Bibliometrics vs. Diversity in the Top Academic Career Positions in Economics in Italy

Marcella Corsi, Carlo D’Ippoliti and Giulia Zacchia

Following an international trend, Italy has reformed its university system, especially concerning methods and tools for research evaluation, which are increasingly focused on a number of bibliometric indexes. To study the impact of these changes, we analyse the changing profiles of economists who have won competitions for full professorship in the last few decades in Italy. We concentrate on individual characteristics and mainly on scientific production. We show that the identification of a univocal and standardized concept of “research quality” within the new research assessments has progressively imposed a strategy of “homologation”, especially for women. We find that women economists are at a higher risk of discrimination than their male colleagues and thus they are more likely to conform their research activities to the standardized profile imposed by the gender-blind application of biased bibliometric methods.

Keywords: Discrimination; Pluralism; Diversity; Women Economists; Italy

JEL Classifications: J16; J70; A14

CEB Working Paper № 17/019
August 2017
**Bibliometrics vs. Diversity in the Top Academic Career Positions in Economics in Italy**

*Marcella Corsi, Carlo D'Ippoliti and Giulia Zacchia*

**Abstract:** Following an international trend, Italy has reformed its university system, especially concerning methods and tools for research evaluation, which are increasingly focused on a number of bibliometric indexes. To study the impact of these changes, we analyse the changing profiles of economists who have won competitions for full professorship in the last few decades in Italy. We concentrate on individual characteristics and mainly on scientific production. We show that the identification of a univocal and standardized concept of “research quality” within the new research assessments has progressively imposed a strategy of “homologation”, especially for women. We find that women economists are at a higher risk of discrimination than their male colleagues and thus they are more likely to conform their research activities to the standardized profile imposed by the gender-blind application of biased bibliometric methods.

**Keywords:** Discrimination; Pluralism; Diversity; Women Economists; Italy

**JEL Codes:** J16; J70; A14

1. Background and motivation

The economic crisis and tightening budget constraints imposed changes both in the governance of universities and in the processes of recruitment, evaluation and promotion of academic staff in many countries. The common trend is to emphasize so-called objective (de facto, standardised) procedures based on supposedly meritocratic and quality-based criteria. Evidently, how to define and measure quality – or even excellence – of research becomes even more a critical issue. From a gender perspective, it is increasingly recognized that these trends are not gender-neutral and could reinforce the “leaky pipeline” phenomenon (i.e. the evidence that women drop out of academia at all stages of their careers) and/or generate an environment adverse to pluralism of research methods and paradigms. In this work we focus on the case of economics in Italy, by investigating how the widespread use of citation-based quantitative indicators affects the selection and promotion of academic economists, and how women economists reacted to the changed environment.

Within a wide debate on how to reform the evaluation of university departments in the UK, it emerged that poorly designed indicators such as journal impact factors and more in general citation counts can produce negative consequences, mainly in terms of equality and diversity (HEFCE, 2015). For this reason, in the last national research assessment in the UK (REF 2014) the definition of “quality” and “excellence” of research is assigned through a process of “expert review” with no preconception of quality attached to the form or medium of a research output. Bibliometric indexes, such as the number of citations, are only used as contextual information to support the peer review, but it is expressly declared that peer reviewers should not use journal impact factors or any hierarchy of journals in their assessment of research outputs (whether these aims will correspond to practice is a different issue: see Stockhammer et al., 2017, for an analysis of the role of journal rankings and impact factors in the REF 2014 in Economics).

In contrast in Italy the “quality” of research undertaken by research centres, judged through a centralized evaluation process (the VTR – Triennial Evaluation Exercise 2001-2003), used to be

---

* Corresponding author: Marcella Corsi, Sapienza University of Rome and CEB/CERMi: marcella.corsi@uniroma1.it. Financial support from the Institute for New Economic Thinking is gratefully acknowledged, INET grant # INO1500040 (coordinator Carlo D'Ippoliti).

1 http://www.ref.ac.uk/media/ref/content/pub/panelcriteriaandworkingmethods/01_12_2C.pdf
assessed with a method based on peer-review; then, starting from 2011 the weight of bibliometric or mixed approaches in various evaluation processes increased.2 Currently, the assessment method of research centres consists of the bibliometric analysis of a sample of journal articles authored by their staff, for the journals indexed in Scopus or Web of Science (WoS), and peer review for all other publications, or when expressly requested by the research centres. In fact, as reported by Geuna and Piolatto (2016), the result of this mix of peer review and bibliometrics “depends more heavily than REF on automatic bibliometrics” (p. 265). Analysing the latest research assessment held in Italy, Franceschini and Maisano (2017) demonstrate how using journal metrics (even when combined with other indicators) to evaluate the quality of individual papers can be misleading. On the one hand, there are well known techniques for manipulating journal-level metrics; on the other hand, journals with high citation indexes are not necessarily more rigorous in the selection of papers. Franceschini and Maisano (2017) propose replacing the use of journal metrics with the so-called altmetrics – i.e., alternative metrics related to individual papers, such as the count of the number of views, downloads, blogs, media coverage, etc. The debate on bibliometric evaluation, usually framed in opposition to peer review, is crucial in the field of economics, which many evaluators perceive as lying somewhere between the natural and the social sciences (Bertocchi et al., 2015; Baccini and De Nicolao, 2016). A crucial issue is that bibliometric indexes can largely differ within the various sub-fields of economics. In fact, different sub-fields of economics have different preferred dissemination outputs (i.e. more books and book chapters than journal articles for the field of the history of economic thought, as opposed to nearly exclusive reliance on journal articles, often even letters, for econometrics); researchers active in the different fields of economics have different research interests or preferences for interdisciplinary approaches, etc. Therefore, the automatic use of bibliometric indices in economics tends to identify a single set of disciplinary values with “excellence” in research, which in turn frames several (especially younger) researchers’ perception of what constitutes the “right kind” of economics.

