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# Gender Bias in the Publishing Process?

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# Gender Bias in the Publishing Process?

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**Abstract**

Using data on articles published in the top-five economic journals in the period 1991 to 2010, we explore whether the gender composition of editorial boards is related to the publishing success of female authors and to the quality of articles that get published. Our results show that female editors reduce, rather than increase, the share of articles that are (co-)authored by females. We also find evidence that female editors benefit article quality at low levels of representation on editorial boards, but harm article quality at higher levels. Several robustness checks corroborate these findings. Our results are broadly consistent with existing evidence on the behavior of gender-mixed hiring committees and of relevance for gender equality policy.

***Keywords:*** Gender bias, Citations, Journals, Editors.
***JEL Classification:*** A14, J16, J71.

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# 1 Introduction

In many areas in the economy, women are still severely under-represented. The economics profession is no exception, notwithstanding some significant changes over the last two decades. According to the annual report of the *Committee on the Status of Women in the Economics Profession (CSWEP)*[1], the share of female full-time economics professors has doubled between 1993 and 2015, increasing from a low 6.7% to 12.2% (Bartlett, 1999; McElroy, 2016) – which is still a very small figure, by any standard. Moreover, with only one in eight full-time economic professors being female, but a nearly threefold share (34.7%) of females among new PhD students in 2015, far fewer female than male economists are destined to enter the upper echelons of the academic hierarchy (McElroy, 2016). The reasons for this differential performance in careers are still disputed, despite extensive past research on the root causes of gender bias in employment and promotions both within and outside academia.

In this study, we explore a potential channel which to date has received surprisingly little, if indeed any, attention in the economics literature, the male domination of editorial boards and its consequences for the publishing success of female economists. Editors are important nodes, or gatekeepers, in the publishing process who ultimately decide which articles get slots in journals.[2] Such slots are limited and highly competitive, particularly in top economics journals.[3] Top publications are regarded a prime indicator for the productivity and potential of economists, and as such of great importance for tenure decisions, pay levels, and the ability of researchers to obtain third-party funding (Hamermesh, 2017).[4] Gender bias in the editorial process, if indeed present, may also entail significant efficiency losses if such bias adversely affects article quality. Knowledge of the role that

[1]The *CSWEP* is a standing committee of the *American Economic Association* since 1971. One of its tasks is to regularly monitor and report on the progress of professional women economists. Since its founding, CSWEP has surveyed some 250 departments annually.

[2]Editors can also take more indirect influence, e.g. by selectively assigning submissions to reviewers who favor certain subjects or do a better job at reviewing (which improves manuscript quality), or by influencing the decisions of other editors in board meetings or informal talks (Addis and Villa, 2003).

[3]Acceptance rates in the top five economic journals have fallen from 15 percent to approximately 6 percent over the last two decades (Card and DellaVigna, 2013).

[4]The overarching importance of publications for academic promotions find vivid expression in the popular proverb "publish or perish", a term first used in the academic context in 1927 (Doyle et al., 2012).

male-dominated editorial boards play in the publishing process is hence of great interest for equity (gender equality) *and* efficiency reasons. We explore both dimensions by analysing articles published in the period 1991 to 2010 in the top-five economics journals, that is, the *American Economic Review (AER)*, *Econometrica (ECO)*, the *Journal of Political Economy (JPE)*, the *Quarterly Journal of Economics (QJE)*, and the *Review of Economic Studies (RES)*. Exploiting for identification variation across journals and time in the share of female editors, we produce first empirical evidence on two related questions: first, whether the share of females in an editorial board has an impact on the share of articles (co-)authored by females that are published in a journal; and second, whether the extent of female representation on editorial boards affects article quality, as measured by the citations that published journal articles receive.

Our results show that female editorship affects both the frequency of female authorship and the quality of published articles. Specifically, we find the appointment of female editors to reduce the share of articles that are (co-)authored by females. We also find evidence that female editors benefit article quality at low levels of representation on editorial boards, but tend to harm article quality at higher levels. These findings suggest that the publishing process in economics is not governed by simple sex discrimination against women that could be easily rectified by (and hence would justify undifferentiated calls for) greater female representation on editorial boards. Given our data, we cannot test explicitly for the causal pathways underlying these relationships. However, our results are broadly consistent with theories, and findings in related areas, that stress the importance of gender composition of hiring committees for committee behavior.

Our study complements and contributes to the existing literature in several ways. First and foremost, this is the first study, to the best of our knowledge, to inquire into how the gender composition of editorial boards is related to the publishing success of female researchers and to the quality of articles that get published. Very few studies, in fact, have to date investigated the behavior of journal editors, despite their pivotal role in the publishing process and the importance of publications for academic careers (Laband and Piette, 1994; Medoff, 2003; Brogaard et al., 2014; Colussi, 2017). These studies, however, focus on professional ties, not gender differences, between editors and authors and whether such professional ties harm article quality because of favoritism. Second, we also add to the still small, but closely related, strand of literature which explores how the gender composition of evaluation committees in academia impacts the chances of female candidates to get hired or promoted (Bagues and Esteve-Volart, 2010; Bagues et al., 2017). Bagues and Esteve-Volart (2010) find relatively more female evaluators in recruiting committees for positions in the four main Corps of the Spanish Judiciary to reduce the chance of female candidates to be hired. Bagues et al. (2017), in turn, find that a larger presence of female evaluators in hiring committees for associate and full professorship positions in all academic disciplines in Italy and Spain does not increase either the quantity or the quality of female candidates who qualify. If anything, there is some indication that gender-mixed committees on some occasions tend to be less favorable towards female candidates than all-male committees and that men become less favorable towards female candidates as soon as a woman joins the committee. Finally, our study relates to a large and diverse literature which is concerned with various root causes for the female under-representation in the economics profession. Conceptually, this literature falls into two types, demand-side and supply-side explanations. Demand-side explanations center around the potential discrimination of women by employers, i.e. universities and research institutions (Kahn, 1993; Paola and Scoppa, 2015; Addis and Villa, 2003; Ginther and Kahn, 2004). Studies in this branch of literature suggest that women may suffer from statistical discrimination when productivity is unobservable or from decision-makers' aversion to interact with women. Supply-side explanations, in turn, emphasize potential male-female productivity gaps, as women often lack professional networks and female mentors (Blau et al., 2010; McDowell et al., 2006). There is also some evidence from this literature that women are less inclined to apply for promotions (Paola et al., 2015), that they shy away more from competition (Niederle and Vesterlund, 2010), and that they devote relatively more time to socially desirable tasks which do not get rewarded through promotions (Misra et al., 2012).

The paper proceeds as follows. Section 2 describes the data and identification strategy we use in our empirical analysis. Section 3 presents and discusses our regression results, including various robustness tests and heterogeneity checks. Finally, Section 4 summarizes our main findings, highlights areas that warrant further study, and concludes.

# 2 Data and Empirical Strategy

## 2.1 Data

For the empirical analysis, we compiled a new data set that contains information on all regular articles published in the period 1991 to 2010 in the top-five economics journals (*AER*, *ECO*, *JPE*, *QJE*, and *RES*).[5] Our observation period starts in 1991 because of a major change in the *Journal of Economic Literature (JEL)* classification system in 1990 (see below for details) and ends in 2010 so that each article has a minimum vintage since publication of at least six years before we measure their quality on 30 December 2016 through the cumulative citations they have received until this date. Overall, our data set contains information on $4,431$ articles.

For each article in our data set, we collected and merged information from three sources: the article itself, editorial information provided in individual issues, and *Web of Science (WoS)* citation statistics. From the articles themselves, which are our unit of analysis, we recorded the journal in which they appeared, their year of publication, their issue number, their first and last page number, and the names and institutional affiliations (at the time of publication) of each of their authors. We then merged to each article editorial information (names of editorial board members) for the years 1988 to 2010 which we obtained from the *Front Matter* of individual issues in the respective journal a particular article was published. Finally, we added *WoS* cumulative citation counts to our data (our measure of article quality), which we extracted in December 2016. From this raw data, we constructed our two dependent variables (female authorship and article citations), our key explanatory variable (female editorship), as well as various control variables which capture features of articles of potential relevance for their scholarly impact. In the following, we discuss each of these in turn.

**Female Authorship:** The gender of authors is not reported in articles (and neither is the gender of editors in the front matters). We assigned gender to authors (and editors)

[5] We exclude articles that are comments, replies, or notes. We also exclude articles which were published in special issues and in the *Papers and Proceedings* issues of the *AER*.

using a three-step procedure. First, we checked (by hand) whether the first name provided a clear indication of a person's gender. If it did not, we checked for auxiliary information (such as photos) on the person's website that could help determine the gender. Finally, for cases still unresolved, we took recourse to two lists of first names (one for women and one for men) created after the 1990 U.S. Census by the *Post-enumeration Survey (PES)*.[6] Both lists contain first names and their respective likelihoods to appear in the *PES*. If a first name appears both in the female and in the male list, we assigned that gender to a person for which the first name has a higher likelihood of appearance.[7] Using this gender information, we then constructed our measures of female authorship (and female editorship). In line with the literature (Laband and Piette, 1994; Medoff, 2003; Brogaard et al., 2014), we define female authorship of an article in our baseline specification by way of a dichotomous variable which takes value one if an article has at least one female author, and zero otherwise.[8]

**Female Editorship:** Finding an appropriate measure for the degree of female representation on an editorial board of a journal at the time that it decides on the acceptance or rejection of a particular article submitted for publication is more demanding than defining female authorship. This is for two reasons. First, the top-five economics journals publish different types of editors in the *Front Matter* of their issues which may not be involved to the same degree in the actual editorial decision process. Second, as lags between the submission and actual publication of articles vary across articles, journals, and time (Ellison, 2002), and are often very sizable in length, editors named in the *Front Matter* of a particular issue need not be the editors that have actually decided to accept the articles published in that issue. Concerning the first issue, there is little consensus in the literature that could provide guidance (Laband and Piette, 1994; Medoff, 2003; Brogaard et al., 2014;

[6]The *PES* is an independent survey conducted after a census that is used to evaluate the quality of the census.

