males. Funk et al. (2024) present evidence that female economists, consistent with our results, are more likely to become editors at a narrow selection of top journals. Sarsons et al. (2021) mainly focus on the differential discounting of coauthored work across

In conclusion, we find no evidence that female scholars are held to higher scientific standards than male scholars in economics. Rather, our results indicate that the bar in terms of academic achievement is similar for males and females when it comes to faculty appointments and lower for females than for males when it comes to network affiliations, research grants, and editor appointments. The literature points to alternative mechanisms that may explain the low female representation in top positions in the economics profession: gender stereotypes as reflected in comments on online platforms (Wu, 2018, 2020) and reference letters (Eberhardt et al., 2023); gender differences in access to co-author networks (Ductor et al., 2023), recognition of group work (Sarsons et al., 2021), treatment by seminar participants (Dupas et al., 2021), acceptance rates at conferences (Hospido and Sanz, 2021) and the propensity to apply for promotions (Bosquet et al., 2019); as well as gender bias in teaching evaluations (Boring, 2017; Mengel et al., 2019).

The paper proceeds by describing the data in Section 2, discussing the empirical design in Section 3, reporting the results in Section 4 and concluding in Section 5.

2. Data

We collect data for the analysis in two steps. First, we identify instances where economics scholars make career steps and use a standard algorithm to determine their gender. Second, we collect information about publications and citations of these scholars at the time of the career step and use it to create measures of academic achievement.[3]

2.1. Career steps

We consider career steps within four distinct domains: (i) becoming an affiliate of a selective *network* for academic economists; (ii) receiving a scientific *grant* from a research council; (iii) being appointed *editor* of an economics journal; and (iv) being appointed to a *faculty position* at an economics department. These four domains represent distinct dimensions of career progression at different levels of academic achievement and thus allow us to take a broad view of how gender shapes career advancement in the economics profession. In all four domains, the information required to conduct the analysis can be harvested from publicly available sources, as we discuss in this subsection.

Networks

We consider affiliations of two highly regarded networks for academic economists: the National Bureau of Economic Research (NBER) in the United States and the Center for Economic Policy Research (CEPR) in Europe. Both networks select new affiliates through a competitive process that draws on nominations from existing members and organize activities within program areas such as labor studies, public economics and corporate finance.

On their websites, both networks maintain lists of current network affiliates by program area. To identify appointment years, we scrape archived versions of the network websites.[4] If one website version indicates that a scholar is an affiliate and another version from around one year earlier indicates that the same scholar is not an affiliate, we infer that the scholar was appointed during the course of the year. We consider that scholars make the same career step if they become affiliates of the same network in the same program area in the same year. We identify 2197 scholars making 629 distinct career steps in this domain over the period 2001–2023 (Table 1, Columns 1–3).

Grants

We consider grants from national research councils in the United States, United Kingdom, France and Germany. We focus on research grants where the recipient is an individual, rather than a network or a group, and where the key criterion is academic excellence. All of the research councils make lists of past grant awards available on their websites.

We scrape the websites to obtain, for each individual grant, the name of the principal investigator, the year of the award, and the type of grant. We consider that scholars make the same career step if they are awarded the same type of grant from the same research council in the same year. We identify 4186 scholars making 271 distinct career steps in this domain over the period 1994–2023 (Table 1, Columns 1–3).

Editorships

We consider editor appointments at the 100 leading economics journals according to IDEAS/RePEc (2023).[5] We retain journals specializing in finance and econometrics, but disregard interdisciplinary journals and journals from adjacent fields where editors may publish primarily outside of economics journals.

Economics journals typically print the names of the current editors in the front matter of each issue. We hand-collect a dataset with the names of the editors at the top-100 journals. If one issue indicates that a scholar is an editor while another issue from around one year earlier indicates that the same scholar is not an editor, we infer that the scholar was appointed in the course of the year. We consider that scholars make the same career step if they are appointed editors of the same journal in the same year. We identify 1028 scholars making 496 distinct career steps in this domain over the period 2004–2023 (Table 1, Columns 1–3).

Faculty positions

We consider appointments to faculty positions at the 100 leading economics departments according to IDEAS/RePEc (2023).

Economics departments generally maintain lists of current faculty members and their titles on department websites. We obtain information about appointment years by scraping archived versions of the websites. If one website version indicates that a scholar holds a given faculty position and another version from around one year earlier indicates that the same scholar holds another position or no position, we infer that the scholar was appointed during the course of year. We consider that scholars make the same career step if they are appointed to a faculty position with the same title in the same department in the same year. We identify 2224 scholars making 1186 distinct career steps in this domain over the period 2012–2023 (Table 1, Columns 1–3).

