



ELSEVIER

Contents lists available at ScienceDirect

Journal of Informetrics

journal homepage: www.elsevier.com/locate/joi

Should the research performance of scientists be distinguished by gender?



Giovanni Abramo^{a,*}, Tindaro Cicero^b, Ciriaco Andrea D'Angelo^{a,c}

^a *Laboratory for Studies of Research and Technology Transfer, at the Institute for System Analysis and Computer Science (IASI-CNR), National Research Council of Italy, Rome, Italy*

^b *Italian National Agency for the Evaluation of Universities and Research Institutes (ANVUR), Rome, Italy*

^c *Department of Engineering and Management, University of Rome "Tor Vergata", Rome, Italy*

ARTICLE INFO

Article history:

Received 15 July 2014

Received in revised form 30 October 2014

Accepted 3 November 2014

Available online 23 November 2014

Keywords:

Research evaluation

Gender

Bibliometrics

Italy

ABSTRACT

The literature on gender differences in research performance seems to suggest a gap between men and women, where the former outperform the latter. Whether one agrees with the different factors proposed to explain the phenomenon, it is worthwhile to verify if comparing the performance within each gender, rather than without distinction, gives significantly different ranking lists. If there were some structural factor that determined a penalty in performance of female researchers compared to their male peers, then under conditions of equal capacities of men and women, any comparative evaluations of individual performance that fail to account for gender differences would lead to distortion of the judgments in favor of men. In this work we measure the extent of differences in rank between the two methods of comparing performance in each field of the hard sciences: for professors in the Italian university system, we compare the distributions of research performance for men and women and subsequently the ranking lists with and without distinction by gender. The results are of interest for the optimization of efficient selection in formulation of recruitment, career advancement and incentive schemes.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

The scientific debate on gender aspects in research systems has focused primarily on the overrepresentation of male academics, often suggesting the occurrence of systematic practices of gender discrimination. The data on the staff of national research systems indeed reveal a significant gap in the presence of women. Only four of 28 OECD nations¹ (OECD, 2014) – Portugal, Estonia, Slovak Republic and Iceland – show a percentage of women greater than 40%, and in any case less than 46%. In the UK, women represent 38.3% of total researchers, in Italy 34.5%; in France the share drops below 26%, and in Germany does not reach 25%. In Japan women represent only 13.8% of national research staff. Although the four Nordic countries (Denmark, Finland, Norway, Sweden) are considered as progressive in women's rights, the fact in these nations is that for each female scientist there are two male colleagues.

Alongside the studies illustrating the underrepresentation of women in science there is a major stream of literature that demonstrates the presence of a so-called “productivity gap” in favor of men. The lesser productivity of female researchers

* Corresponding author. Tel.: +39 06 72597362.

E-mail address: giovanni.abramo@uniroma2.it (G. Abramo).

¹ Data for the remaining 6 OECD nations (Australia, Canada, Israel, Mexico, New Zealand, and United States) are not available.

has been established in tens of studies of diverse disciplines and countries (Larivière, Ni, Gingras, Cronin, & Sugimoto, 2013; Mauleón & Bordons, 2006; Xie and Shauman, 2004; Long, 1992; Fox, 1983). Examining the issue in detail, it emerges that gender differences lessen over time (Frietsch, Haller, Funken-Vrohings, & Grupp, 2009; Abramo, D'Angelo, & Caprasecca, 2009a; Alonso-Arroyo, González-Alcaide, Valderrama-Zurián, & Aleixandre-Benavent, 2007; Leahey, 2006; Xie & Shauman, 1998; Cole & Zuckerman, 1984) and seem to be most visible in the early career stages (Xie & Shauman, 1998). The tails of the distribution of scientific performance are especially affected by gender differences. The concentration of women among very low performers is greater than that of men (Alonso-Arroyo et al., 2007; Lemoine, 1992), while their representation among top scientists is lower (Abramo, D'Angelo, & Caprasecca, 2009b; Bordons, Morillo, Fernández, & Gómez, 2003). In the area of patenting, women faculty members patent at about 40% of the rate of men (Ding, Murray, & Stuart, 2006).

However there are a significant number of scientific sectors where the performance of women does not result as inferior (Abramo et al., 2009b). Yet even in these cases, men still predominate in the prestigious first and last author positions of the byline, and women are significantly underrepresented as authors of single-authored papers (West, Jacquet, King, Correll, & Bergstrom, 2013).