[7]For about 45 percent of the articles, the gender of all authors could be determined using the first method. For about 97 percent of the articles, the gender of all authors could be determined using the first two methods, and for about 98 percent of the articles, the gender of all authors could be determined using all three methods. For less than two percent of articles, the gender of all authors could not be determined. We exclude these articles from our estimation sample. The gender of all editors could be obtained with the first and second method.

[8]In our robustness analysis, we will use also alternative thresholds to define female authorship of an article.

Colussi, 2017).[9] We therefore asked the editorial office of each journal, which editors at the journal actually directly handle, and ultimately decide on, submitted manuscripts. Based on the feedback we received from these inquiries, we consider for the *QJE* the board of editors (3-4 persons, depending on the issue), for *ECO* the editor and coeditors (1 editor and 3-6 coeditors, depending on the issue), for the *RES* the managing editors (2-5 persons, depending on the issue), for the *AER* the editor and coeditors (1 editor and 3-6 coeditors, depending on the issue), and for the *JPE* only the editors (4-7 persons, again depending on the issue) which are named also on the *Front Matter* of its issues. Henceforth, we will refer to these decision-makers as 'editors', irrespective of their formal status and denomination at a particular journal outlet.[10] Concerning the second issue, previous studies either ignore submission-to-publication lags (Laband and Piette, 1994; Medoff, 2003; Colussi, 2017), or consider the editorial board in charge one, two, or three years before the publication of an article (Brogaard et al., 2014). In our study, we follow the latter approach. Specifically, we consider in our baseline specification the average share of female editors of a journal over the three years before an article was published (henceforth referred to as 'editor share'), but also make use of alternative measures in our robustness checks.[11]

**Article Citations:** As a proxy for the quality of articles, we obtained cumulative *Web of Science (WoS)* citation counts for each article in our data set from the *WoS* website.[12] We used the advanced search option on the *WoS* website for a listing of all published articles by journal and year and their citations reported in the different *WoS* databases. Our citation count is based on the total number of citations reported in these databases.

[9]Laband and Piette (1994) consider all editors, coeditors, and associate editors. Medoff (2003) and Colussi (2017) consider only the editor and coeditors, and Brogaard et al. (2014) only editors.

[10]Female editors in our sample have a lower *h-index* and have published less articles in the top-five economics journals in the five years prior to their appointment than their male editorial colleagues at the time of their appointment. All female editors, as well as nearly all male editors, are affiliated to top-ranked US universities.

[11]Knowing the editors for each issue, we first calculated for each issue the share of female editors named in the respective *Front Matter*. We then calculated the mean annual share for a particular year by adding the female editor shares of all issues and dividing this sum by the total number of issues in the respective year. Note that this share is affected not only by appointments and retirements of editors, but also by changes in the absolute number of editors and the time that a new appointment or retirement occurs within a particular year (i.e. from which issue in a year an editorial change takes effect).

[12]Access to the *WoS* website at `https://apps.webofknowledge.com` is restricted to registered individual or institutional users and requires login.

We collected this citation data on a single day, 30 December 2016. Articles in our data therefore have a vintage of at least six years before taking stock of the scholarly impact.

***JEL* Codes:** Some fields are more heavily researched than others, and some fields may be researched more by female economists than male economists. This is of importance, as articles from more heavily researched fields are likely to get cited more often. To control for such potential level differences in citations by research area, we generate a set of indicator variables that classify articles into major fields – the twenty 1-digit *Journal of Economic Literature (JEL)* codes – using the *JEL* information provided for each article on the *EconLit* webpage (Medoff, 2003). Most articles state more than one field and hence have more than one *JEL* code. The last major change in the *JEL* classification system occured in 1990 (Cherrier, 2017). It is for this reason that we restrict our analysis to articles which have been published after 1990.

**No. of Authors, Length of Article, and Year of Publication:** The ability of an article to generate citations (our measure of article quality) may also vary with the number of authors to an article, its length, and its year of publication. More authors are likely to enjoy efficiency gains from specialization and a division of labor (Boschini and Sjörgen, 2007), and higher quality research may require more pages (Medoff, 2003). Time of publication is likely to correlate systematically with citations. As we record citations for all articles at the same point in time (30 December 2016), articles published earlier are of older vintage when we measure their scholarly impact. To account for these potentially confounding influences in our regression analysis, we generated two sets of indicators, one for the year of publication of an article, and one for the number of authors to an article. We also generated a measure of the standardized page length of an article. For this, we first calculated the unadjusted page length of an article as the difference between the page number of the last and first page of an article, plus one. As the formats of published articles and hence their page densities (in terms of letters to a page) differ between journals, we then normalized the page length of an article to a page length compliant to *AER* page limits, using the procedure in Card and DellaVigna (2013).

## 2.2 Summary Statistics

Table 1 presents summary statistics for all regular articles published in the top-five economics journals in 1991-2010. Columns 1-5 consider each of the five journals separately, column 6 the total sum of all articles published in these journals. The *AER* accounts for most articles in our sample (25.4%), the shares of the other journals vary between 18.1% and 19.2%.[13] Overall, our data set contains information on $4,431$ articles.

Table 1 provides several insights. First, as shown in the first row of Panel A, females account for only 4.1% of editors among the top-five economics journals in the observation period. This very low average is caused to a large part by two factors. First, two journals, the $QJE$ and the $RES$, have no female editor in any year of our observation period. Second, no top-five journal has a non-zero female editor share before 1997. These important heterogeneities across journals and time are illustrated also in Figure 1, which plots for the period 1991 to 2010 for each journal and year our baseline measure of the female editor share, i.e. the average share of female editors for the 3 years prior to a particular calendar year. Figure 1 reveals that the three top-five journals with a non-zero female editor share (*AER*, *ECO*, *JPE*) display sizable year-to-year changes in the gender composition of their editorial boards. The female editor share hence exhibits great variability both across journals and time, a variability we will exploit for identification in our empirical analysis.

Second, articles with at least one female author account for only 16.3% of all articles in our data (see second row of Panel A in Table 1). Female-authored articles are most common in the *QJE* (21.0%), and least frequent in *ECO* (10.5%). The shares in the other journals fall in a narrow range between 15.9% and 17.6%. Further insights are provided by Figure 2, which plots for each journal the share of articles per annum that have some female author. First, the share of female-authored articles has risen steadily for all journals over the twenty years we consider in our data; and second, the share of female-authored articles in a journal, and differences in that share between journals, displays great variability across time.

[13] The *AER* publishes by far the most articles per year (an average of 56.3 per year in our observation period), and *RES* the least (40.1). *QJE*, *JPE*, and *ECO* publish respectively 41.4, 41.4, and 42.5 articles per year.

Table 1: Summary Statistics

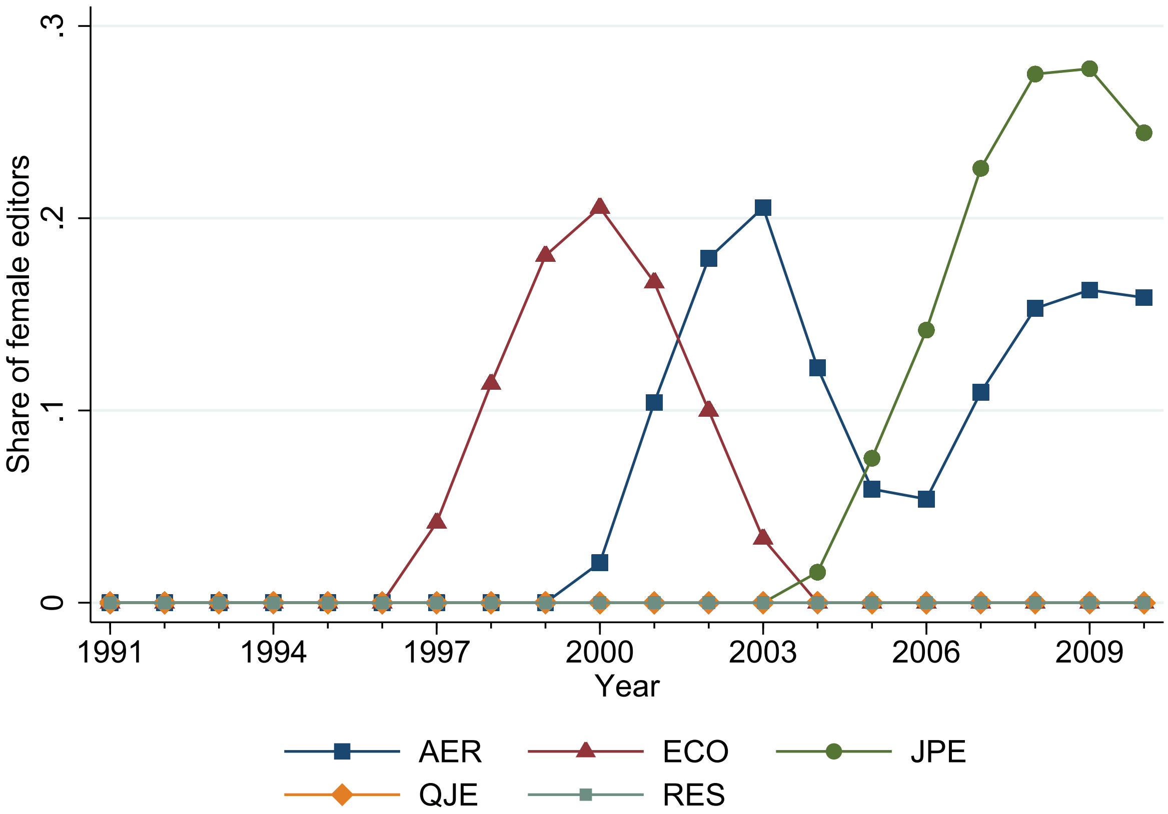
| | *AER* | *ECO* | *JPE* | *QJE* | *RES* | All |
|---|---|---|---|---|---|---|
| *A. Gender composition (share female):* | | | | | | |
| Editorship | .082 | .042 | .083 | .000 | .000 | .041 |
| Authorship | .176 | .105 | .159 | .210 | .160 | .163 |
| *B. Article citations:* | | | | | | |
| *WoS* (mean) | 126.8 | 123.3 | 123.5 | 184.0 | 71.8 | 126.2 |
| *WoS* (median) | 71.0 | 59.0 | 62.0 | 109.0 | 33.0 | 63.0 |
| *C. Article features (mean):* | | | | | | |
| No. of standardized pages | 38.6 | 40.7 | 36.3 | 37.3 | 39.7 | 38.5 |
| No. of authors | 1.9 | 1.8 | 1.9 | 2.0 | 1.8 | 1.9 |
| No. of *JEL* codes | 1.9 | 1.4 | 1.8 | 1.8 | 1.6 | 1.7 |
| Vintage (years) | 15.1 | 15.8 | 16.2 | 15.6 | 15.0 | 15.5 |
| *Share of articles:* | .254 | .192 | .187 | .187 | .181 | 1 |
| *No. of articles:* | 1,125 | 849 | 828 | 827 | 802 | 4,431 |