The relevant negative consequences of this process, as reported e.g. for the UK by Lee et al. (2013) or for Italy by Corsi et al. (2010; 2017), are mainly a gradual decline in variability in the approaches used by economists and an increasing homologation of research towards the mainstream paradigm.

In Italy, the definition of “quality” of research made within the national assessment exercises, which is used for the allocation of public resources to universities, also affected hiring and promotion practices. However, concerning the latter even more relevant is the new nationally centralized selection procedure of candidates for associate and full professorships. It was introduced through a reform of the university system enacted in 2010, and it introduced bibliometric thresholds for the candidates in all disciplines (with a broad diversification of indexes between the natural and the social sciences). In this work, we propose an analysis of such new system, focussing on its impact on gender diversity and pluralism of research.

Since women’s academic careers remain markedly characterized by a strong vertical segregation, we focus on the top career positions, in order to describe in which cases women have succeeded in competitions for full professorship in Italy. We analyse the competitions for full professorship held before and after the 2010 university reform, in order to identify how the taxonomy of the successful candidate has changed and what the determinant elements are for promotion to full professor. A comparison between the systems prevailing before and after the reform allows us to verify how the (mis)use of bibliometrics is affecting Italian academic economists’ research activities by imposing a univocal model of the “right kind” of economics; it also allows us to analyse the main gender differences in these trends.

As noted by Aistleitner et al. (2017), in “methodologically guided evaluations in general and evaluative scienctometrics in particular, reactivity induces actors to anticipate evaluation criteria.

---

2 In 2011 the largest evaluation assessment, known as the eValuation of the Quality of Research (VQR 2004-2010), took place across 95 universities, 12 public research institutions and 16 voluntary organizations. A second assessment (VQR 2011-2014) for the evaluation of research output from 2011-2014 was held in 2015 and the results were available starting December 2016.
This anticipation in turn affects the behavior of the subjects or institutions evaluated” (pp. 8-9). Along these lines, we interpret differences between the observed behavior of economists before and after the 2010 reform as evidence of a reaction on the side of the researchers because the reform was widely debated and gradually implemented (with the first round of competitions with the new criteria only taking place two years after approval of the reform law). Moreover, the general direction of the reform, and in particular the heavy reliance on bibliometrics are part of a more general process that started at least in 2005 with the first evaluation of research centres, and which was amply debated both in the scientific literature and in the political arena. Thus, our work could be considered as an application to the case of gender diversity in economics, of the broader issue of performativity of research evaluation.

The paper is organised as follows: first, we propose a study of the evolution of selection procedures for promotion to the top of the hierarchical structure in Italian academia, along with a detailed analysis of the recent university reform and of the main changes that occurred in competitions for full professorship, which might be affecting the gender balance in Italian universities. In the second section, using a gender perspective, we describe how the taxonomy of the successful candidate has changed in the competitions held before and after the university reform, therefore before and after the institutionalization of the use of bibliometrics as a decisive criterion for selection. We concentrate on gender differences in academic production and preferences in research fields in order to search for evidence of the adoption of a strategy of “homologation” on the side of women, to break the glass ceiling in academia. In the third section by means of multivariate probit regressions we examine the determinants of the probability of successfully qualifying for full professorship, comparing pre- and post-reform competitions. Finally, we draw some concluding remarks from this analysis that can have some relevant implications on an international level.

First, we find that research evaluation aimed at identifying “excellence” through the use of purely bibliometric indexes could negatively affect equality and diversity in the selection of staff. Different indicators that reflect and support the plurality of research and researchers should be used to preserve pluralism and diversity. Second, it is fundamental to better organize data collection on researchers’ scientific production at all levels of academia, in order to monitor the consequences of research assessments on research field concentration/diversification and on gender discrimination in career paths. Third, the creation of a gender auditing of research evaluation outputs could help anticipate the systemic and potential discriminatory effects of indicators and update them in response to the issues that arise.

2. Reaching the top: the evolution of national recruitment criteria in Italian universities

An academic career in Italy is made out of three different positions: “Ricercatore universitario”, roughly corresponding to an assistant professor or lecturer, has become a three-year renewable temporary position after the 2010 reform; “Professore Associato”, roughly corresponding to an associate professor, is now the lower-ranked tenured position; and “Professore ordinario”, roughly corresponding to a full professor, is the highest ranked tenured position. All researchers and professors are classified as belonging to one field (called scientific-disciplinary sector, there are 367 in all); every field is grouped into one of 14 so-called scientific areas. For every position, teaching and research duties as well as wages are defined by national laws.