2.2. Academic achievement and field

For each of the scholars who make a career step, we obtain detailed information about publications and citations by scraping their profiles on Google Scholar.[6] We use this information to construct two measures of the scholars' academic achievements at the time they make the career step: the cumulative number of citations that their work has attracted and the number of articles they have published in academic journals adjusted for the quality of the journals.[7]

To adjust the number of publications for journal quality, we express publications in AER-equivalents (Conroy et al., 1995). Concretely, we adopt the ranking of economics journals by their h-index from IDEAS/RePEc (2023) and assign to each journal in the top-500 an AER-equivalent, which is the ratio of the journal's own score to the score of the *American Economic Review*. With this procedure, the AER-equivalent of a paper published in *Econometrica* is around 0.8, a paper in *Journal of Econometrics* around 0.5, a paper in *Journal of Human Resources* around

male and female scholars but also find, contrary to our results, that female scholars are less likely to get tenure conditional on publications and citations. The discrepancy may reflect that their sample goes back to the early 1980s while ours almost exclusively covers the period after 2015.

[3] We describe in more detail how the dataset is constructed in the Online Appendix.

[4] This approach is similar to Heckman and Moktan (2020).

[5] We rank journals by their h-index. See discussion below.

[6] As shown in Table A.1 in the Online Appendix, we are able to identify Google Scholar profiles for more than 80% of the scholars who make career steps, almost the same fraction for males and females.

[7] See details in the Online Appendix

Table 1
Estimation samples. The table describes the samples of economists who make a career step in the four domains, i.e., are appointed to a faculty position at an economics department, receive a scientific research grant, become members of an academic network, and are appointed editor of an economics journal. The table shows the time period covered (Column 1), the total number of unique career steps (Column 2), the total number of economists making a career step (Column 3), the number of "mixed-gender" career steps, i.e., where the set of economists making the career step includes at least one male and one female (Column 4), and the number of economists making a "mixed-gender" career step (Column 5).

	(1)	(2)	(3)	(4)	(5)
		All career steps		Mixed-gender career steps	
	Period	# Distinct career steps	# Economics scholars	# Distinct career steps	# Economics scholars
Faculty	**2012 - 2023**	**1,186**	**2,224**	**273**	**883**
- Assistant professor	2012 - 2023	435	904	125	409
- Associate professor	2012 - 2023	349	629	74	237
- Full professor	2012 - 2023	402	691	74	237
Grants	**1994 - 2023**	**271**	**4,186**	**126**	**3,947**
- France	2005 - 2022	18	1,379	17	1,437
- Germany	1994 - 2023	170	669	46	382
- UK	2015 - 2020	6	236	6	242
- USA	1999 - 2023	77	1,902	57	1,886
Networks	**2001 - 2023**	**629**	**2,197**	**217**	**1,441**
- CEPR	2001 - 2022	402	1,220	137	745
- NBER	2001 - 2023	227	977	80	696
Editors	**2004 - 2023**	**496**	**1,028**	**111**	**424**
- Top-50 journal	2004 - 2023	294	631	72	269
- Lower ranking journal	2004 - 2023	202	397	39	155

0.3, a paper in *Journal of Comparative Economics* around 0.2 and a paper in *Journal of International Development* around 0.1.[8] For robustness analysis, we construct alternative achievement measures that aggregate publications and citations differently.

The publication measure is not meaningful for non-economists whose publication outlets will typically not be among the top-500 economics journals. In practice, this does not represent a major challenge since most of the career steps we consider, e.g., appointments in economics departments and membership of economics networks, naturally limit the sample to academic economists. We address any remaining concerns by excluding scholars from the estimation sample whose publication records suggest they are not economists.[9]

Finally, we compute the two measures of academic achievement for all of the 50,000 economists registered at IDEAS/RePEc. This sample serves as a reference population of academic economists, against which we can compare the economists in our estimation datasets. From the IDEAS/RePEc web page, we also retrieve the main field of the scholars in our sample, which we use in robustness tests that control for field.[10]

2.3. Descriptive analysis

Fig. 1 provides context for the analysis by documenting key patterns in the data we have collected. Panel A shows that the female share among those who make a career step has exhibited a clearly increasing trend over the sample period in all four domains.[11] Panel B shows that, although citation and publication scores capture distinct dimensions of academic achievement, they are highly correlated and exhibit a relationship that is strikingly close to log-linear over the entire distribution. Panels C–D show that our analysis primarily concerns economists from the upper half of the distribution of citation and publication scores. Intuitively, economists appointed to editor positions (green line) almost all come from the very top of the distribution, reflecting that editors are recruited from the ranks of senior academics with excellent publication records. Economists appointed to faculty positions (brown line) and receiving research grants (red line) also generally have high citation and publication counts, but the distributions are much more dispersed, reflecting that both career steps occur at many levels of seniority, e.g., assistant vs. full professorships and starting vs. advanced grants. Finally, economists given network affiliations (blue line) exhibit a tight distribution of citation and publication scores with a mode below that of editors, reflecting that they tend to be accomplished, but relatively early-career economists.