*Notes:* The table reports summary statistics for all regular articles published in the top-five economics journals in the years 1991-2010. All entries are means, except for *WoS* (median) article citations reported in Panel B. Panel A reports the share of female editors and the share of articles with at least one female author. Panel B reports mean and median cumulative *Web of Science (WoS)* article citations as of December 2016. Panel C reports mean article length based on standardized pages, which were calculated using a routine suggested by Card and DellaVigna (2013), the mean number of authors of articles, the mean number of 1-digit *JEL* codes recorded for articles on *EconLit*, as well as the mean vintage (in years) of articles published in our observation period (1991-2010) at the time we measure their scholarly impact by *WoS* citations in December 2016.

Third, mean citations vary greatly across the top-five economics journal (see Panel B in Table 1). They are highest for the *QJE* (184.0 citations), and lowest for *RES* (71.8 citations), with shares for the remainder of journals all clustered closely around 125 citations per article. The clear top position for the *QJE* in our data, but not the bottom one for *RES*, is consistent with recent *Journal Citation Reports* by *Thomson Reuters*, the most widely referenced journal ranking in use.[14] Furthermore, median *WoS* citations are much

[14]However, the top rank for the *QJE*, and the bottom rank for the *RES* we find, is consistent with the journal rankings emerging from previous research that covers observation periods similar to the one

Figure 1: Share of female editors per annum in the top-five economics journals, 1991-2010



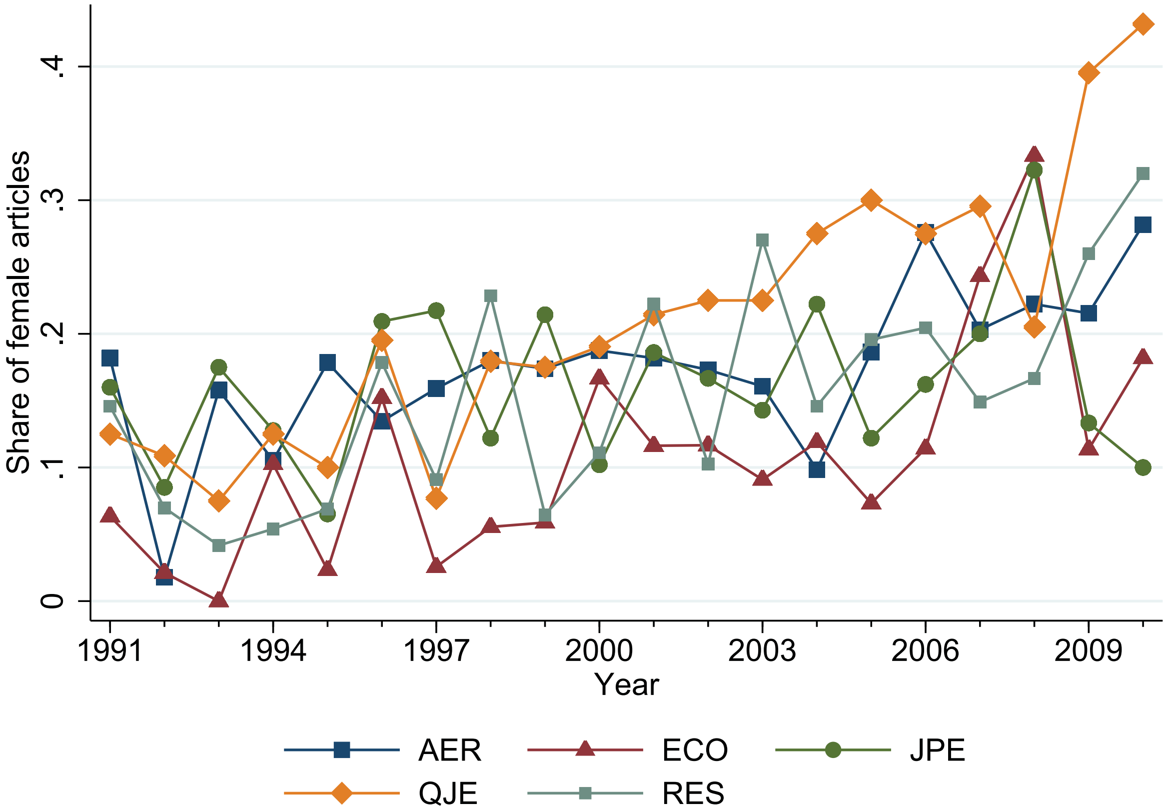

*Notes:* The figure plots the female editor shares for the period 1991 to 2010 in the *American Economic Review (AER)*, *Econometrica (ECO)*, the *Journal of Political Economy (JPE)*, the *Quarterly Journal of Economics (QJE)*, and the *Review of Economic Studies (RES)*. The female editor shares are averages of the shares of female editors over the last 3 years prior to a particular calendar year.

smaller than mean *WoS* citations for all five journals, which indicates that the citation distribution is heavily right-skewed. Our *WoS* citation counts also host some sizable outliers. 5.4% (15.1%) of articles have received less than 10 (20) citations as of 2016; at the same time, the most cited paper ($5,075$ citations) received 40.2 times as many citations as the average article in our data (not shown in table). In the empirical analysis, we will take into account both such (potentially influential) outliers and the skewness of the citation distribution.

Fourth, concerning article features of potential relevance for the scholarly impact of a

considered in this study (Card and DellaVigna, 2013; Hamermesh, 2017).

Figure 2: Share of female-(co-)authored articles per annum in the top-five economics journals, 1991-2010




*Notes:* The figure plots for each of the top 5 economic journals (AER, ECO, JPE, QJE, and RES) in the period 1991 to 2010 the annual share of articles that are (co-)authored by a female researcher.

study, several insights are provided by Panel C in Table 1. For one thing, mean article length (measured in standardized pages) varies little across journals. Articles in *ECO* are the longest (40.7 pages), and articles in the *JPE* the shortest (36.3 pages). Average article length in our data is 38.5 pages. Over time, average page length has increased substantially in all five journals – in our data, by about a third from 1991-2000 to 2001-2010 (not shown in Table 1).[15] For another, articles with multiple authorship clearly dominate, in particular joint work by two co-authors. Articles with two authors account for nearly half (47.2%) of all articles in our data, while single-authored articles account for only a third (34.4%)

[15]This trend development is well documented in the literature (Card and DellaVigna, 2013; Ellison, 2002).

(not shown in Table 1).[16] The average number of authors to an article in our data is 1.9. Concerning thematic breadth, the average number of *JEL* codes used to classify an article is 1.7 and varies from 1.4 for *ECO* to 1.9 for the *AER*. The three *JEL* codes used most often in the classification of an article are *(D) Microeconomics* (41.0%), *(J) Labor and Demographic Economics* (18.0%), and *(C) Mathematical and Quantitative Methods* (17.7%).[17] Although all journals cover also the remaining *JEL* codes (with one common exception), frequency distributions of JEL classifications are not the same across the five journals.[18] In *ECO*, *JEL* code *(C) Mathematical and Quantitative Methods* is highly overrepresented, and *JEL* code *(J) Labor and Demographic Economics* underrepresented; and in the *QJE* and *JPE*, *(J) Labor and Demographic Economics* is overrepresented. Finally, considering the vintage of articles on 31 December 2016 (the day we record their cumulative citation counts), average article age in our data set is 15.5 years. Among the five journals, mean article age is highest in the *JPE* (16.2 years), and lowest in *RES* (15.0 years). The top position for the *JPE* is the result of a sizable reduction in the number of articles published in this journal outlet over time, falling from 50 in 1991 to just 30 in 2010. Similarly, the low average vintage of articles in *RES*, is caused in large part by an upward trend in the total number of articles it publishes. Following a decline in article output per annum to less than 30 per year in the years 1995 to 1997, output rose steadily thereafter to 50 articles in 2010. The youngest articles in our sample are 6 years when taking stock of their quality. At this minimum vintage, cumulative citations received should provide a good proxy for the long-run scholarly impact of an article (Hamermesh, 2017).