In the logic of the proposed gender analysis, there have been two significant changes over the last few years that marked a turning point in the rules governing competitions for full professorship. One is the introduction of a new system of selection for the commissioners in charge of assessing candidates (Decree-Law n. 180 of November 2008), which now involves a random drawing (by lottery) of two external commissioners (to be added to one internal commissioner appointed by the Faculty that runs the competition) out of a pool of previously selected full professors from the same disciplinary field. This procedure aims to avoid the creation of ad personam committees and to expand the circle of ‘gate keepers’. The definition of gate-keeping was introduced by Lewin (1943);
Merton (1973) applied it to science, identifying that of gate-keeper as the fourth major role of a scientist, in addition to that of researcher, teacher and administrator. Gate-keeping is about determining who is allowed into a particular scientific community, influencing or controlling access to a scientific field. Women are usually under-represented among gatekeepers and hence among those having leading positions in science and science policy.

In Italy, the introduction of this new mechanism of random selection of the members of the committees had a significant effect on a gender perspective: 44.4% of competitions for full professorship in economics held in 2008 had at least one woman commissioner, while, the average share of all pre-2008 competitions was 34.7%3 (see table 1). The increased number of women in the evaluation process inspired a number of studies on the impact of the gender composition of selection committees on the likelihood of obtaining tenure in Italian universities (Bagues et al., 2017; De Paola and Scoppa, 2015).

A second, less studied change introduced by the 2010 reform of the university system (Law 240 of 2010) created a double evaluation process for the selection of candidates to full professor positions. The new recruitment system was first implemented in 2012. Until 2012, the processes of recruitment and career advancement to full professorship were in the hands of the single universities, which followed nationally-defined procedures. The last major set of competitions under this system took place in 2008. Since 2012, only researchers that have obtained a National Scientific Qualification (ASN) as full professors can then compete at the local level for a vacancy at an Italian university. The ASN is granted with a unified, national procedure and is a necessary condition for employment as tenured faculty in Italy, though it is not a guarantee of employment.

The National Scientific Qualification is held separately for every field. For each research field the candidates are evaluated by a committee of five members: four of the them are full professors at Italian Universities and one is a foreign member from an OECD country. The commissioners are randomly selected from a pool of full professors with certain scientific productivity standards who have volunteered for the task. In the 2010 reform it was foreseen that there would be yearly rounds of ASN, but after 2013 (two rounds) the procedure was interrupted and it was reintroduced in 2016 in a slightly modified way, with quarterly rounds.

The qualification is based only on candidates’ CVs and publications, no tests or interviews are required. The ASN system provides two different sets of bibliometric indexes for the natural sciences (the so called “bibliometric areas”) and for the social sciences and humanities (the so called “non bibliometric areas”). For economics (defined as a “non bibliometric area”), candidates are evaluated based on three parameters:

(i) the number of articles published in high quality scientific journals in the ten years before the selection;

(ii) the overall number of book chapters and articles published in any scientific journal; and

(iii) the number of published books.

The Italian National Agency for Evaluation of University and Research (ANVUR) coordinates the ASN, and provides each research field and ASN round with:

- quantitative thresholds concerning all the three parameters above; until 2013, these thresholds were determined by the estimated median number of publications (in a certain time span4) by the full professors employed in Italian Universities in the same field;

- a list of journals defined as high quality (the so called “A-list”), and one of journals defined as “scientific”;

- a report on every candidate with the number of her/his publications, separately listed according to

3 We analysed 67 competitions for full professorship between 2001 and 2008 in economics (field classified as SECS-P01).
4 The number of records was normalised by taking into account job interruptions such as parental leaves.
the three parameters, and where relevant – i.e. for candidates in the natural sciences – with selected bibliometric data (Scopus, WoS and Google Scholar indexes, such as SJR, SNIP, IF and H index) and the corresponding three thresholds.

In the debate around the reform law, there often was an understanding that in order to pass at the ASN would be necessary to pass at least two out of the three thresholds. However, the judging commissions had (and have) full autonomy on the criteria to use in their evaluation, and the thresholds are only to be considered as reference points. The only actual requirement was a positive evaluation by a qualified majority of four positive votes out of the five committee members (this requirement was recently reversed to a simply majority by a judgement of Italy’s administrative court).

From a gender perspective, the most critical issue posed by the ASN system is the uncertainty about the new selection procedures, caused by the lack of regularity in the calls for applications (they are now supposed to be quarterly rounds called in yearly calls for applications, but as we write no call has yet been announced for 2018). As a matter of fact, the selection procedure has not occurred on a regular basis so far; as mentioned, there have been two yearly rounds with the “old new system”, in 2012 and in 2013, and two quarterly rounds with the “new new system”, in December 2016 and April 2017.

This means that it is impossible for Italian researchers to plan their career paths in advance, and the consequence may be an even higher “leaky pipeline” effect for women.