Many scholars have inquired into the possible causes of the productivity gap. In general, a researcher's performance depends on his or her capacities, but also derives from a series of gender-dependent environmental and personal factors (Zainab, 1999). Discrimination can emerge in the early stage of the relationships between professors and their students. Moss-Racusin, Dovidio, Brescoll, Graham, and Handelsman (2012) show the subtle bias in favor of male students that occurs in science faculties. Among the factors that can produce the gender gap, Rossiter (1993) indicated the "Matilda effect"², where female scientists active in research are not recognized in the publication bylines. In the career stage of selecting university professors the percentages of female applicants who are successful is generally lower (van den Brink, Brouns, & Waslander, 2006). In the phase of entry to the academic professional environment females generally evaluate their mentors as less satisfactory than do their male colleagues (Sambunjak, Straus, & Marusic, 2006).

However it is also clear that there are changes in the personal and working contexts of individuals, and that these influence their productivity over time. In the late postdoctoral and early faculty years many qualified women scientists stop applying for NIH grants (Ley & Hamilton, 2008). During their careers, women also present lower productivity in the intermediate levels of seniority (Mauleón, Bordons, & Oppenheim, 2008). In this stage, differing forms of marriage conduct (Fox, 2005) and the presence of school-age children seem to have a negative effect on research productivity (Fox, 2005; Stack, 2004; Kyvik & Teigen, 1996). The level of specialization also has a positive relation with research productivity, which could explain a part of the negative gap for women, who are generally less specialized than their male colleagues (Leahey, 2006). It has been verified that research collaborations have a positive correlation with scientific performance (Abramo, D'Angelo, & Di Costa, 2009c; Lee & Bozeman, 2005; Dundar & Lewis, 1998), particularly collaborations at the international level (Barjak & Robinson, 2007; Martin-Sempere, Rey-Rocha, & Garzon-Garcia, 2002; van Raan, 1998). However female researchers register less international collaborations than men (Abramo, D'Angelo, & Murgia, 2013a), probably due in part to motivations against travelling in consideration of family roles. In general, women tend to have more restricted collaboration networks than men (Badar, Hite, & Badir, 2013; Larivière, Vignola-Gagné, Villeneuve, Gelinas, & Gingras, 2011; Kyvik & Teigen, 1996), particularly in the first years of their career (McDowell, Singell, & Stater, 2006; McDowell & Smith, 1992). This limits their access to resources and other complementary assets, necessary for their research activities. In fact academic institutions often do not provide adequate financial support for their female researchers, particularly in the hard sciences (Duch et al., 2012). According to Ceci and Williams (2011) differential gender outcomes result exclusively from differences in resources. When contrasting research performance by gender, one should account for compulsory abstention from work, such as maternity or sick leaves. For large-scale studies investigators often lack such information, which causes a distortion in favor of men.

However the aim of the current paper is not the further investigation of if or to what extent there is gender discrimination in the research sphere, or to further examine the objective limitations on women's careers given their roles in nuclear families. Instead, our specific objective is to verify if separating the measurement of research performance by gender produces notably different results compared to measurement without such distinction. A female researcher who results less productive than a male when evaluation does not distinguish by gender, may indeed result relatively more productive when research assessment is separated by gender. We then leave it to the decision-maker to choose which approach to adopt, according to the evaluation objectives and the conditions of the context. In those contexts where gender discrimination is understood to exist, or where the family roles of women condition the time, energies and concentration devoted to research, then the conduct of evaluations without distinction by gender would inevitably penalize women. The results of the analysis are of interest for all processes involving efficient selection, such as the formulation of incentive systems in research organizations; methods of evaluation for applicants in career recruitment and advancement, or calls for project proposals.

The context for the study is Italy's national staff of professors in the disciplines of the hard sciences, considered the most appropriate fields for the use of bibliometric techniques in performance evaluation. The Italian context is particularly suitable for the analyses because of its national classification system for faculty members, in which each professor is identified as belonging to one and only one field of research. This feature permits minimization of distortion in the comparative evaluation of researchers working in different research fields, which arises due to the differing intensity of publication across fields, and

² Named for the 19th century social activist, Matilda Joslyn.

Download English Version:

<https://daneshyari.com/en/article/523912>

Download Persian Version:

<https://daneshyari.com/article/523912>

[Daneshyari.com](https://daneshyari.com)