[16] Multiple authorship has expanded strongly over time. Of all articles published in 1991 to 2000, 59.4% had multiple authors; in the decade that followed (2001 to 2010), this figure had risen to 71.7% (not shown in Table 1). Like the development in average article length, this trend decline of single-authored papers has been noted and documented in the literature (Card and DellaVigna, 2013).

[17] The *JEL* code descriptors can be found on the website of the *American Economic Association*, at `https://www.aeaweb.org/econlit/jelCodes.php`.

[18] *JEL* code *(Y) Miscellaneous Categories* is not used in any journal to classify articles, and no article in the *RES* is assigned *JEL* code *(A) General Economics and Teaching*.

## 2.3 Empirical Strategy

To explore whether the gender composition of editorial boards is related to the publishing success of female authors, we estimate variants of the following linear probability model:

$$femart_{ijt} = \alpha_0 + \alpha_1 femedshare_{jt} + \delta_j + \gamma_t + \varepsilon_{ijt}, \tag{1}$$

where $femart_{ijt}$ is a dichotomous variable taking value one if article $i$ published in journal $j$ in year $t$ has at least one female author, and zero otherwise. The explanatory variable of key interest is $femedshare_{jt}$. It measures the female editor share for journal $j$ and year $t$ in which article $i$ was published. We also control for journal fixed effects ($\delta_j$) to account for potential time-invariant systematic differences between journals in the likelihood to publish an article that is (co-)authored by a female (base journal is *AER*), and time fixed effects ($\gamma_t$) to account for common trend changes across journals in the publishing success of female economists (base year is 1991). $\varepsilon_{ijt}$ is an error term. Throughout, we will cluster standard errors at the journal-year level.

The coefficient of primary interest is $\alpha_1$. It captures the ceteris paribus marginal effect of a change in the female editor share on the probability that a published article has at least one female author. Prior research provides little guidance on the sign to expect of $\alpha_1$. Studies exploring the importance of gender for evaluators' decisions on and preferences for candidates produced mixed findings. Some studies found evaluators to prefer same gender candidates (Wenneras and Wold, 1997; Casadevall and Handelsman, 2014; Paola and Scoppa, 2015), which suggests $\alpha_1 > 0$, i.e. more articles with female (co-) authors should be published when female representation on editorial boards rises. Other studies found exactly the opposite, i.e. a preference of editors for candidates of the opposite rather than the same gender (Donald and Hamermesh, 2006; Broder, 1993; Ellemers et al., 2004), which favors $\alpha_1 < 0$. There is also some empirical evidence which suggests that the gender of candidates is irrelevant for the preferences and decisions of evaluators (Blank, 1991; Marsh et al., 2009; Abrevaya and Hamermesh, 2012; Bagues et al., 2017), implying $\alpha_1 = 0$.

To explore whether the gender composition of editorial boards is related to the quality of articles that get published, we estimate variants of the following linear regression model:

$$\log citations_{ijt} = \beta_0 + \beta_1 femedshare_{jt} + \mathbf{x_{ijt}}'\phi + \delta_j^* + \gamma_t^* + \upsilon_{ijt}, \tag{2}$$

where $\log citations_{ijt}$ is the log total citation count (plus one) as of December 2016 of article $i$ published in journal $j$ in year $t$. We use the logarithm of citations because the citation distribution is heavily skewed and exhibits some sizable outliers (see discussion in Section 2.2). The explanatory variable of key interest is again $femedshare_{jt}$, i.e. the female editor share of journal $j$ in the year $t$ that article $i$ was published. Journal ($\delta_j^*$) and time ($\gamma_t^*$) fixed effects control for permanent quality differences between journals, respectively common trends across journal outlets in average article quality over time and the fact that articles published earlier are of older vintage when recording their total citation count. Vector $\mathbf{x_{ijt}}$ contains further controls for article features of potential relevance for the scholarly impact of a study. These include a measure of article length, measured in standardized pages, a set of indicators for the number of authors to an article (base group is single author), which ranges from 1 to 5 in our data, and a set of indicators for the 1-digit JEL codes assigned to an article (base group is category A). The error term of the model is $\upsilon_{ijt}$. Again, we will cluster standard errors at the journal-year level.

The coefficient of interest is $\beta_1$. It captures how a marginal change in the female editor share affects the citation count of published articles, i.e. their quality. If $\beta_1 > 0$, higher quality articles tend to get published when females are more strongly represented on editorial boards. If $\beta_1 < 0$, greater female representation on editorial boards tends to harm article quality, and if $\beta_1 = 0$, the gender composition of editorial boards is of no consequence for the scholarly impact of published articles.

# 3 Results

This section reports and discusses our findings. Section 3.1 presents our results on female editorship and the frequency of female authorship, Section 3.2 our results on female editorship and article quality. In each section, we test for the robustness of our results. In Section 3.2, we also consider potential effect heterogeneity in the relationship between female editorship and article quality. We conclude each section with a discussion of our findings and the potential causal pathways that may explain them.

## 3.1 Female Editors and Female Authorship

Table 2 contains our main regression output on the relationship between the share of female editors and the extent of female authorship (cf. model equation (1)). We report results for three different estimation samples. The first sample is the largest and covers all journals in all years of our observation period (see column (1) of Table 2). The second sample excludes articles from the *QJE* and *RES*, as these two journals at no point in the observation period ever have a positively-valued female editor share. The third sample excludes on top of the *QJE* and *RES* also all articles published in 1991 to 1996, as no journal has a positive female editor share in these first six years of our observation period (see discussion in Section 2.2 and Figure 1). The use of these different estimation samples provides a test of robustness or sensitivity of our findings to the exclusion of journal outlets and calendar years with zero variation in, and zero level of, the female editor share across time (in the case of journal outlets), respectively journals (in the case of calendar years). Both in this section, and in Section 3.2 that follows, we will make use of these three estimation samples.

Our baseline regression for the unrestricted sample produces a negative coefficient estimate for our measure of female editorship which is statistically significant at the 5% level (see column (1) of Table 2). According to this point estimate, an increase in the share of female editors by ten percentage points reduces the likelihood of an article to have a (at least one) female author by 2.58 percentage points. This is a quite sizable effect, given that only 16.3% of articles published in the top-five economics journals in 1991 to 2010 are

Table 2: Female editors and female authorship

| | Dep. variable: female authorship (0/1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Editor share | $-0.258^{**}$ | $-0.202^{**}$ | $-0.203^{**}$ |
| | (0.122) | (0.099) | (0.097) |
| QJE | 0.021 | | |
| | (0.016) | | |
| JPE | $-0.011$ | $-0.012$ | $-0.022$ |
| | (0.016) | (0.014) | (0.017) |
| ECO | $-0.074^{***}$ | $-0.072^{***}$ | $-0.072^{***}$ |
| | (0.015) | (0.013) | (0.017) |
| RES | $-0.036^{***}$ | | |
| | (0.016) | | |
| Constant | $0.144^{***}$ | $0.330^{***}$ | $0.333^{***}$ |
| | (0.030) | (0.054) | (0.055) |
| $R^2$ | 0.031 | 0.026 | 0.019 |
| Observations | 4,346 | 2,755 | 1,884 |

*Notes:* The table shows selected estimated coefficients from three different linear regressions. The first column considers all articles published in 1991-2010. The second column considers all articles published in 1991-2010, but excludes articles published in the QJE and in RES. The third column considers all articles published in 1997-2010 and excludes articles published in the QJE and in RES. The endogenous variable in all regressions is dichotomous taking value one if at least one author of an article is female, and zero otherwise. *Editor share* measures the average female editor share of a journal in the three years prior to the publication of an article. All specifications control for main effects of journal outlet (base category is AER) and year fixed effects (base year is 1991). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

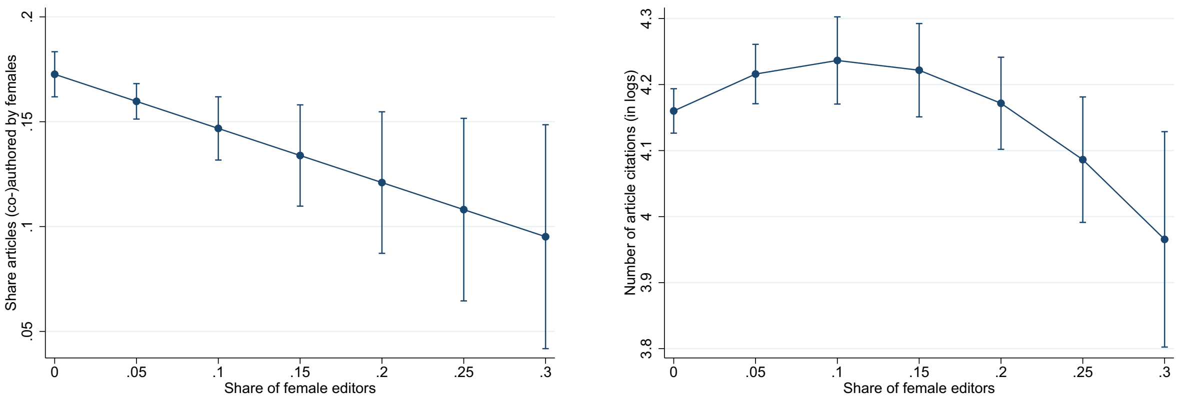
(co-)authored by females (see summary statistics in Table 1). Restricting the estimation sample to the *AER*, *JPE*, and *ECO*, as done in our second specification (see column (2) of Table 2), produces similar results, both qualitatively and quantitatively. The same holds true, when we omit in addition all articles published in the years 1991 through 1996 (see column (3) of Table 2). For both the unrestricted and the two restricted estimation samples, we hence find an increase in the female editor share to be associated with a decline in the share of articles that are (co-) authored by a female.[19] Greater female representation on editorial boards, it appears, tends to harm rather than benefit female authors in the publishing process.[20] Based on estimates from the unrestricted sample, the left graph in

[19]We obtain similar results when we assign the articles that were dropped because of missing gender information to female authored articles or to male only articles.