3. Empirical design

3.1. Conceptual framework

The aim of the empirical analysis is to test whether female scholars need more (or less) academic achievement to make a career step than male scholars. We motivate the empirical specifications with a simple conceptual framework.

Consider the selection of economists for a career advancement among a larger set of candidates. Each candidate has an observable level of academic achievement y. The selection committee has a preference for candidates with greater achievement, but may also have a gender preference. Hence, it chooses two achievement thresholds, α_F and α_M, and selects female candidates with $y \geq \alpha_F$ and male candidates with $y \geq \alpha_M$. If $\alpha_M < \alpha_F$, we say that the bar is higher for females or that females are held to higher standards.

Comparison of means

Empirically, we only observe the set of successful candidates. Given this constraint, we perform an outcome test that compares the mean

[8] We use the ranking based on h-indexes because it is consistent with the profession's strong priors about the top-5 journals in economics and the top-3 journals in finance. The 7 highest ranked journals by this approach are the top-5 economics journals and 2 of the top-3 finance journals.

[9] Concretely, we exclude scholars if none of their five most cited papers is published in an outlet with a title containing words such as economics, finance, or econometrics. More details are available in the Online Appendix.

[10] See Table A.2 in the Online Appendix for the distribution across fields.

[11] Card et al. (2022) document similar patterns for publishing in top economics journals and election to the Econometric Society.

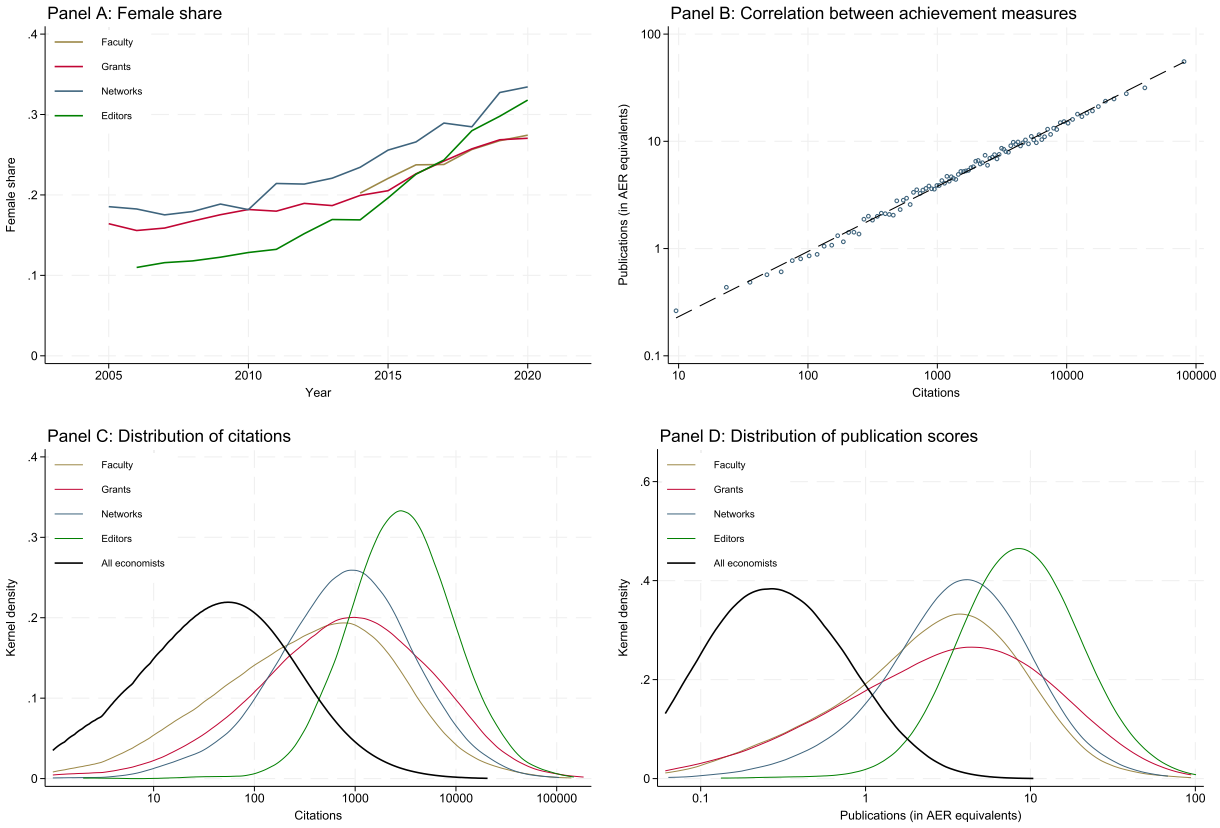

Fig. 1. Descriptives. Panel A shows how the female share of the economists who make a career step in each of the four domains evolves over the sample period (3-year moving averages). Panel B shows the correlation between our two measures of academic achievement, i.e., citation counts and publication scores (both in logs), in a binned scatterplot. Panel C shows the distribution of citations for the full sample of academic economists registered at IDEAS/RePEc (black line) and each of the four samples of economists who make a career step (colored lines). Panel D shows the distribution of publication scores for the full sample of academic economists registered at IDEAS/RePEc (black line) and each of the four samples of economists who make a career step (colored lines).