From a paradigmatic pluralism perspective, the main concerns arise from the incorrect and anachronistic use of journals’ perceived prestige as a criterion for assessing individual papers/articles, and thus authors, as well as the definition of a national list of “high quality” journals. In the definition of this list, the prevailing tendency in economics has been to take a purely bibliometric approach, whereby scientific journals are ranked on the basis of bibliometric indexes only. The selected ones for economics (indeed, the larger “economic sciences and statistics” area, were the Impact Factor and the AIS from the Web of Science (WoS) database,6 and the IPP and SJR from Scopus.6

In the bibliometric literature there is a strong consensus on considering journals’ metrics as inappropriate to estimate the impact of individual articles (Seglen, 1997; Lozano et al. 2012; IEEE, 2013; Marx and Bornmann, 2013; Ware and Mabe, 2015), because the number of citations received by articles published in the same journal varies widely. With specific respect to economics, the final effect of the selection of journals for the A-list has been the concentration of top-ranked economic research in fewer sub-fields with a common methodology (mostly econometrics), which pushes for the convergence of research towards mainstream economics. In fact, as reported by Corsi et al. (2017), out of 454 journals included in the A-list for the ASN in 2012 and 2013, only 12 (2.6%) are also in the ranking of heterodox journals by Lee and Cronin (2010). Moreover, in the A-list only two journals are explicitly engaged with gender, sexuality and feminist approaches.7

3. Changing profiles: the evolution of the profile of successful candidates to full professorship

In order to study the consequences of the 2010 reform in selection procedures on both the dimensions cited above, gender and pluralism, we investigate data on the academic production of candidates in economics before and after the reform, looking at the determinants of success in competitions for full-professorship. We concentrate on the top career positions in the academic hierarchy in economics, because the under-representation of women in top positions is still a chronic phenomenon in Italy, as in many other countries.

---

6 For details about Journal metrics in Scopus see https://www.elsevier.com/solutions/scopus/features/metrics
7 They are Feminist Economics, and Gender, Work & Organization.
In order to account for the difficulties faced by women economists in gaining access to the highest level of academia we compute the Glass Ceiling Index (GCI). The GCI compares the proportion of women in academia with the proportion of women in top academic positions (full professors). The index can range from 0 to infinity. A value of 1 indicates that there are no differences between men and women in terms of their chances of being promoted, while the higher the value, the stronger the glass ceiling effect, since women are less represented in full-professorships than in academia in general. The GCI in 2016 in Italy amounts to 1.68 in academia in general and 1.84 in economics.\(^8\) The index in economics is even higher than the ones computed for traditionally male dominated fields (i.e. 1.71 in mathematics and computer sciences\(^9\)). There has been some progress towards reducing the glass ceiling effect in the last years: the share of women among full professors in economics increased from 7.7% in 2002 to 16.2% in 2016, but inequalities persist and progress is slow.

The persistence of vertical segregation is evident in the different shapes of the academic hierarchical structure by sex. In fact, for women we find a classic pyramidal structure: full professors at the top (22% of all women economists), associate professors in between (40%) and researchers at the base (38%). Instead for men the hierarchical structure looks like an overturned pyramid: full-professors represent the highest share (47%), followed by associate professors (35%) and, in the lowest percentage, researchers (18%). These gender differences in the Italian hierarchical structure have remained unchanged over the last decade.

In this work, we are particularly interested in finding strategies that might have been adopted by successful candidates to compete for the top positions, and in trying to discern whether there have been changes, mainly from a gender perspective, caused by the more competitive environment introduced by the above-mentioned 2010 university reform in Italy. In order to observe how the profile of a successful woman candidate evolved in the years following the reform, and how it was affected by it, we compare 23 competitions for full-professorship before the introduction of the new recruitment procedures\(^10\), half held in the first years of 2000s –namely in 2001-2003- and half held in 2008 with the introduction of the random selection commissioners, with the results of the first two yearly rounds (2012 and 2013) of the ASN system, the “old new system” described in the previous section.

The sample choice of competitions was directed by data availability constraints, but it covers respectively the 44% of all competitions held in 2001-2003 period and 66% of those in 2008. The ASN was laudably characterised by extreme transparency of the all the steps of the procedure – with the online publication of all candidates’ CVs, lists of publications, bibliometric thresholds values and final results. However, the same transparency was not the norm of local competitions before the 2010 reform. Thus, with a careful data collection activity, we were able to collect data on 23 competitions for full professorship held before the reform, accounting for 53% of all competitions for full professorship in economics in the 2001-2008 period. As mentioned, before the reform a significant turning point in the rules governing competitions for full professorship took place in 2008. Our sample is balanced from this point of view, as we were able to find and analyse all data and documents of 12 selections held in 2008 (66% of all competitions held in 2008) and 11

\(^8\) For economics, we only consider the disciplinary field formally known as Political Economy, SECS-P01.

\(^9\) We consider the research area 01 - Mathematics and computer sciences, as classified by the Ministry of Research and University.

competitions held in the years 2001-2003 (44% of the total in the selected years).\(^\text{11}\)

In total, we collected data on the profiles of 522 candidates, of which 22.8% were women. In our sample 177 economists were candidates for a full professorship before the reform (of which 24.3% were women), and 345 after it (22.1% women).

For all candidates we collected the publications recorded in EconLit, a very rich database maintained by the American Economic Association, in the ten years before the competition to which they too part. From this source we gathered metadata on each publication, such as the keywords, JEL codes,\(^\text{12}\) the number of co-authors, the type of publication and the sources (journals and publishers). We use EconLit because it is one of the most complete databases for journal articles, book chapters, books and working papers in all fields of economic research. It has a wide geographical coverage and it is updated monthly since 1969. For all candidates to the 2012 and 2013 rounds of the ASN, we integrated the information from EconLit with that provided by them in the CVs published on the ASN’s website.