[20]Estimating probit instead of linear models produces similar results, both qualitatively and quantitatively. In the unrestricted sample, the estimated marginal effect is $-0.26$, and in the two restricted samples, it is respectively $-0.23$ (each of these estimates is significant at the 5% level). Full probit results are available from the authors upon request.

Figure 3 plots the predicted probability of an article to be (co-)authored by a female for different female editor shares, which range from 0% to 30% in our data. Over this range, the predicted share of articles (co-)authored by females declines almost by half, from 17.2% when no female is on the editorial board to 9.2% when women account for a third of editors.

Figure 3: Predicted share of articles (co-)authored by females and predicted log number of article citations for different female editor shares




*Notes:* The left graph plots the predicted share of articles (co-)authored by females for different female editor shares based on our baseline estimates for the unrestricted estimation sample reported in column (1) of Table 2 which covers all articles published in the top-five economics journals in the period 1991 to 2010. The right graph plots predicted log citations to an article for different female editor shares based on our estimates reported in column (1) of Table 6 which are also for the unrestricted estimation sample and cover all articles published in the top-five economics journals in the period 1991 to 2010. The point estimates are marked by a dot. The vertical bands indicate the 90% confidence interval of each estimate.

We conducted a series of further checks to assess the robustness of our finding (see Table 3). First, we added a quadratic term of the share of females on an editorial board to our set of regressors to allow for potential non-linearities in the relationship between the extent of female authorship among published articles and the degree of female representation on editorial boards of journals. Re-estimating our model in equation (1) for the three estimation samples considered in Table 2, however, does not produce evidence to suggest that our baseline linear model suffers from mis-specification in functional form. As shown in Panel A of Table 3, the estimated coefficient of the squared female editor share turns out statistically insignificant in all three regressions, while the estimated coefficient of the non-squared female editor share remains negative throughout and also statistically significant at the 10% level in two out of the three regressions (in the unrestricted and in the most restricted estimation sample).

Table 3: FEMALE EDITORS AND FEMALE AUTHORSHIP - ROBUSTNESS CHECKS I

| | Dep. variable: female authorship[a] | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *A. Linear-quadratic editor term:* | | | |
| Editor share | $-0.526^{*}$ (0.294) | $-0.388$ (0.282) | $-0.545^{*}$ (0.280) |
| Editor share sq. | 1.287 (1.582) | 0.880 (1.322) | 1.608 (1.322) |
| *B. Female authorship ($\geq 50\%$):* | | | |
| Editor share | $-0.153^{*}$ (0.087) | $-0.121$ (0.073) | $-0.126^{*}$ (0.073) |
| Editor share[b] | $-0.177^{*}$ (0.097) | $-0.135^{*}$ (0.079) | $-0.140^{*}$ (0.079) |
| *C. Articles/authors per journal and year:* | | | |
| Editor share[c] | $-0.260^{**}$ (0.103) | $-0.202^{*}$ (0.101) | $-0.199^{*}$ (0.106) |
| Editor share[d] | $-0.131^{**}$ (0.057) | $-0.100^{*}$ (0.055) | $-0.097^{*}$ (0.055) |
| *D. Annual female editor share in $t-2$:* | | | |
| Editor share | $-0.216^{**}$ (0.101) | $-0.184^{**}$ (0.081) | $-0.184^{**}$ (0.080) |

*Notes:* The table shows estimated coefficients of the female editor share in different regressions using the unrestricted (in column (1)) and two restricted estimation samples (in columns (2) and (3)) from the previous regression table (see notes to Table 2 for details). Entries in each column of Panel A are from a different regression. In the other panels, estimates in each cell are from a different regression. [a] In Panels A and D, the dependent variable is dichotomous and takes value one if at least one author of an article is female, and zero otherwise; in Panel B, the dependent variable is dichotomous and takes value one if at least 50% of authors of an article are female, and zero otherwise; in Panel C, the dependent variable measures the share of all articles in a journal outlet per annum that are co-authored by females (first row estimates in Panel C), respectively the share of all authors who publish in a journal outlet per annum who are female (second row estimates in Panel C). [b] Second row estimates in Panel B are obtained from regressions that exclude articles which are co-authored by females but where females account for less than 50% of authors to an article. [c] First row estimates in Panel C are based on regressions in which the unit of analysis is the article output of a journal in a given year. [d] Second row estimates in Panel C are based on regressions in which the unit of analysis is the total number of authors who publish in a journal in a given year. Estimates in Panel D are from regressions that use the annual female editor share two years prior to the publication of an article. The number of observations in columns (1), (2), and (3) is respectively 4,346, 2,755, and 1,844 in Panel A, in the first row of Panel B and in Panel D, 4,163, 2,657, and 1,801 in the second row of Panel B, and 100, 60, and 42 in Panel C. All specifications control for main effects of journal outlet (base category is AER) and year fixed effects (base year is 1991). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

Second, we changed our dependent variable to a dichotomous measure of female authorship of an article that takes value one if at least 50% of authors of an article are female, and zero otherwise. This alternative dependent variable hence identifies only articles with significant or predominantly female authorship (rather than all articles with a positive female author share that may be but marginal on occasion). We estimated two sets of regressions, one for all articles in the respective three estimation samples (see first row estimates in Panel B of Table 3), and one for articles that are either all male in authorship or that have at least 50% females among their authors (see second row estimates in Panel B of Table 3).[21] As is evident, estimated coefficients in all six specifications are again negatively signed and differ but little within and across our three basic estimation samples. Furthermore, five of the six estimates are statistically significant at the 10% level. Our basic finding of a negative relationship between the female editor share and female authorship hence proves robust also to changes in the way we measure such authorship and changes in the baseline type of article we consider in the analysis as a benchmark (all-male, respectively not all-male authored).[22]

Third, we changed the unit of analysis from an individual article to the body of all articles published in a journal per annum (see first row estimates in Panel C of Table 3), respectively the total of authors who published in a journal in a particular year (see second row estimates in Panel C of Table 3). These changes necessitate also a change in our dependent variable. For the first exercise, we consider the yearly share of articles per journal that are co-authored by females;[23] and for the second, we consider the yearly share of female authors per journal.[24] By virtue of the first change, we exploit only journal-year variation in female authorship and in the female editor share. The second change, in turn,

[21] In the former case, a zero value of our dichotomous dependent variable hence identifies articles with a zero or low share ($< 50\%$) of females among the authors. In the latter, a zero value is assigned only to all-male articles and articles where women account for a minority of authors are dropped from the estimation sample.

[22] We obtain similar results when we use the share of females among the authors of an article as dependent variable.

[23] The yearly share of articles that are co-authored by females is obtained by dividing the number of female co-authored articles published in a journal in a given year by the total number of articles published in that journal and year.

[24] The yearly share of female authors is obtained by dividing the number of female authors who published in a journal in a particular year by the total number of authors who published in that journal in the same year.

provides a way to check whether the gender composition of authors to an article may be affected by changes in the female editor share in a way such that less articles with at least one female author may be published (our baseline result) but at the same time the share of females among all authors who publish in a journal outlet per year does not show such a decline (or possibly even an increase). However, both type of analyses again produce an estimated negative coefficient of the female editor share that is significant at least at the 10% level. Consistent with our baseline findings, more female editors are associated with less articles that are co-authored by females, as well as fewer females among the authors who publish in a journal outlet per annum.

Fourth, we replaced the female editor share for the three years prior to the publication of an article with the annual female editor share two years prior to the publication of an article. The latter measure has been favored and used in some of the literature (see Brogaard et al. (2014)). However, estimated coefficients of the female editor share again remain negatively signed and statistically significant in all three estimation samples.[25]

Finally, we used two alternative measures of female representation on an editorial board that better reflect the discrete nature of changes (or differences) in the gender composition of editorial boards that is caused by the appointment (or presence) of a female editor. So far, we have explored only the impact of a *continuous* change in the female editor share on the publishing success of female authors. Such change, however, need not be caused by the appointment of a female editor and does not differentiate between changes in the gender composition of boards at the extensive and intensive margin.[26] In a first set of regressions (see first row estimates in Table 4), we replaced the continuous female editor share with a dichotomous variable that takes value one if the female editor share is above 0%, and zero otherwise. This alternative measure hence considers only changes at the extensive margin. Furthermore, in a second set of regressions (see second row in Table 4),

[25]The same holds true if we use the annual female editor share one and three years (instead of two years) prior to the publication of an article.