level of achievement $\bar{y}$ across the successful male and female candidates. The comparison identifies differences in the threshold subject to a distributional assumption:

Proposition 1. *Assuming that female and male scholars in the consideration set are drawn from the same distribution of achievement $\theta(y)$, it holds that:*

$$\bar{y}_M < \bar{y}_F \implies E[\alpha_M] < E[\alpha_F]$$

Proof. $E[\bar{y}] = \int_\alpha y\theta(y)dy / \int_\alpha \theta(y)dy$ implies $dE[\bar{y}]/d\alpha > 0$. By Bayesian inversion, higher observed realizations of $\bar{y}$ therefore correspond to higher expected values of α. □

The distributional assumption concerns both successful (observed) and unsuccessful (unobserved) scholars and is therefore not testable. Without distributional assumptions, it is possible that $\bar{y}_M > \bar{y}_F$ despite $\alpha_M < \alpha_F$ if, for instance, the male distribution of achievement has a thicker right tail than the female distribution.

Comparison of quantiles

We also conduct an alternative analysis that relaxes the distributional assumption. Rather than comparing the achievement of successful female and male scholars at the mean, this test makes comparisons in the lower part of the achievement distribution, e.g., the 5th, 10th, or 25th percentile. Intuitively, these quantiles represent "marginal" candidates whose achievement levels approximate the gender-specific achievement thresholds. This test is not affected by potential gender differences in the upper part of the achievement distribution:

Proposition 2. *Assuming that female and male scholars in the consideration set are drawn from the same distribution of achievement $\theta(y)$ up to $\tilde{y}$, it holds that:*

$$y^q_M < y^q_F \implies E[\alpha_M] < E[\alpha_F] \;\; if \;\; y^q_F < \tilde{y}$$

where y^q denotes the qth percentile of draws larger than α

Proof. It is immediately clear that $dE[y^q]/d\alpha > 0$. By Bayesian inversion, higher observed realizations of y^q therefore correspond to higher expected values of α. □

Extensions

We consider two extensions. First, we assume that selection committees consider other qualities other than academic achievement, e.g., teaching skills for faculty appointments and organizational skills for editor appointments, and let ϵ denote such qualities. Second, we assume that publication and citation scores are imperfect measures of true academic achievement and let γ denote the measurement error. If committees consider a broad set of qualities and observe true academic achievement, selection is based on $z = y + \epsilon - \gamma$ rather than y.

Proposition 3. *Assuming that ϵ and γ are uncorrelated with gender, Propositions 1 and 2 continue to hold when scholars are selected based on z.*

Proof. First, $\bar{y}_M < \bar{y}_F$ implies $E[\bar{z}_M] < E[\bar{z}_F]$ and therefore, by application of Proposition 1, that $E[\alpha_M] < E[\alpha_F]$. Second, $y^q_M < y^q_F$ implies $E[z^q_M] < E[z^q_F]$ and therefore, by application of Proposition 2, that $E[\alpha_M] < E[\alpha_F]$. □

3.2. Empirical implementation

The main challenge for the empirical implementation is to pool observations from many different career steps into a single regression while