As shown in table 2, the presence of a “sticky floor” for women is evident and has been constant through the years: women experience greater difficulties in reaching top positions than men, and represent 22% of successful candidates in pre-reform competitions, and only 15.6% in the last National Scientific Qualifications. Looking at the success rate (number of winners over the total candidates) by sex, we also find that the gender gap increased in the last years. Moreover, candidates that achieve full professorship tend to be older now than in the past. In the pre-reform competitions the median age for women who were able to break the glass ceiling was 43 years old (against 42.5 for men) while in 2012-2013 the median age was 47 years for women and 45 for men. On average, women succeeded in achieving full-professorship almost two years after their male colleagues.

However, we find some encouraging evidence too: over time the visibility, in terms of scientific production, of successful candidates has drastically increased. In the literature, since Cole and Zuckerman’s (1984) publication, gender differences in productivity among academics is usually reported as a key element influencing gender inequality in academic careers (Levin and Stephan 1998; Xie and Shauman 2003; Fox 2005; Leahey 2006; Fox et al. 2011). As reported by Abramo et al. (2009) for the natural and life sciences, we find evidence of a progressive reduction over time of the gender productivity gap for Italian researchers in economics as well. In fact, as table 2 shows, over the years the median number of publications has increased more for women than for men. In the last competitions, the median is 24 publications for women and 27 for men.

Similarly to what underlined by Elsevier in its report *Gender in the Global Research Landscape*, we too find that women’s average lower productivity does not affect their visibility in terms of citations. Women economists that succeeded in full professorship competitions in the ASN have the same or an even higher \(H\) index\(^\text{13}\) than their male colleagues. Since the \(H\) index summarizes the number of publications and the number of citations of each author, in light of their lower productivity the higher \(H\) index recorded for women means that the number of citations they receive, and not the number of publications they author, is higher for women than for men.

In sum, women economists show an increasing ability to adapt to the “rules of the game” to succeed in academic competitions, by increasing their visibility both in terms of scientific production and citation networks. This higher adaptation implies a progressive homogenisation in the choice of type of publication, with the growth of journal articles and working papers (see table 2) at the

\(^{11}\) Information on competitions and candidates is increasingly less available the more we proceed back in time. Data on all competitions held between 2011 and 2013 was obtained from Zacchia (2016).

\(^{12}\) EconLit is the database maintained by the American Economic Association (AEA), indexing a large number of journals, working paper series, Ph.D. theses, books and book chapters in economics. Entries in EconLit are catalogued according to a standardized index of research methods and topics, denoted by alphanumeric symbols called “JEL codes”. JEL codes are frequently chosen by the publications’ authors, but they are attributed by AEA in an unknown, possibly relevant number of cases.

\(^{13}\) We calculate the \(H\) index using the software Publish or Perish on the publications in Google Scholar in the ten years before the competition. For a detailed analysis of the strengths and weaknesses of the \(h\)-index see Rousseau and Leuven (2008).
expense of books and chapters in collective volumes. Only 2% of the publications by ASN candidates are monographs and 13% are collective volume articles, significantly lower than the figures observed for competitions held before 2012. The decrease in productivity in books and book chapters is higher for women than for women, and this once more may suggest that women suffer from a higher pressure to conform to a standard that could make them more visible in terms of the bibliometrics used for research evaluation.

Finally, considering the content of publications, or rather their research topics, as mentioned we consider the JEL codes recorded for each publication in EconLit. JEL codes are a classification system introduced by the American Economic Association in March 1911; the current codes (from 1991) are composed of three sections (a letter and two digits). In our analysis we consider the first section, which is represented by a single letter, denoting 20 major sub-fields of economics.

In figure 1 we report the aggregate JEL codes of all publications authored by men and women economists in the two periods considered. As shown in the figure, a common trend for the candidates to the ASN is towards a sharp reduction of articles on the History of Economic Thought, Methodology, and Heterodox Approaches (denoted by the JEL code B). This contraction is more evident for women; in fact, women exhibit the highest variability in research preferences between pre- and post-reform competitions. The women economists who passed the national qualification for full professorship exhibit a smaller gap in research field preferences with respect to their male colleagues, with a higher production in Macroeconomics and Monetary Economics (E), Labor and Demographic Economics (J), and Economic Development and Innovation (O), at the same time reducing the number of their publications in Public Economics (H), Industrial Organization (L) and Economic History (N). The main exception to this trend is women winners’ increased interest in Financial Economics, probably driven by the recent financial crisis.

To better identify the degree of gender heterogeneity in the research fields of winning candidates to full professorship in economics before and after the university reform, we compute the Duncan segregation index. The index is defined as: $S_f = \frac{1}{2} \sum_{i=1}^{n} |m_i - f_i|$, in which $m_i$ and $f_i$ respectively represent the percentage of men women in a particular field. The Duncan index reports the proportion of women (men) who would have to swap fields with a person of the other sex in order for both sexes to be represented in each field exactly in proportion to their representation in the whole sample. Therefore, a value of 0 indicates that the distribution of men and women across fields is the same, while a value of 100% would imply that women and men are active in completely different research fields.