[26]As noted in Section 2.1, a change in the editor share may be caused not only by appointments and retirements of editors, but also by changes in the absolute number of editors, the particular time that a new appointment or retirement occurs within a given year (i.e. from which issue in a year an editorial change takes effect), and by averaging over a moving three-year window prior to the publication of an article.

we used (as yet another alternative measure) a dichotomous variable that takes value one if a female editor was newly appointed to an editorial board in the three years prior to the publication of an article and excluded from the estimation sample all observations where the female editor share is above 0% but no female editor has been appointed in these three pre-publication years. The latter specification hence entails a comparison between articles published by boards that are either all male or have recently appointed a female editor. As is evident, however, estimated coefficients remain negatively signed in both specifications and are statistically significant at the 10% level in five out of the six regressions.

Table 4: FEMALE EDITORS AND FEMALE AUTHORSHIP - ROBUSTNESS CHECKS II

| | Dep. variable: female authorship | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Female Editor (0/1)[a] | $-0.037^{**}$ (0.016) | $-0.025$ (0.015) | $-0.028^{*}$ (0.015) |
| Female Editor (0/1)[b] | $-0.035^{**}$ (0.015) | $-0.028^{*}$ (0.014) | $-0.034^{**}$ (0.013) |

*Notes:* The table shows estimated coefficients in different regressions of a dummy variable which indicates whether a women is present on an editorial board. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The endogenous variable in all regressions is dichotomous, taking value one if at least one author of an article is female, and zero otherwise. Estimates in each cell are from a different regression. [a] First row estimates are from regressions that use a dichotomous explanatory variable which takes value one if the share of female editors is above 0%. [b] Second row estimates are from regressions that use a explanatory dichotomous variable which that takes value one if a female editor was appointed in the three years prior to the publication of an article. In this second set of regressions, observations are excluded from the estimation sample where the female editor share is above 0% but no female editor was appointed in the three years prior to the publication of an article. The number of observations in columns (1), (2), and (3) is respectively 4,346, 2,755, and 1,844 in the first row and 4,020, 2,429, and 1,558 in the second row. All specifications control for main effects of journal outlet (base category is AER) and year fixed effects (base year is 1991). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

Summarizing the above, our key finding of a negative relationship between the share of female editors and the extent of female authorship proves robust to a whole set of sensitivity checks. While our results provide no evidence on the specific causal pathways underlying this negative relationship, they are consistent with several explanations put forward in the literature. First, female editors may expect that there is an upper limit to the number of female authors who get accepted in the male dominated publishing process. To protect their standing as top female economists, female editors may hence discriminate against submissions by female authors (Broder, 1993). Second, male editors may be more supportive of submissions by female authors in an all-male editorial board than in a mixed-gender board, if female evaluators strengthen male identity (Akerlof and Kranton, 2000). Third, the behavior of female editors may be characterized by a ”queen bee syndrome” which makes female editors prefer male over female authors. Female editors may discriminate against female authors because they have got used to the male dominated system, have adjusted to it, and do not want it to change (Ellemers et al., 2004). Fourth, the appointment of a top female economist as an editor may significantly reduce the time she has available for research and harm her scholarly output. If so, and if the pool of top female economists is small, the (submission and) publication share of females in top-five economics journals may suffer as a consequence (Vernos, 2013).[27] Finally, female authors may submit fewer articles to journals with female editors because they expect a higher likelihood of rejection by female editors. It is also possible that female authors submit lower quality articles to journals with female editors because they expect, but do not receive, a preferential treatment by female editors. Hence, more female articles are rejected and less female articles get published.

Given our data, we cannot adjudicate between these rival, yet potentially also complementary, explanations. In any case, however, our findings clearly suggest that the publishing process in economics is not governed by simple sex discrimination of men against women that could easily be rectified by (and hence would justify undifferentiated calls for) greater female representation on editorial boards. The various potential root causes we reviewed above also support this critical view and call for utmost caution in the choice of policy tools to promote greater gender equality.

In the next section, we explore whether the female editor share is of consequence also for the average quality of articles that get published in a journal, as measured by the

[27]We re-estimated all specifications dropping articles co-authored by the female editors in our sample. The estimated coefficients of the female editor share, however, remain negative, significant, and virtually identical in magnitude to those of our baseline regressions. The same holds true when we only drop articles published by the female editors in the journals where they are editors at some point in time.

cumulative citations an article receives. We will also investigate, whether greater female representation on editorial boards has a different effect on the quality of articles that are co-authored by females, i.e. we will explore potential effect heterogeneity by gender of author.

## 3.2 Female Editors and Article Quality

Tables 5 and 6 contain our main regression output on the relationship between the share of female editors and the quality of published articles, as measured by the log of cumulative citations an article has received by December 2016. We estimate two versions of model equation (2), one that controls for the female editor share only in levels (see Table 5), and one that adds also its quadratic to the set of regressors (see Table 6). As in the last section, we again report results in each case for three different estimation samples, the unrestricted full sample, and the two samples with restricted journal coverage, respectively restricted journal and year coverage.

The main regression output for the first model version is shown in Table 5. As is evident, the female editor share does not exert a statistically significant influence on the citation count of an article in any of the three estimation samples.[28] Other regressors have estimated coefficients that are signed as expected and also statistically significant (see discussion in Section 2.1). Articles in the *QJE* tend to receive the most citations and articles in *RES* the least. The length of an article (measured in standardized pages) and the number of co-authors to an article both exert a positive effect on the cumulative number of citations an article receives. JEL fixed effects also help to explain variation in article performance (not shown).[29] Overall, the estimated models explain between one fifth and one fourth of the total variation in log citations in our data, a sizable fraction.

However, the models we estimated assume a linear relationship between the female editor share and log article citations, which might be too restrictive a functional form.[30]

[28]Running quantile regressions for the 10th, 25th, 50th, 75th, and 90th percentiles also produce coefficient estimates for the female editor share that lack statistical significance.

[29]The F-statistic for the joint significance of the JEL fixed effects is 7.31.

[30]Note also that estimated coefficients of our key regressor, although statistically insignificant, are all of

Table 5: Female editors and article citations

| | Dep. variable: log(citations+1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Editor share | 0.002 (0.271) | 0.397 (0.280) | 0.349 (0.251) |
| QJE | 0.242*** (0.054) | | |
| JPE | −0.108** (0.049) | −0.105** (0.046) | −0.213*** (0.048) |
| ECO | −0.188*** (0.043) | −0.171*** (0.045) | −0.200*** (0.053) |
| RES | −0.673*** (0.047) | | |
| Article length | 0.024*** (0.002) | 0.023*** (0.002) | 0.021*** (0.002) |
| 1 coauthors | 0.158*** (0.035) | 0.118** (0.045) | 0.135** (0.053) |
| 2 coauthors | 0.297*** (0.052) | 0.225*** (0.067) | 0.214*** (0.079) |
| 3 coauthors | 0.583*** (0.095) | 0.556*** (0.138) | 0.479*** (0.158) |
| 4 coauthors | 0.837*** (0.206) | 0.204 (0.163) | 0.142 (0.188) |
| Constant | 3.432*** (0.107) | 2.667*** (0.144) | 2.814*** (0.145) |
| $R^2$ | 0.238 | 0.186 | 0.203 |
| Observations | 4,431 | 2,802 | 1,915 |

*Notes:* The table shows selected estimated coefficients from three different regressions. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The dependent variable in all regressions is the log of the total citations count of an article plus one as of December 2016. All specifications control for main effects of journal outlet (base category is AER), year fixed effects (base year is 1991), and 1-digit JEL code fixed effects (base category is A). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

We therefore re-estimated all specifications using a linear-quadratic instead of a linear term for our key explanatory variable, i.e. the female editor share. As shown in Table 6, allowing for potential non-linearities in the relationship between the female editor share and log citations proves crucial. In all three estimation samples, the estimated coefficient of the female editor share is now positive *and* significant. Moreover, the estimated coefficient of its squared term is throughout negative and significant. The respective absolute magnitudes

the same sign. This is at least indicative of a systematic relationship between the female editor share and average article quality.

Table 6: FEMALE EDITORS AND ARTICLE CITATIONS - ALTERNATIVE SPECIFICATION

| | Dep. variable: log(citations+1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Editor share | 1.471* | 2.724*** | 1.734* |
| | (0.763) | (0.863) | (0.868) |
| Editor share sq. | −7.065** | −11.07*** | −6.546* |
| | (3.178) | (3.425) | (3.632) |
| $R^2$ | 0.238 | 0.188 | 0.204 |
| Observations | 4,431 | 2,802 | 1,915 |

*Notes:* The table shows estimated coefficients of the female editor share and its square in different regressions. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The dependent variable in all regressions is the log of the total citations count of an article plus one as of December 2016. All specifications control for main effects of journal outlet (base category is AER), year fixed effects (base year is 1991), article length (number of standardized pages), number of coauthors (base category is single-authored article), and 1-digit JEL code fixed effects (base category is A). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

of these differently signed estimates imply that the sign of the total effect of the female editor share eventually changes from positive to negative when the size of the female editor share gets larger.[31] This is illustrated graphically in the right graph of Figure 3 which plots predicted log citations to an article for different female editor shares based on our estimates reported in column (1) of Table 6 for the unrestricted estimation sample. Marginal increases in the female editor share begin to exert a negative effect on article quality when female representation on editorial boards exceeds 11.7%, and female editor shares above 22.2% even cause average article quality to fall below the level predicted for boards with zero female representation. In other words, female editors seem to benefit article quality at low levels of representation on editorial boards, but tend to harm article quality at higher levels.