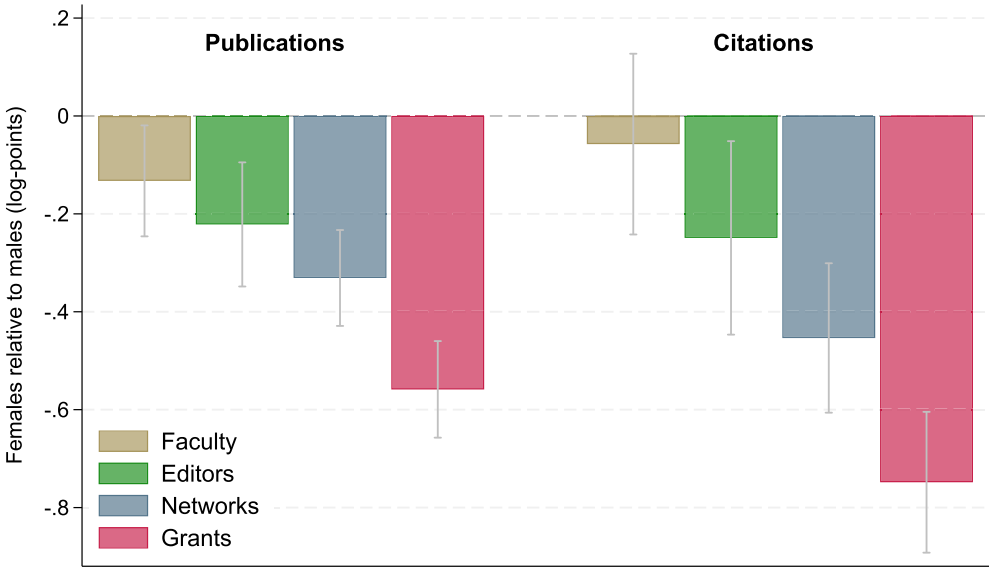

Fig. 2. Main results. The figure illustrates the main regression results. Each bar represents the mean difference in publication scores (left side) and citation counts (right side) between female and male economists at the time they make the same career step in one of the four domains, i.e., are appointed to a faculty position at an economics department (brown bars), are appointed editor of an economics journal (green bars), become members of an academic network (blue bars), and receive a scientific research grant (red bars).

ensuring that the estimates are always identified from comparisons within sets of candidates who made the same career step.

Denoting individuals by i and distinct career steps by c, we estimate the following equation separately for each of the four types of career steps:

$$y_{i,c} = \alpha_c + \beta^d \text{female}_{i,c} + \mu_{i,c} \quad (1)$$

where y is one of the two measures of academic achievement and α_c represents a separate intercept for each career step c. The estimated β expresses the mean achievement of female economists who make a career step in domain d over and above the mean achievement of male economists who make the same career step.[12]

Concretely, the intercepts represent interactions between indicators for network, program area and year (networks); department, academic title and year (faculty); journal and year (editor); and country, grant type and year (grant). The intercepts ensure that identification comes from comparisons across scholars who make the same career step at the same time and absorb a range of potential confounders. For instance, they address the possibility that male scholars have less academic achievement when appointed professors because they are hired by lower-ranking departments and other versions of Simpson's paradox. We address a number of other potential confounders in the robustness analysis.

To make comparisons at different positions of the achievement distribution, we first estimate the following regression:

$$y_{i,c} = \alpha_c + \eta_{i,c} \quad (2)$$

and compute the residual $\overline{\eta}_{i,c}$ for each economist. The residual is a measure of "relative achievement", i.e., an economist's achievement relative to the average for economists who make the same career step. For instance, $\overline{\eta}_{i,c} = 0.1$ means that the achievement of economist i is 0.1 log-points higher (roughly 10%) than the average economist who made career step c. This metric is directly comparable across career steps in the same domain. Hence, we construct the cumulative distribution of $\overline{\eta}_{i,c}$ for males and females separately and make comparisons at specific quantiles. Systematic gender differences at the bottom of the distributions are suggestive of systematic achievement differences between the "marginal" male and female candidates and, thus, of gender differences in the level of achievement needed to make a career step.

4. Results

4.1. Comparison of means

Fig. 2 illustrates the main results. It shows the estimated coefficient on the female indicator across 8 separate regressions varying the measure of achievement (i.e., publication and citation scores) and the domain (i.e., faculty positions, editor positions, network affiliations and research grants). In all regressions, the point estimate is negative implying that the average female economist who makes a career step has less academic achievement than the average male economist who makes the same career step.

There is significant heterogeneity in the size of the achievement gap across domains. For faculty positions, the estimated difference is around 0.1 log-point for either achievement measure, which corresponds to an achievement gap of around 10%. The difference widens to around 0.2 log-points for editor positions, 0.3–0.4 log-points for network affiliations and 0.5–0.7 log-points for research grants. The gap tends to be slightly larger when achievement is measured in terms of citations rather than publication scores.

We investigate heterogeneity within each of the four domains (Figure A.1). Comparing faculty positions at different levels, we find almost no difference across assistant professors, associate professors and full professors (Panel A). Comparing research grants across countries, the gap is smallest in France and quite similar in the United Kingdom, Germany and United States (Panel B). Comparing different networks, the gap is somewhat larger for NBER in the United States than for CEPR in Europe (Panel C). Comparing editor positions at different journals, the gap is smaller for top-20 journals than for lower-ranking journals (Panel D).

We also investigate heterogeneity over time by splitting the sample at the onset of the global #MeToo movement in 2017 (Figure A.2). The results do not provide clear evidence that this watershed moment

[12] Only when at least one male and one female scholar make the same career step, does it contribute to the identification of β. Table 1 provides information about the number of career steps and scholars contributing to identification (Columns 4–5).