In our data, the Duncan index amounts to 39.7% before the reform of the university system, and 21.5% thereafter. These results clearly mark a trend: the choices of research topics by those who want to reach the top of the academic career tend to converge towards a uniform profile, and there is a tendency to homologate to the standardised, highly visible profile of the successful candidate.

4. Bibliometrics vs diversity: the determinants of success in breaking the glass ceiling before and after the reform of the university system

Analysing how the profiles of the winners of competitions for full professorship have changed before and after the university reform in Italy, descriptive statistics described in the previous section suggest a higher tendency/pressure in recent years for women to conform to a highly visible profile in terms of bibliometric indexes. In this section we aim to test this hypothesis by means of multivariate analysis, specifically inquiring whether diversity both of researchers’ identity and of research methodology and themes proved an asset or a liability in the competitions. In other words, we try to establish whether the introduction of the new recruitment system, heavily based on

---

14 As reported in Marcuzzo and Zacchia (forthcoming), the JEL codes can be fruitfully used to classify economic papers in order to provide a map of the economic discipline and of its evolving nature and trends.
We run probit regressions separately examining the determinants of the probability of successfully qualifying in a competition to full professorship held either before or after the 2010 reform. The determinants of success are assumed to be individual characteristics such as gender and age, and a set of variables that characterise the candidates’ publications in terms of quantity, type, impact and content.

As shown in table 3, we find that the determinants of success in the competitions held before the reform are often different with respect to the ASN in 2012 and 2013. From a gender perspective, we find a statistically significant difference in the probability of success for men and women in the 2012 and 2013 ASN: ceteris paribus, being a woman lowers the probability of success in full professorship competitions independently of publications and research fields. In contrast, we find that in the pre-reform competitions being a woman ceteris paribus did not significantly affect the chances of success. Our data confirm the presence of gender-based discrimination in Italy for economics, though significantly only in the most recent period, when the new rules were applied within the ASN.

In the literature, an increasing number of surveys gather information about the presence of gender bias in academia. Carr et al. (2000), in their analysis of U.S. medical school departments, find that women are more than 2.5 times more likely than men to perceive gender-based discrimination in the academic environment. Moving to the UK, Knights and Richards (2003) report that masculinity has a dominant position within academia and that femininity is actively marginalized of in all aspects of academic life, from the promotion process to the selection of panels. More recently Howe-Walsh and Turnbull (2016) have observed how, although the United Kingdom universities adopted policies to mitigate gendered practices, women respondents perceive direct and indirect discrimination mainly in the recruitment and selection process and in the lack of recognition of their professional successes, which are reported to be “left uncelebrated compared to their male colleagues” (p. 7). Further qualitative studies are necessary to interpret the determinants of the discrimination highlighted by our analysis.

Furthermore, we find a significant negative effect of age, in that younger researchers have a slightly higher probability of success than their older colleagues. In this case too, such unexplained residual hurdle only emerges in the most recent competitions, while age differences in the winners before the 2010 reform are explained by other observable characteristics of the candidates.

Concerning candidates’ publications, we considered the production rate by looking at the total number of publications in the ten years before the competition, and we separately consider what proportion of publications is composed of journal articles, books and book chapters. Finally, we study candidates’ academic production in terms of:

(i) Visibility: measured by the $H$ index on Google Scholar for each candidate in the ten years before the competition.

(ii) Co-authorship: the mean number of co-authors of each candidate’s publications.

(iii) Variety of interests: the average number of different JEL codes used to describe each candidate’s articles.

(iv) Intellectual diversity: we identify economists that research outside the mainstream, considering the cases of heterodox economists and historians of economic thought.

For the last characteristic, we use the identification of heterodox economists in Italy developed in Corsi et al. (2017), while for historians of economic thought we use the relevant JEL codes.15

---

15 We identify as historian an economist that has at least one publication described by one or more of the following JEL codes: B1 - History of Economic Thought through 1925; B2 - History of Economic Thought since 1925; B3 - History of Economic Thought: Individuals.
The results of the probit regressions show that the relevance of being the author of a book has changed drastically in the competitions: before the 2010 reform, writing books had a significantly positive effect, while it turns out to have a significantly negative effect in the 2012-2013 ASN. This is compatible with evidence for other countries and disciplines, that the introduction of bibliometric methods entails a significant bias in favour of journal articles, at the expense of books in particular. However, in the case of Italy’s ASN the sheer number of journal articles does not seem to exert a significantly positive impact on candidates’ chances of qualifying: this is most likely a consequence of the highly different weight attributed to journals in the A-list and all other journals (Corsi et al., 2017).

With the introduction of the ASN, other variables that typically correlate with higher bibliometric indexes become relevant to successfully qualify to full professorship: thus visibility, in terms of the H index, and writing with many co-authors acquire a significant positive effect after the 2010 reforms.

However, it may be even more relevant to note that with the introduction of the ASN not only the quantity and visibility of publications become relevant, but their content and method too. Thus, having a large spectrum of research interests or a heterodox approach penalised candidates to the ASN. Having some interest in the history of discipline, which played a positive role until 2010, ceased to exert any impact thereafter. Finally, the increased use of standard bibliometric indexes to measure the quality of research in the recent Italian assessments in economics is deviating from its original purpose, i.e. to ensure greater transparency in faculty selection and an efficient allocation of public resources. Research evaluation, imposing a single set of disciplinary values through the concept of “excellence” is used instrumentally to achieve academic and cultural aims and impose a univocal way of doing economics. This is affecting and will shape the future generation of academic economists in the country.