We also checked the robustness of this finding in several ways. First, we used an alternative system of classifying articles into major thematic fields to control for potential level differences in citations by research area. Replacing our set of indicators for 1-digit

[31] Least-absolute deviation (LAD) regressions yield virtually identical results in terms of the sign, magnitude, and statistical significance of our key estimated coefficients. The estimated coefficient of the squared female editor share in specification (3), however, is only imprecisely estimated when using LAD.

Table 7: Female editors and article citations - robustness checks I

| | Dep. variable: log(citations+1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *A. Alternative JEL classification:* | | | |
| Editor share | $1.485^{*}$ | $2.731^{***}$ | $1.718^{*}$ |
| | (0.805) | (0.920) | (0.916) |
| Editor share sq. | $-6.726^{**}$ | $-10.69^{***}$ | $-5.999$ |
| | (3.322) | (3.657) | (3.784) |
| *B. Articles per journal and year:* | | | |
| Editor share | $4.889^{***}$ | $5.649^{***}$ | $4.676^{***}$ |
| | (1.634) | (1.671) | (1.557) |
| Editor share sq. | $-26.33^{***}$ | $-27.98^{***}$ | $-23.74^{***}$ |
| | (7.292) | (7.441) | (6.970) |
| *C. Annual female editor share in $t-2$:* | | | |
| Editor share | $1.310^{**}$ | $1.998^{***}$ | $1.424^{**}$ |
| | (0.626) | (0.638) | (0.630) |
| Editor share sq. | $-5.916^{**}$ | $-7.510^{***}$ | $-5.162^{**}$ |
| | (2.375) | (2.278) | (2.325) |

*Notes:* The table shows estimated coefficients of the female editor share and its square in different regressions. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The dependent variable in all regressions, except those in Panel B, is the log of the total citations count of an article plus one as of December 2016. Entries in each column of a panel are from a different regression. In Panel B, the dependent variable measures the log of the total number of citations that the sum of articles published in a particular journal and year have received as of December 2016. The unit of analysis in Panel B is hence the entire article output of a journal in a given year. Estimates in Panel C are from regressions that use the annual female editor share two years prior to publication as independent variable. The number of observations in columns (1), (2), and (3) is respectively $4,431$, $2,802$, and $1,915$ in Panels A and C, and 100, 60, and 42 in Panel B. All specifications control for main effects of journal outlet (base category is AER), year fixed effects (base year is 1991), article length (number of standardized pages), number of coauthors (base category is single-authored article), and 1-digit JEL code fixed effects (base category is A), except those in Panel A, which use instead indicators for fourteen thematic groups following the classification of Card and DellaVigna (2013). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

JEL codes, we make use of a classification suggested by Card and DellaVigna (2013) which groups articles into fourteen thematic groups. As shown in Panel A of Table 7, however, this change in classification proves immaterial. The relationship between log citations and female editor share remains hump-shaped.[32] In fact, estimated coefficients for the female editor share and its square differ little from those obtained in our baseline regressions reported in Table 6.

Second, we again changed the unit of analysis from an individual article to the body of all articles published in a journal per annum and regress the log of total citations received by articles published in a particular journal and year on the female editor share of that journal for the same year (see Panel B of Table 7). By virtue of this change in the unit of analysis, we exploit only journal-year variation in article citations and in the female editor share in the analysis. As is evident, however, this robustness check also produces estimated coefficients for the female editor share and its square that are positively, respectively negatively signed, and statistically significant in all three estimation samples.

Third, we again replaced the average female editor share over the last three years before an article was published with the annual female editor share two years prior to its publication (see Brogaard et al. (2014)). Estimated coefficients of the female editor share and its square remain positively, respectively negatively signed and statistically significant in all three estimation samples.[33]

Fourth, we again used two alternative measures of female representation on an editorial board that better reflect the discrete nature of changes (or differences) in the gender composition of editorial boards that is caused by the appointment (or presence) of a female editor. First, to consider only changes at the extensive margin, we replaced the continuous female editor share with a dichotomous variable that takes value one if the female editor share is above 0%, and zero otherwise (see first row estimates in Table 8). Second, to compare articles published by boards that are either all male or have recently appointed a female editor, we used instead a dichotomous variable that takes value one if a female editor was newly appointed to an editorial board in the three years prior to the publication of an article and excluded from the estimation sample all observations where the female editor share is above 0% but no female editor has been appointed in these three pre-publication

[32] The same holds true if we omit all controls for classifying articles into alternative fields.

[33] We again obtain qualitatively identical (albeit at times imprecisely estimated) coefficients if we use the annual female editor share one and three years (instead of two years) prior to the publication of an article.

Table 8: FEMALE EDITORS AND ARTICLE CITATIONS - ROBUSTNESS CHECKS II

| | Dep. variable: log(citations+1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Female Editor (0/1)[a] | 0.034 | 0.120** | 0.089* |
| | (0.046) | (0.051) | (0.047) |
| Female Editor (0/1)[b] | 0.032 | 0.092* | 0.049 |
| | (0.046) | (0.050) | (0.041) |

*Notes:* The table shows estimated coefficients in different regressions of a dummy variable which indicates whether a women is present on an editorial board. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The dependent variable in all regressions is the log of the total citations count of an article plus one as of December 2016. Estimates in each cell are from a different regression. [a] First row estimates are from regressions that use a dichotomous explanatory variable which takes value one if the share of female editors is above 0%. [b] Second row estimates are from regressions that use a explanatory dichotomous variable which that takes value one if a female editor was appointed in the three years prior to the publication of an article. In this second set of regressions, observations are excluded from the estimation sample where the female editor share is above 0% but no female editor was appointed in the three years prior to the publication of an article. The number of observations in columns (1), (2), and (3) is respectively 4,431, 2,802, and 1,915 in the first row and 4,101, 2,472, and 1,585 in the second row. All specifications control for main effects of journal outlet (base category is AER), year fixed effects (base year is 1991), article length (number of standardized pages), number of coauthors (base category is single-authored article), and 1-digit JEL code fixed effects (base category is A). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

years (see second row estimates in Table 8). Reassuringly, estimated coefficients turn out positively signed (albeit at times imprecisely estimated) in both specifications and for all estimation samples (unrestricted and restricted).

Finally, we added two types of control variables to capture thematic congruence between editors and articles (not tabulated).[34] In a first set of regressions, we used a dichotomous variable that takes value one if the thematic field of an article is congruent with at least one of the two main research fields of any editor in charge in the last three years prior to the publication of the article, and zero otherwise.[35] In a second set of regressions, we added in addition to this binary variable also a dichotomous variable that takes value one if the thematic field of an article is congruent with the main research fields of a female editor

[34]Tabulated regressions results are available from the authors upon request.

[35]We defined the main research fields of an editor by the two most frequently assigned one-digit JEL codes of the articles the editor published in the years 1992 until 2017.

(if present) at the journal outlet over the same period, and zero otherwise. Estimating both specifications for the three estimation samples using our linear-quadratic term for the female editor share produces identical results to those of our baseline specification reported in Table 6. Moreover, the coefficients of the two binary indicators for thematic congruence of articles and editors lack statistical significance in both specifications and all estimation samples.

Before we discuss potential explanations for our findings on the relationship between the female editor share of a journal and the average quality of the articles it publishes, we explore whether this relationship is subject to effect heterogeneity by gender composition of an article's authorship, i.e. whether greater female representation on editorial boards has a different effect on the quality of articles whose authorship is largely or exclusively female. For this purpose, we augment regression model (2) by adding to its set of regressors an indicator that takes value one if at least 50% of its authors are female, and zero otherwise, and the interactions of this indicator with the female editor share variable and its square. Estimated key coefficients of this modified model for our three estimation samples are reported in Table 9. Estimated coefficients of the female authorship dummy are throughout insignificant and also alternate in sign. Articles with a largely or exclusively female authorship hence do not differ systematically from other articles in the average number of citations they receive. Estimated coefficients of the female editor share and its square, in turn, are signed as before, suggesting a hump-shaped relationship between log citations and the female editor share of a journal outlet. The two interaction terms, however, both lack statistical significance in all three estimation samples. This suggests that the relationship between the female editor share of a journal and the average quality of its articles does not depend on the gender composition of an article's authorship.[36]

Given our data, we may again only speculate on the factors behind the robust hump-shaped relationship between the female editor share of a journal and log citations of its articles. We review two potential explanations which have received some support in the literature but were advanced for areas other than the scientific publishing process in eco-

[36]We obtain similar results when we use an alternative system to classify articles into major thematic fields or replace the female editor share with the annual average share of female editors two years prior to publication.