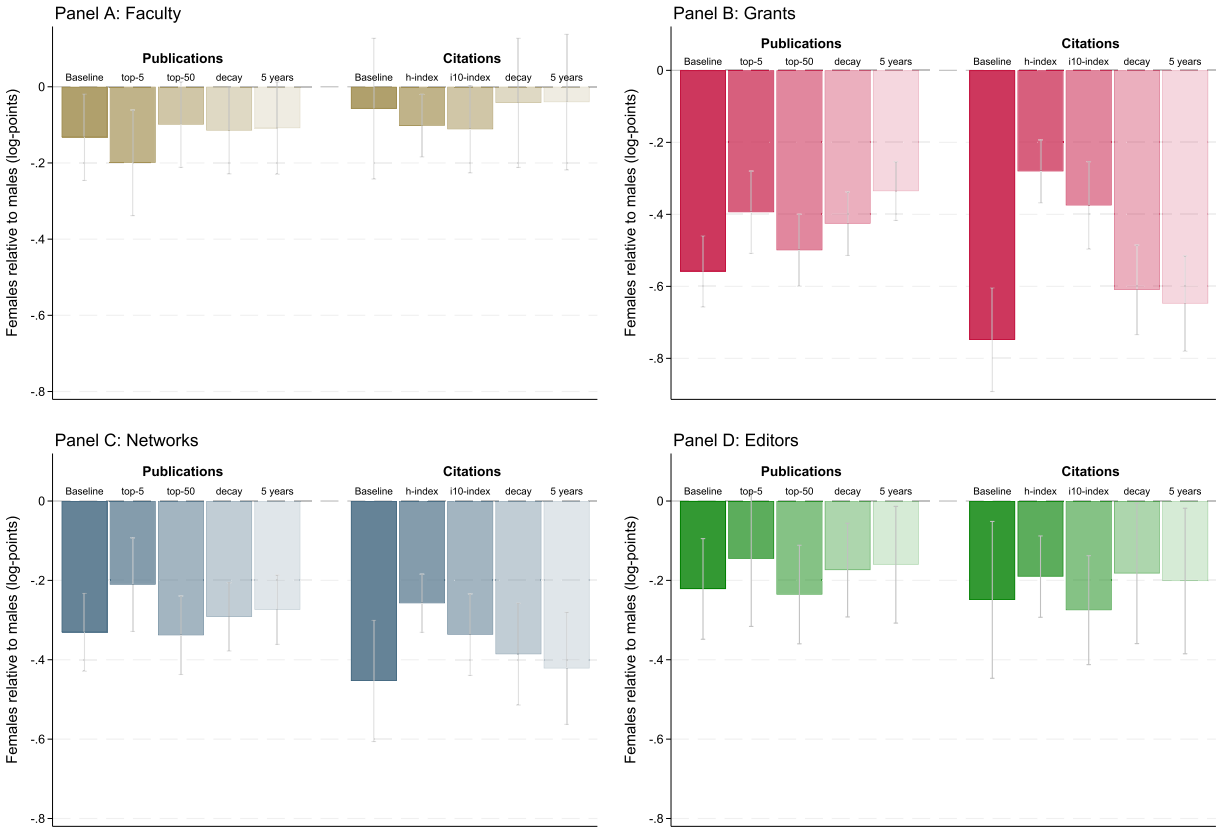

Fig. 3. Alternative summary measures of scientific achievement. The figure illustrates the results for a range of alternative summary measures of publications and citations for each type of career step: appointments to faculty positions (Panel A), awards of research grants (Panel B), appointments to academic networks (Panel C), appointments to editor positions (Panel D). Each bar within a panel corresponds to the mean difference in publication scores (left side) and citation counts (right side) between female and male economists at the time they make the same career step. We compare the results using the following publication scores: AER-equivalents for the top-500 journals (*baseline*), number of top-5 publications (*top-5*), AER-equivalents for the top 50 journals (*top-50*); baseline except that the contribution of each publication decreases by 10% per year (*decay*); baseline except that only publications from the 5 most recent years contribute (*5 years*). We compare the results for the following citation scores: total citation count (*baseline*), the highest number h for which at least h papers have been cited at least h times (*h-index*), the number of papers with at least 10 citations (*i10-index*); baseline except that the contribution of each citation decreases by 10% per year (*decay*); baseline except that only citations from the 5 most recent years contribute (*5 years*).

for gender relations is the origin of the achievement gap in the economics profession. The gap generally existed before #MeToo and did not systematically widen afterward.[13]

Finally, we break down total achievement scores into a quantity component, i.e., the number of papers, and a quality component, i.e., citation counts and publication scores for the average paper (Figure A.3). Quantity consistently contributes much more to the achievement gap than quality. The average female economist who makes a career step tends to have fewer papers, but of roughly the same quality, as the average male economist who makes the same career step.

4.2. Robustness

Fig. 3 illustrates that the baseline results are generally robust to using alternative measures of academic achievement. For publication scores, we use the number of top-5 publications, the publication score restricted to the top-50 journals and two measures that penalize older publications by (i) reducing their contribution by 10% per year or (ii) disregarding publications more than 5 years old. For citation counts, we use the h-index, the i10-index and two measures that penalize older citations in the same way as for publications. While some of the estimates become smaller and others less precise, the qualitative findings are highly robust.