5. Conclusions and discussion

Our analysis contributes to the study of how institutional changes and the use of bibliometrics as the basis of recruitment and promotion systems can influence diversity in the composition of research teams and pluralism.

With respect to economics in Italy we find evidence of a convergence in recent years in the research interests of men and women, simultaneous to the introduction of the new national qualification system. This trend of homologation is more evident for women, and we ascertained how the determinants of success in breaking the glass ceiling in the academic economics profession are increasingly gender-biased and driven by mainstream publishing habits and research topics.

Our analysis suggests that the new recruitment system introduced by the 2010 university reform in Italy, which is heavily based on bibliometric indexes, discriminates against diversity both in terms of economists’ gender and of their research topics. We find evidence of a gender glass ceiling and, as noted by Corsi et al. (2017), a more hostile environment for pluralism. As a consequence, women suffer from a double burden in academia in Italy: gender discrimination, and a higher pressure to conform in their research activities in order to success in their careers.

With respect to the four survival strategies pursued by women economists identified by Forget (1995), i.e. “separatism” (the concentration of women’s publications on research fields where there is a comparative advantage and less male competition), “subordination” (women’s acceptance to remain in second-role positions or second-rate institutions), “super performance”, and “innovation” (in the sense of not following the traditional standards of success), it appears that women economists in Italy chose or were forced to embrace the strategy of “super-performance”. They tended to write more, on top of their already higher administrative and family duties (documented for the case of Italy by the reports on the status of women economist in Italy produced by the Italian Economic Association: Corsi, 2015; 2017). And they tended to homologate their research interests
to the same fields of their male colleagues, more visible and therefore characterized by higher bibliometric indexes.

In light of this evidence, it is important to start a debate on how to account for diversity, on the use a range of indicators that should reflect and support the plurality of research and researchers, and on how to anticipate the systemic and potential reactions of researchers to preserve diversity and pluralism in academia. As reported by James Wilsdon in the HEFCE report (2015), “metrics holds real power: they are constitutive of values, identities and livelihoods” (p. iii).

In order to foster the progressive and equitable development of economic thought, it is essential to monitor the status of women, not only in terms of their presence in the research teams but also in terms of the evolution of their contribution to the different fields of the discipline. Gender diversity in research teams and women’s more prominent involvement in research are an asset, because having both women and men researchers can provide the academic environment with different approaches and intersectional perspectives and ideas (Horizon 2020). For example in economics Davis (1997), Davis et al. (2011), Hedengren et al. (2010) for the case of the USA, and Stastny (2010) for the Czech Republic, find that women typically reach a much stronger consensus, particularly on issues of equity and fairness, both in the economics profession and in policy recommendations that call for greater governmental intervention. Albelda (1997), on the other hand, focuses on gender and on how men economists are much less interested in topics such as labour force participation, the impact of fiscal and monetary policies on women and family structures, wage discrimination, and the economic status of minority women. May et al. (2014) have also reported important and significant gender differences in the approach to policies such as minimum wages, health insurance and equal opportunities in the labour market.

Research assessments should aim to account sensibly for this heterogeneity, not drive the development of the economic discipline towards a “right kind of economics” that is generally identified with the mainstream paradigm.

REFERENCES


---


Table 1 - Gatekeepers in full professorship competitions: 2001-2008

<table>
<thead>
<tr>
<th>Competitions’ year(s)</th>
<th>No. of competitions for full-prof.</th>
<th>% of committees with at least one woman member</th>
<th>% of competitions with at least one woman winner</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>15</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>2003-2004</td>
<td>19</td>
<td>32%</td>
<td>42%</td>
</tr>
<tr>
<td>2005-2006</td>
<td>15</td>
<td>33%</td>
<td>40%</td>
</tr>
<tr>
<td>2008</td>
<td>18</td>
<td>44%</td>
<td>50%</td>
</tr>
</tbody>
</table>

We considered the competitions to full professorship in Italy in the field SECS-P01 held from 2001 to 2008; in 2007 there has not been competitions for this field.

Table 2 – Gender differences among successful candidates to full professorship, pre reform (until 2011) and post reform competitions (2012-2013)

<table>
<thead>
<tr>
<th></th>
<th>Obs</th>
<th>Success Rate</th>
<th>Age median</th>
<th>Publications median</th>
<th>H index median</th>
<th>More than one author</th>
<th>Publication Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Journal art.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Book chapter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Book</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>WP</td>
</tr>
<tr>
<td>Pre 2012</td>
<td>W</td>
<td>43</td>
<td>21%</td>
<td>43</td>
<td>9</td>
<td>6</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>134</td>
<td>24%</td>
<td>42.5</td>
<td>21</td>
<td>6</td>
<td>67%</td>
</tr>
<tr>
<td>2012-2013</td>
<td>W</td>
<td>76</td>
<td>32%</td>
<td>47</td>
<td>24.5</td>
<td>13</td>
<td>87%</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>269</td>
<td>48%</td>
<td>45</td>
<td>27</td>
<td>12</td>
<td>72%</td>
</tr>
</tbody>
</table>
Table 3 – Determinants of the probability of success of candidates to full professorship, probit estimation, pre 2012 and 2012-2013 competitions