Table 9: Female editors and article citations - effect heterogeneity

| | Dep. variable: log(citations+1) | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Female authorship ($\geq$ 50%) | $-0.024$<br>(0.054) | 0.048<br>(0.072) | 0.131<br>(0.096) |
| Editor share | 1.406$^{*}$<br>(0.769) | 2.676$^{***}$<br>(0.849) | 1.769$^{*}$<br>(0.884) |
| Editor share sq. | $-6.738^{**}$<br>(3.223) | $-10.82^{***}$<br>(3.402) | $-6.499^{*}$<br>(3.741) |
| Female authorship ($\geq$ 50%) $\times$ Editor share | $-0.515$<br>(1.477) | $-1.556$<br>(1.652) | $-2.914$<br>(1.915) |
| Female authorship ($\geq$ 50%) $\times$ Editor share sq. | 1.211<br>(5.938) | 4.568<br>(6.331) | 9.095<br>(6.881) |
| $R^2$ | 0.237 | 0.190 | 0.209 |
| Observations | 4,346 | 2,755 | 1,884 |

*Notes:* The table shows selected estimated coefficients from different regressions. The first column considers all articles published in 1991-2010 (unrestricted sample), the second column excludes from this sample all articles published in the QJE and in RES (restricted sample 1), and the third column furthermore excludes all articles published in 1991-1996 (restricted sample 2). The dependent variable in all regressions is the log of the total citations count of an article plus one as of December 2016. All specifications control for main effects of journal outlet (base category is AER), year fixed effects (base year is 1991), article length (number of standardized pages), number of coauthors (base category is single-authored article), and 1-digit JEL code fixed effects (base category is A). ***, **, * denote statistical significance at the 1%, 5%, and 10% level. Standard errors are throughout clustered at the journal-year level and reported in parentheses.

nomics. First, the hump-shape relationship may be explained by the existence of gendered networks, their break up and growth. Gendered networks, which have been used to explain, amongst others, gender differences in labor market outcomes (Saloner, 1985), may impede the merit-based selection process in the publishing process if they cause articles of lesser quality of network members (insiders) to be published and articles of higher quality of non-members (outsiders) to be rejected. In economics, men dominate editorial boards. At low levels of representation on editorial boards, female editors may break up existing networks of male editors, sort out particularly low quality papers of insiders and thereby help to realize efficiency gains. At higher levels of representation, however, female networks themselves may start to take root and bias the selection of articles for publication in the editorial decision process, harming article quality.

A second explanation for our finding of a hump-shaped relationship between the female editor share of a journal and log citations of its articles is that the appointment of women to a group of male evaluators may improve the performance of this group (Wooley et al., 2010) by enabling them to better identify articles of the highest quality, but that such productivity effect is reversed and group performance even harmed when the share of female evaluators reaches a critical value.

# 4 Conclusion

Although female economists today are found more often in higher academic positions than some decades ago, they continue to be severely under-represented in the higher echelons of academic professions. In this study, we have explored a new potential root cause of this differential performance by gender, the male domination of editorial boards. Based on a self-compiled data set for the top-five economics journals containing information on the gender composition of their editorial boards and the gender mix of the authorship of articles published by these journals in the years 1991 to 2010, we have explored whether the female editor share is of consequence for the share of articles that are (co-)authored by females and the quality of articles that get published.

Our findings suggest that the gender composition of editorial boards does affect both dimensions. However, female editors appear to reduce, rather than increase, the share of articles that are (co-)authored by females. The under-representation of female editors in the top-five economics journals hence does not seem to be an obstacle for female economists in the academic publishing process. Several reasons may account for this finding. While we cannot test for these, given our data, we have reviewed potential candidate explanations that have been advanced in the literature, albeit for different areas. We also found that the female editor share is systematically related to the quality of articles that get published in a journal, as measured by their citation count. Specifically, we found a hump-shaped relationship between the female editor share and log citations, which suggests that female editors tend to benefit article quality at low levels of representation on editorial boards, but harm article quality at higher levels. Moreover, in additional explorations, we did not find any evidence that this relationship is subject to effect heterogeneity by gender composition of an article's authorship. We reviewed two potential explanations for this finding, but given our data cannot test them to assess their respective importance.

Our first set of findings suggests that the publishing process in economics is not governed by simple sex discrimination of men against women that could easily be rectified by (and hence would justify undifferentiated calls for) greater female representation on editorial boards. The various potential root causes we reviewed for this finding also support this critical view and call for utmost caution in the choice of policy tools to promote greater gender equality. Future research is required to test these rival, yet potentially complementary explanations and identify the major causal pathways for our results on the publishing success of female authors and the quality of articles. Such research could also fruitfully broaden the scope of analysis by considering a larger set of journals and by expanding the observation period to include also the more distant past.

# References


Abrevaya, J. and Hamermesh, D. S. (2012). Charity and favoritism in the field: Are female economists nicer (to each other)? *The Review of Economics and Statistics*, 94(1):202–207.

Addis, E. and Villa, P. (2003). The editotial boards of italian economic journals: Women, gender, and social networking. *Feminist Economics*, 9(1):75–91.

Akerlof, G. A. and Kranton, R. E. (2000). Economics and identity. *The Quarterly Journal of Economics*, 115(3):715–753.

Bagues, M. and Esteve-Volart, B. (2010). Can gender parity break the glass ceiling? evidence from a repeated randomized experiment. *Review of Economic Studies*, 77(4):1301–1328.

Bagues, M., Sylos-Labini, M., and Zinovyeva, N. (2017). Does the gender composition of scientific committees matter? *American Economic Review*, 107(4):1207–1238.

Bartlett, R. L. (1999). Report of the committee on the status of women in the economics profession. *American Economic Review*, 89(2):492–498.

Blank, R. M. (1991). The effects of double-blind versus single-blind reviewing: Experimental evidence from the american economic review. *American Economic Review*, 81(5):1041–1067.

Blau, F. D., Currie, J. M., Croson, R. T. A., and Ginther, D. K. (2010). Can mentoring help female assistant professors? interim results from a randomized trial. *American Economic Review*, 100(2):348–352.

Boschini, A. and Sjörgen, A. (2007). Is team formation gender neutral? evidence from coauthorship patterns. *Journal of Labor Economics*, 25(2):325–365.

Broder, I. E. (1993). Review of nfs economics proposals: Gender and institutional patters. *American Economic Review*, 83(4):964–970.

Brogaard, J., Engelberg, J., and Parsons, C. A. (2014). Networks and productivity: Causal evidence from editor rotations. *Journal of Financial Economics*, 111(1):251–270.

Card, D. and DellaVigna, S. (2013). Nine facts about top journals in economics. *Journal of Economic Literature*, 51(1):144–161.

Casadevall, A. and Handelsman, J. (2014). The presence of female conveners correlates with a higher proportion of female speakers at scientific symposia. *mBio*, 5(1):1–4.

Cherrier, B. (2017). Classifying economics: A history of the JEL codes. *Journal of Economic Literature*, 55(2):545–579.

Colussi, T. (2017). Social ties in academia: a friend is a treasure. *Review of Economics and Statistics*, forthcoming.

Donald, S. G. and Hamermesh, D. S. (2006). What is discrimination? Gender in the American Economic Association, 1935-2004. *American Economic Review*, 96(4):1283–1292.

Doyle, C., Mieder, W., and Shapiro, F. (2012). *The Dictionary of Modern Proverbs*. Yale University Press, New Haven and London.

Ellemers, N., van den Heuvel, H., de Gilder, D., Maass, A., and Bonvini, A. (2004). The underrepresentation of women in science: Differential commitment or the queen bee syndrome? *British Journal of Social Psychology*, 43(3):315–338.

Ellison, G. (2002). The slowdown of the economics publishing process. *Journal of Political Economy*, 110(5):947–993.

Ginther, D. K. and Kahn, S. (2004). Women in economics: Moving up or falling off the academic career ladder? *Journal of Economic Perspectives*, 18(3):193–214.

Hamermesh, D. S. (2017). Citations in economics: Measurement, impacts and uses. *Journal of Economic Literature*, 55:forthcoming.

Kahn, S. (1993). Gender differences in academic career paths of economists. *American Economic Review*, 83(2):52–56.

Laband, D. N. and Piette, M. J. (1994). Favoritism versus search for good papers: Empirical evidence regarding the behavior of journal editors. *Journal of Political Economy*, 102(1):194–203.

Marsh, H. W., Bornmann, L., Mutz, R., Daniel, H.-D., and O'Mara, A. (2009). Gender effects in the peer reviews of grant proposals: A comprehensive meta-analysis comparing traditional and multilevel approaches. *Review of Educational Research*, 79(3):1290–1326.

McDowell, J. M., Singell, L. D., and Stater, M. (2006). Two to tango? gender differences in the decisions to publish and coauthor. *Economic Inquiry*, 44(1):153–168.

McElroy, M. V. (2016). Report: Committee on the status of women in the economics profession (cswep). *American Economic Review*, 106(5):750–773.

Medoff, M. H. (2003). Editorial favoritism in economics? *Southern Economic Journal*, 70(2):425–434.

Misra, J., Lundquist, J. H., and Templer, A. (2012). Gender, work time, and care responsibilities among faculty. *Sociological Forum*, 27(2):300–332.

Niederle, M. and Vesterlund, L. (2010). Explaining the gender gap in math test scores: The role of competition. *Journal of Economic Perspectives*, 24(2):129–144.

Paola, M. D., Ponzo, M., and Scoppa, V. (2015). Gender differences in attitudes toward competition: Evidence from the italian scientific qualification. *IZA Discussion Paper*, No. 8859.

Paola, M. D. and Scoppa, V. (2015). Gender discrimination and evaluators' gender: Evidence from italian academia. *Economica*, 82(325):162–188.

Saloner, G. (1985). Old boy networks as screening mechanisms. *Journal of Labor Economics*, 3(3):255–267.

Vernos, I. (2013). Research management: Quotas are questionable. *Nature*, 495(7439):39.

Wenneras, C. and Wold, A. (1997). Nepotism and sexism in peer-review. *Nature*, 387(6631):341–343.

Wooley, A. W., Chabris, C. F., Pentland, N. H., and Malone, T. W. (2010). Evidence for a collective intelligence factor in the performance of human groups. *Science*, 330(6004):686–688.

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