We probe the robustness of the main results in a number of ways. First, the estimated achievement gap could reflect gender differences in collaboration patterns if female economists work more alone or in smaller groups (Ductor et al., 2023). We address this concern by showing that the estimates remain qualitatively unchanged when using an alternative measure of academic achievement that divides the contribution of each paper by the number of authors (Figure A.4). Second, the achievement gap could in principle owe itself to female scholars being more active in fields where researchers publish less and papers attract fewer citations.[14] Reassuringly, including separate intercepts for the 96 distinct fields represented in our sample has little impact on the estimated achievement gap (Figure A.5).[15] Third, decisions about career steps plausibly account for expected future publications and citations, which are relatively predictable over short horizons due to the time lag involved in the editorial process (e.g., a revise-and-resubmit is a strong predictor of a future publication) and the autocorrelation

[13] By comparison, Card et al. (2022) find strong evidence of time trends in their study of selection to the Econometric Society, but over a much longer period: a penalty for females in the early years (1933–1979) and a premium in the later years (2010–2020).

[14] The analysis of editor and network appointments implicitly controls for field by including intercepts specific to journals and program areas respectively.

[15] Field controls reduce the effective sample size considerably as scholars with missing field information drop out and scholars who are the sole representatives of a field in the sample are absorbed by the field-specific intercepts.

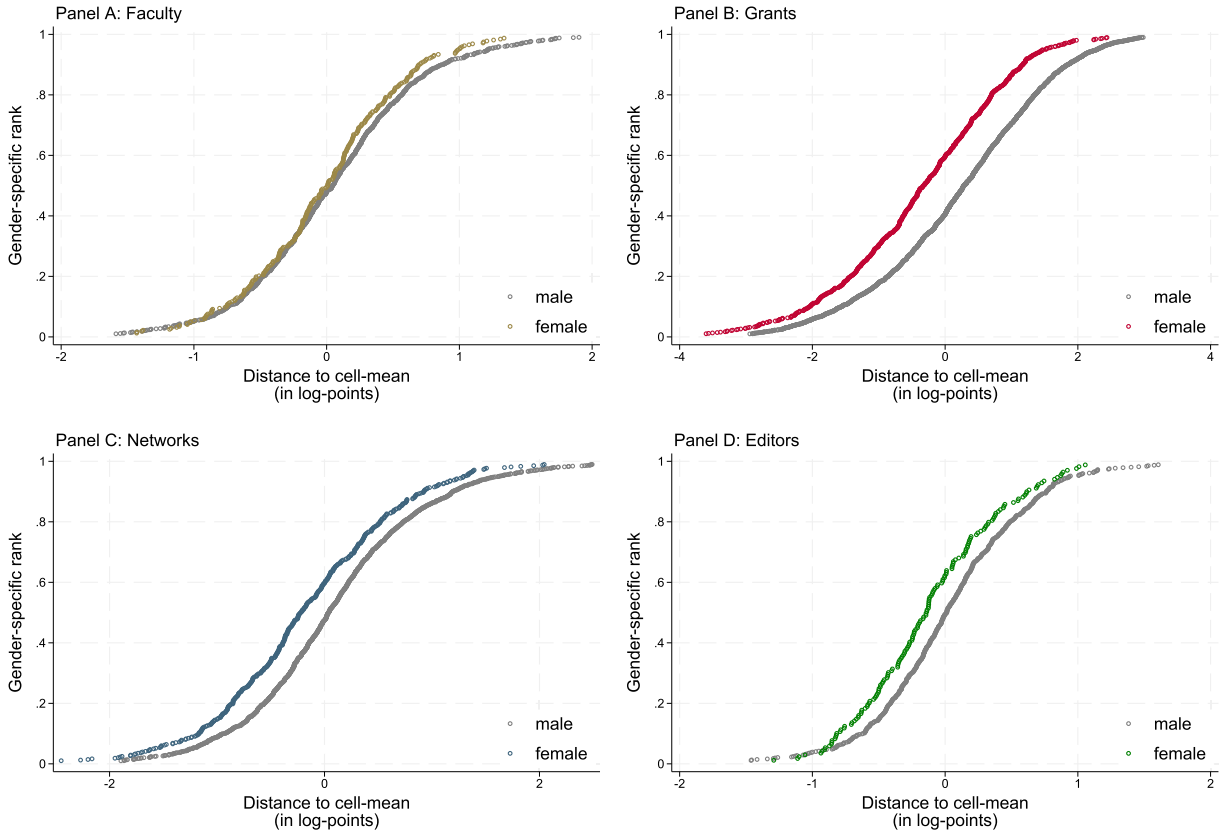

Fig. 4. Distribution of relative academic achievement. The figure shows the cumulative distribution of academic achievement of male economists (gray lines) and female economists (colored lines) in our four samples measured *relative* to the average taken across other economists making the same career step in the same year. To construct the figures, we first regress each measure of academic achievement, i.e., citation counts and publication scores, on career step fixed effects. For each economist, we then take the average of their residuals in the citation and publication regressions to obtain a single measure of their relative academic achievement at the time they make a career step, i.e., achievement relative to the other economists who make the same career step. Finally, we rank these relative achievement measures, for male and female economists separately, and plot them against their ranks.