<table>
<thead>
<tr>
<th></th>
<th>Pre-2012 competitions</th>
<th>2012 -2013 ASN rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woman</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 2 3 4 5</td>
<td>1 2 3 4 5</td>
</tr>
<tr>
<td>Woman</td>
<td>0.044 - 0.179</td>
<td>-0.256 - 0.342*</td>
</tr>
<tr>
<td></td>
<td>0.107 0.172</td>
<td>-0.342* - 0.418*</td>
</tr>
<tr>
<td></td>
<td>(0.25 (0.25 0.25 0.26</td>
<td>(0.179 (0.184 0.182 (0.196</td>
</tr>
<tr>
<td></td>
<td>1) 8 5 5 )</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>0.003 - 0.00179</td>
<td>0.0680 - 0.0483</td>
</tr>
<tr>
<td></td>
<td>0.031 0.004 0.001</td>
<td>-0.0479 - 0.0484</td>
</tr>
<tr>
<td></td>
<td>0.008 57 61 78</td>
<td>0.0388</td>
</tr>
<tr>
<td></td>
<td>(0.01 (0.01 0.01 0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58) 7) 66 58 64</td>
<td></td>
</tr>
<tr>
<td>Productivity: # journal articles (JA)</td>
<td>0.005</td>
<td>0.0006</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>(0.02 (0.018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14)</td>
<td></td>
</tr>
<tr>
<td>Productivity: # books (B)</td>
<td>0.204 0.212 0.176</td>
<td>0.120* 0.114* 0.0988</td>
</tr>
<tr>
<td></td>
<td>** *** *</td>
<td>** ** **</td>
</tr>
<tr>
<td></td>
<td>(0.08 (0.07 0.07 0.09</td>
<td>(0.0438 (0.0433 (0.0472</td>
</tr>
<tr>
<td></td>
<td>0.03) 82 32)</td>
<td></td>
</tr>
<tr>
<td>Productivity: # book chapters (BC)</td>
<td>0.045 0.035 0.042</td>
<td>0.0279 0.0232 0.0343</td>
</tr>
<tr>
<td></td>
<td>9 8* 8*</td>
<td>** ** **</td>
</tr>
<tr>
<td></td>
<td>(0.02 (0.01 0.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>90) 94 30)</td>
<td></td>
</tr>
<tr>
<td>Productivity: # publications (P)</td>
<td>0.007 0.079</td>
<td>0.0182 0.0027</td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(0.008 (0.01 0.0055</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10) 89)</td>
<td>(0.0072 (1)</td>
</tr>
<tr>
<td>Visibility: H index</td>
<td>0.033 0.030</td>
<td>0.0585 0.0662</td>
</tr>
<tr>
<td></td>
<td>3 3</td>
<td>*** ***</td>
</tr>
<tr>
<td></td>
<td>(0.027 (0.02 0.0136</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7) 80)</td>
<td>(0.0141 ()</td>
</tr>
<tr>
<td>Co-authorship: mean # co-authors</td>
<td>-0.232</td>
<td>0.406*</td>
</tr>
<tr>
<td></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.213</td>
<td>)</td>
</tr>
<tr>
<td></td>
<td>)</td>
<td></td>
</tr>
<tr>
<td>Wide interests: mean # different macro JEL codes</td>
<td>0.304</td>
<td>-1.151*</td>
</tr>
<tr>
<td></td>
<td>0.48 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.38 7)</td>
<td></td>
</tr>
<tr>
<td>Heterodox</td>
<td>0.187</td>
<td>1.001* **</td>
</tr>
<tr>
<td></td>
<td>(0.38 7)</td>
<td></td>
</tr>
<tr>
<td>Historian of economic thought</td>
<td>0.718</td>
<td>0.146</td>
</tr>
<tr>
<td></td>
<td>0.38 0.30</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.851 0.581</td>
<td>3.194* 1.754*</td>
</tr>
<tr>
<td></td>
<td>(0.68 (0.869 0.928 (0.68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.748 0.658)</td>
<td>(0.78 0)</td>
</tr>
<tr>
<td></td>
<td>(0.5) 0 3)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>177 177 177 177 177</td>
<td>345 345 345 345 345</td>
</tr>
<tr>
<td>Wald chi2</td>
<td>0.199 2.797 2.812 8.019</td>
<td>39.010 54.676 48.655 46.428 71.774</td>
</tr>
<tr>
<td>p &gt; Chi2</td>
<td>0.905 0.731 0.209 0.091 0.093</td>
<td>0.000 0.000 0.000 0.000 0.000</td>
</tr>
<tr>
<td>Correctly classified</td>
<td>0.768 0.768 0.774 0.774 0.761</td>
<td>0.646 0.704 0.684 0.670 0.754</td>
</tr>
</tbody>
</table>

Heteroskedasticity-robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1
Figure 1 – Gender differences in research fields: distribution of publications’ JEL codes, pre 2012 and 2012-2013

Pre 2012 competitions

2012 - 2013 ASNs