in annual citation counts. We address concerns that anticipation may create a bias by documenting that the results are highly robust to using leaded citation and publication scores as achievement measures (Figure A.6).[16]

Finally, the achievement gap could reflect that female economists are selected for career steps earlier than comparable male economists. We tackle this issue, first, by augmenting the main specification with non-parametric controls for PhD age (Figure A.7) and, second, by using an alternative achievement metric—the rank in the achievement distribution of economists with similar PhD age—that captures expected long-run achievement rather than achievement up until the career step (Figure A.8).[17] While the results are qualitatively similar to the main results, accounting for PhD age generally seems to decrease the estimated gender gaps, suggesting that the gaps in long-run achievement may be somewhat smaller than the gaps observed at the time of the career step. It also raises questions about another dimension of unequal treatment—the timing of career steps conditional on long-run expected achievement—which we cannot address rigorously with our empirical design.[18]

4.3. Comparison of quantiles

Fig. 4 plots the cumulative distribution of "relative academic achievement" separately for males (gray) and females (color) in each of the four domains. The results give rise to different conclusions across domains.

For faculty positions, the male and female distributions are highly similar until the median (Panel A). Specifically, marginal candidates, i.e., those at say the 5th or 10th percentile, do not exhibit any visible gender differences. Around the median, the two distributions start diverging and at each position at the top, i.e., the 90th or 95th percentile, males have more academic achievement than females. This pattern suggests that the bar for selection is similar for male and female candidates and that the difference in average achievement across successful male and female candidates reflects that the male distribution exhibits a thicker tail of candidates with extremely high levels of achievement relative to the career step they are making.

[16] If females are more likely to be teaching faculty or to be hired as "trailing spouses", it may contribute to the gender difference in academic achievement for faculty appointments. While we cannot address these issues rigorously, we note that teaching faculty only affect the estimates in the presumably rare cases where they have a Google Scholar profile and hold the same title as regular faculty.

[17] We approximate the PhD graduation year as the earliest of two events: the first citation and the first paper published in a top-500 journal.

[18] For faculty positions, the estimates are similar when we restrict the sample to "external hires", suggesting that our baseline results are not confounded by private information about internal candidates correlating with gender (Figure A.9). For grants, the estimates are similar for small and large grants, suggesting that our baseline results are not confounded by a correlation between grant size and gender (Figure A.10).

For research grants and network affiliations, the patterns are markedly different (Panels B and C). The entire female distribution is shifted left relative to the male distribution, indicating that successful female candidates have less academic achievement than their male counterparts at every position in the distributions. Specifically, the difference is pronounced at the bottom, suggesting that the threshold for making a career step in these domains tends to be lower for female than for male candidates. For editor positions, the pattern is similar except that the two distributions almost coincide below the 10th percentile and that the level difference between the male and female distributions is generally smaller (Panel D). This is suggestive of a lower threshold for females given that many "marginal" candidates are far above the 10th percentile.[19]

We complement the raw distributional comparisons with quantile regressions of relative academic achievement on gender. This yields estimates that are analogous to horizontal comparisons of the male and female distributions in Fig. 4 and allows for statistical inference. The results are illustrated in Figure A.11. For faculty positions, the achievement gap is close to zero and statistically insignificant in the bottom half of the distribution; for research grants and network affiliations, it is significant at all quantiles; and for editor positions, it is significant at all quantiles except at the very bottom (5th percentile) and at the top (from the 90th percentile).

Finally, we conduct an alternative test of gender differences at the achievement thresholds. For each unique career step, we identify the successful candidate with the lowest level of academic achievement as measured by citation counts and publication scores. We then compare the fraction of females in these two sets of marginal candidates to the fraction of females in the overall set of successful candidates within each domain. The results are illustrated in Figure A.12. Across all four domains and both measures of achievement, females constitute a larger share of the marginal candidates than overall. Consistent with the evidence above, the difference is particularly striking for research grants and network affiliations.

5. Conclusion

Male scholars occupy most of the top positions in economics and more broadly in academia. A common view holds that this asymmetry reflects unequal treatment in the sense that female scholars need more academic achievement than males to be selected for the same career steps.

Our analysis of four types of career steps in economics does not support this view. We consistently find that the average female scholar has less academic achievement than the average male scholar who makes the same career step. In all domains except faculty positions, this reflects gender differences among marginal scholars, consistent with lower achievement thresholds for females.

The results suggest that more subtle mechanisms are required to understand the low female representation in top academic positions.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data for this article can be found online at doi:10.1016/j.jpubeco.2026.105611.

[19] The average number of economists in the "mixed-gender" career steps that contribute to identification is less than 4.

Data availability

Data will be made available on request.

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